



Universidade de Aveiro
2022

**LILIANA
MARIA DE
ALMEIDA
FONSECA**

**O PAPEL DAS UNIVERSIDADES NAS
POLÍTICAS E PRÁTICAS DE INOVAÇÃO
REGIONAL**

**THE ROLE OF UNIVERSITIES IN
REGIONAL INNOVATION POLICIES AND
PRACTICES**



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PRACTICES**

Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Políticas Públicas, realizada sob a orientação científica do Professor Doutor Carlos José Rodrigues do Departamento de Ciências Sociais, Políticas e do Território da Universidade de Aveiro, e do Professor Doutor Joan-Lluís Capelleras do Departamento de Empresa da Faculdade de Economia e Negócio da Universidade Autònoma de Barcelona.

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Thesis submitted to the University of Aveiro for fulfilment of the necessary requirements leading to the Doctoral degree in Public Policies, carried out under the scientific supervision of Professor Doctor Carlos José Rodrigues, of the Department of Social, Political and Territorial Sciences of the University of Aveiro, and Professor Doctor Joan-Lluís Capelleras from the Department of Business of the Faculty of Economy and Business of the Autonomous University of Barcelona.

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**The Role of
Universities in
Innovation and
Regional Development**





À minha mãe e ao meu pai.
E àqueles que me apoiaram neste caminho.

À memória do meu padrinho José Alcobia.

*To my mother and my father.
And to those that supported me on this journey.*

In loving memory of my godfather José Alcobia.



Universidade de Aveiro
2022



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palavras-chave

Universidade, política regional, inovação, agência, liderança, governo regional

resumo

O discurso atual da política de inovação sublinha metodologias colaborativas para desbloquear o potencial de desenvolvimento numa região. Isto é precedido por uma tendência nas políticas públicas de integração de redes de atores cada vez mais complexas e interconectadas, com o objetivo de enfrentar "grandes desafios" e impulsionar o crescimento e o desenvolvimento económico. Como resultado, a formulação de políticas está inevitavelmente a tornar-se mais multidimensional, contando com a colaboração de um grupo diversificado de atores - instituições de ensino superior, empresas e indústria, entidades do terceiro setor, etc. - para alcançar uma agenda comum de inovação e desenvolvimento. Por sua vez, as universidades têm sido cada vez mais reconhecidas comonexo de inovação regional. São consideradas atores-chave em sistemas de inovação, incorporando conhecimento global na região, proporcionando impactos de desenvolvimento e afirmando-se como instituições primárias na regulação económica ao lado da indústria e do Estado. Estão cada vez mais voltadas para a sociedade e a região, exercendo uma missão de engajamento regional junto com as missões de ensino e investigação. Como instituições-chave na sociedade do conhecimento e da aprendizagem, as universidades têm-se destacado como pivôs nesses processos de estratégia de inovação regional, com expectativas crescentes em relação à sua colaboração regional e contribuição para a dinâmica da inovação.

Esta tese de doutoramento analisa três casos principais de universidades com envolvimento regional: a Universidade de Aveiro, Portugal; a Universidade de Twente, Holanda; e a Universidade Autónoma de Barcelona, Espanha. Por meio de uma pesquisa exploratória e indutiva sustentada pela filosofia do realismo crítico, procura compreender como as universidades interagem com o governo regional no processo de política regional de inovação. A análise de dados quantitativos e qualitativos na forma de documentos, políticas, alocações de fundos e 88 entrevistas permitiu a construção de um modelo conceptual que demonstra como as universidades podem atender melhor às necessidades regionais através de colaboração com o governo regional e o processo de política de inovação. Resultados sugerem que as universidades e o governo têm uma interação bidirecional, que tem o potencial de moldar estruturas organizacionais. Para que as universidades ativem a sua capacidade de agência, liderança e, gerem transformação regional mais ampla por meio de seu envolvimento neste processo, os mecanismos de alinhamento interno e externo e de legitimidade são identificados como facilitadores.





keywords

University, regional policy, innovation, agency, leadership, regional government

abstract

Current innovation policy discourse emphasises collaborative methodologies for unlocking development potential in a region. This is preceded by a trend in public policy in integrating an increasingly more complex and interconnected web of actors, in order to tackle 'grand challenges' and boost growth and economic development. Policymaking is inevitably becoming more multidimensional as a result, relying on the collaboration of a diverse group of actors – higher education institutions, businesses and industry, third sector entities, etc. – to reach a common innovation and development agenda.

In turn, universities have been increasingly acknowledged as nexus of regional innovation. They are considered key actors in innovation systems, embedding global knowledge in the region, providing developmental impacts, and asserting themselves as primary institutions in economic regulation alongside industry and the state. They have increasingly become more oriented towards society and the region, exerting a mission of regional engagement along with the teaching and research missions. As key institutions in the knowledge and learning society, universities have been highlighted as nexus in these regional innovation strategy processes, bearing this with increasing expectations regarding their regional engagement and contribution to innovation dynamics.

This doctoral thesis primarily analyses three main cases of regionally-engaged universities: the University of Aveiro, Portugal; the University of Twente, the Netherlands; and the Autonomous University of Barcelona, Spain. Through an explorative and inductive research underpinned by critical realism, it seeks to understand how universities engage with regional government in the regional innovation policy process. Analysis of both quantitative and qualitative data in the form of documents, policies, fund allocation and 88 interviews allowed for the construction of a conceptual model demonstrating how universities can better address regional needs in their engagement with regional government and the innovation policy process.

Findings suggest universities and government interact in a self-reinforcing interplay that has the potential to shape organisational structures. For universities to enact agency, leadership and thus broader regional change through their engagement in this process, the mechanisms of internal and external alignment, and legitimacy are identified as enabling.



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2022



Contents

Table of Figures.....	iv
List of Tables	v
List of Abbreviations	vi
Part I - Approach.....	1
1. Introduction.....	3
1.1. Research rationale.....	3
1.2. Aim and Objective.....	5
1.3. Thesis structure	7
2. Literature Review and Conceptual Framework.....	9
2.1. Knowledge, innovation, and development.....	10
2.2. Universities in (innovation) policy arenas	20
2.3. Lacunae and Conceptualisation.....	33
2.4. Summary & operationalisation of research questions	45
3. Designing a methodological approach	49
3.1. Philosophical stance	51
3.2. Methodological approaches	52
3.3. Ethics and data management	66
3.4. Summary	68
References to Chapters 1 to 3	70
Part II – Results and Discussion	85
PUBLICATION I.....	87
4. Embedding entrepreneurial regional innovation ecosystems: reflecting on the role of effectual entrepreneurial discovery processes	87
4.1. Introduction and Problem-Setting.....	88
4.2. Towards a theory of effectual entrepreneurial discovery	89
4.3. Methodology & introduction to the case-studies.....	95
4.4. Entrepreneurial discovery processes in the three regions.....	98
4.5. Effectual & causal entrepreneurial discovery repertoires.....	103
4.6. Reasoning approaches in entrepreneurial discovery processes.....	106
4.7. Embedding effectual entrepreneurial activation in smart specialization processes.....	108
4.8. References	110
PUBLICATION II.....	114
5. The Role of Universities in Building Dense Triple Helix Ecosystems in Sparse Regional Environments.....	114



5.1.	Introduction.....	115
5.2.	Literature Review.....	116
5.3.	Methodology and Case Studies	118
5.4.	The Dynamics of University Collaboration Activities in Sparse Innovation Environments	120
5.5.	Discussion	126
5.6.	Conclusion.....	131
5.7.	References	133
PUBLICATION III.....		137
6.	Designing regional development? Exploring the University of Aveiro's role in the innovation policy process.....	137
6.1.	Introduction.....	138
6.2.	Activating Innovation in LDRs: Why Universities and Institutional Collaboration Matter 140	
6.3.	Methodology	144
6.4.	Results	147
6.5.	Discussion	154
6.6.	Conclusions	157
6.7.	Acknowledgements.....	158
6.8.	References	159
PUBLICATION IV		163
7.	The Role of Universities in Regional Development Strategies: A Comparison across Actors and Policy Stages.....	163
7.1.	Introduction.....	164
7.2.	Background	165
7.3.	Methodology	170
7.4.	Key aspects of the role of universities in regional development strategies..	171
7.5.	Understanding university engagement in the regional development policy process	176
7.6.	Discussion and conclusions.....	180
7.7.	Acknowledgements.....	184
7.8.	References	185
PUBLICATION V		190
8.	Entrepreneurial Universities and Regional Innovation: Matching Smart Specialisation Strategies to Regional Needs?.....	190
8.1.	Introduction.....	191
8.2.	Background	192
8.3.	The Case of the University of Aveiro: Research and Innovation Policy and Regional Priorities	197



8.4.	Challenging Entrepreneurial Universities' Regional Impact.....	210
8.5.	From Policy Discourse to Integrated Collective Learning	213
8.6.	Further Research Directions	214
8.7.	Conclusion.....	214
8.8.	References	216
8.9.	Additional Reading.....	219
8.10.	Key Terms and Definitions	220
PUBLICATION VI		223
9.	The Organizational Adaptation of Universities to Smart Specialization: the emergence of strategic network interface units	223
9.1.	Introduction.....	224
9.2.	Literature review	225
9.3.	Methodology	230
9.4.	Findings.....	232
9.5.	Discussion	241
9.6.	Conclusion.....	245
9.7.	References	246
9.8.	Appendices.....	250
PUBLICATION VII		255
10.	Universities and Place Leadership – A question of agency and alignment	255
10.1.	Introduction	256
10.2.	Understanding practical constraints on university regional leadership	257
10.3.	Methodology & Cases	262
10.4.	University institutional architecture elements in regionally engaged HEIs	267
10.5.	Discussion.....	271
10.6.	Conclusion	273
10.7.	References.....	275
Part III - Conclusions.....		281
11.	Cross case discussion.....	283
11.1.	University engagement in the innovation policy process.....	285
11.2.	Agency and place leadership	291
11.3.	Organisational, institutional and policy change	297
11.4.	A new approach	300
12.	Conclusion, contributions, and suggestions for future research	303
12.1.	Key results	303
12.2.	Contribution to theory	306
12.3.	Implications for practice.....	309



12.4.	Future research avenues	310
12.5.	Limitations.....	312
13.	References to Chapters 11 to 12.....	314
14.	Annexes	316
	Annex I: Key concepts.....	316
	Annex II: RUNIN project	317
	Annex III: About the author	318
	Annex IV: Overview of the data, methods, and case-studies in the thesis' publications.	319



Table of Figures

Figure 1 – Depiction of focus of study on university-regional government collaboration in innovation strategy.	40
Figure 2 - University-regional government relationship in the innovation strategy process analysed through the lenses of agency, leadership and change.	44
Figure 3 - Illustration of operational research question.	46
Figure 4 - Summary of the research framework.	50
Figure 5 - Simplified illustration of the black-hole of classical strategy development. ..	92
Figure 6 - Portugal with the NUTS-II administrative divisions and the NUTS-III Aveiro region highlighted.	146
Figure 7 - Summary of the initial phase of the UA–CIRA partnership in the strategy process.	150
Figure 8 - Summary of the findings and discussion sections.	157
Figure 9 - Universities' participation in the policy process.	169
Figure 10 - Map of Portugal displaying NUTS II statistical divisions and the NUTS III Aveiro Region.	199
Figure 11 - Centro 2020 distribution of approved funding by organisation type.	202
Figure 12 - CENTRO 2020 distribution of approved projects by organisation type.	202
Figure 13 - Distribution of approved funding (€) in the Centro region by NUTS III. Source: Centro 2020 (2019).	203
Figure 14 - Centro 2020 distribution of university-led projects by institution.	204
Figure 15 - Centro 2020 distribution of university-led project funding per institution. .	204
Figure 16 - Analytical model of the process of organizational adaptation and creation of interface units.	233
Figure 17 - Details into the process of creation, management and impact of the University of Aveiro's technological platforms.	233
Figure 18 - Details into the process of creation, management and impact of the Autonomous University of Barcelona's strategic research communities.	234
Figure 19 - Alignment and agency as emerging elements. Source: Authors' own elaboration.	274
Figure 20 - Alignment dynamic in university engagement in the innovation policy process.	291
Figure 21 - Illustrating the mechanisms of internal and external alignment and legitimacy.	296
Figure 22 - Illustration of change dynamics.	300
Figure 23 - A spiral model of university enhanced engagement in the innovation policy process.	301



List of Tables¹

Table 1 - Tensions and barriers to innovation in different types of regions	14
Table 2 - University contributions to regional governance and the policy process	24
Table 3 - Tensions and barriers to universities' regional engagement in different types of regions.....	28
Table 4 - Regional contribution and drivers for engagement in different types of universities.....	30
Table 5 - Potential of university governance/policy roles in addressing tensions and barriers to innovation	32
Table 6 - Operationalisation of research questions in publications.....	48
Table 7 - Overview of case study universities (adapted from Fonseca & Nieth, 2021, Chapter 7).....	57
Table 8 – Data sources utilised for this dissertation.	61
Table 9 - Interview data collection phases in each case study.	62
Table 10 - General interview guide with examples of questions.	63
Table 11 - Overview of the number of interviews utilised in this dissertation by case study and interviewee type.....	64
Table 12 - Approximate calculation of contribution to co-authored publications in this thesis. Source: Author's own elaboration	68
Table 13 - Key distinctions between causal and effectual reasoning in entrepreneurial processes.	93
Table 14 - Stylized distinctions between causal and effectual reasoning in entrepreneurial discovery.....	95
Table 15 - Examples of the weaknesses of the AvT1 and proposed solutions for the AvT2.....	101
Table 16 - Universities in multi-partner governance processes	166
Table 17 - Interview Partners.....	171
Table 18 - Comparison of case study universities and their respective regions.....	172
Table 19 - Overview inspired by Germain-Alamartine & Moghadam-Saman (2019) of the application of the methodology developed in Gioia et al. (2013).....	232
Table 20 - University Institutional Architecture Elements in Regional Engagement /Leadership. Authors own design after (Benneworth et al., 2014b; Clark, 1998; Nedeva, 2008)	261
Table 21 - Emergence of key themes and mechanisms within empirical chapters	285
Table 22 – Potential regional contribution from primary research cases of university engagement in the innovation policy process.....	295

¹ The tables included in the literature review section of this thesis are not aimed at displaying a comprehensive review on the literature, but instead at demonstrating a summary of relevant views and authors.



List of Abbreviations

AAU	Aalborg University
ACUP	Catalan Association of Public Universities
AIDA	Aveiro District Industrial Association
AvT1	Agenda of Twente (2017 - 2014)
AvT2	Agenda for Twente (2014 -)
CCDRC	Coordination and Development Commission of Centro Region
CIE	Campus of International Excellence
CIRA	Intermunicipal Community of the Aveiro Region
CORE	Strategic Research Communities
CCVO	County Council of Vallès Occidental
CRA	Constructing Regional Advantage
CSP	Creative Science Park
DK	Denmark
EC	European Commission
ECIU	European Consortium of Innovative Universities
EDP	Entrepreneurial Discovery Process
EEG	Evolutionary Economic Geography
EIDT	Integrated Territorial Development Strategy
EMDA	East Midlands Development Agency
ERDF/FEDER	European Regional Development Fund
ES	Spain
ESF	European Social Fund
EU	European Union
EUC	Center for Education and Business
FI	Finland
FPC	Fraunhofer Project Centre
GDP	Gross Domestic Product
GF	Growth Forum
GLLEP	Greater Lincolnshire Local Enterprise Partnership
HEI	Higher Education Institution
ICT	Information Communications Technology
LDR	Less-Developed Region
LEP	Local Enterprise Partnership
LIAT	Lincoln Institute for Agri-Food Technology
LLL	Lighting Living Lab
NCFM	National Centre for Food Manufacturing
NL	The Netherlands
NSBD	Network for Sustainable Business Development
NSI	National Systems of Innovation
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
PBL	Problem-based learning
PhD	Doctor of Philosophy
PRUAB	Research Park of the Autonomous University of Barcelona
PT	Portugal
PTD	Territorial Development Programme
RCS	Regional Council of Satakunta
REVUS	Regional growth and development strategy (of North Denmark)
RIC	Network for Innovation and Competitiveness
RIS	Regional Innovation System



RIS3	Research & innovation strategies for smart specialisation
RIS3CAT	Smart specialisation strategy of Catalonia
RSP	Regional Strategic Plan
RUCI	Urban Network for Competitiveness and Innovation
RUNIN	The Role of Universities in Innovation and Regional Development
R&D	Research & Development
S3	Smart Specialisation Strategies
SEP	Strategic Economic Plan
SF	Structural Funds
SME	Small and Medium-sized Enterprise
TB	Twente Board
TTO	Technology Transfer Office
TP	Technological Platform
UA	University of Aveiro
UAB	Autonomous University of Barcelona
UATEC	University of Aveiro Technology Transfer Unit
UBI	University of Beira Interior
UC	University of Coimbra
UCN	University of Applied Sciences
UC-Pori	University Consortium of Pori
UK	United Kingdom
UoL	University of Lincoln
UPC	Polytechnic University of Catalonia
UT	University of Twente
WP4	Work Package 4





Part I – Research Framework

1. Introduction
2. Literature Review and
Conceptual Framework
3. Designing a methodological
approach





1. Introduction

1.1. Research rationale

“History has taught us that when an era, or even a certain kind of knowledge or institution, starts to search and argue about its meaning, its reason to be, or its identity, this is a sign of that era’s decline and the advent of something new”.

(Magalhães, 2001, p. 35)

Universities² have been regarded as one of the most stable institutions in society (Kerr, 2001), figuring as central pivots of knowledge, interaction and innovation throughout the centuries. However, this does not indicate that they have remained unchanged. Whether in more incremental or radical ways, universities have reinvented themselves throughout the ages, and perhaps never more so than in the last century.

Universities have been likened to ‘ivory towers’, firm, gleaming and imposing landmarks that, for it, are all the more detached and withdrawn from the ever-changing ‘real world’ around them (Etzkowitz et al., 2000; Meyer & Schachermayer-Sporn, 2018). While this image may be culturally pervasive (Shapin, 2012), it is perhaps even more fantastical today, as universities are increasingly reaching toward society, and engaging in once closed off realms to them. Over one hundred years ago, in the nineteenth century, the Humboldtian model of higher education caused a disruptive shift in the purpose or mission of German universities, and later in universities around the world. This model introduced the concept of research-based teaching, combining the two institutional university missions of knowledge dissemination (teaching) and knowledge production (research) (Etzkowitz, 1990; Rodrigues, 2008).

Given the rate at which change occurs in the current interconnected society, and likely a result of emerging New Public Management³ (Bleiklie, 1998), arguments emerged that a second revolution in the academic *ethos* had occurred more recently (e.g., Etzkowitz, 1990; Rodrigues, 2008; Zomer & Benneworth, 2011). This second revolution was evidenced in the commercialisation of research. A dialogue between university and

² The term “university” is used herein as a shorthand to refer to any higher education institution with substantive knowledge dissemination and knowledge production elements (teaching and research). See Annex I for details.

³ New Public Management refers to a model for public administration reform developed in the 1980s which employs private sector entrepreneurial management models to boost the efficiency of public services. It includes decentralised service delivery models, incentives for public workers, performance targets, and a general cost reduction. For more information on the integration of New Public Management ideals in higher education, please refer to Bleiklie (1998).



society was thus accentuated, as this commercialisation is underpinned by external expectations upon universities and internal motivations (e.g., funding attainment, applied research, societal impact) linked to the need or will to intensify connections with external actors. This outreach has been referred to as a ‘third mission’ of societal engagement, accompanying the first and second academic missions of teaching and research (Gulbrandsen & Slipersæter, 2007; Zomer & Benneworth, 2011). Universities have thus progressively assumed a more outward stance, which is generally recognised as an advantage in the stimulation of innovation and socio-economic development (Arbo & Benneworth, 2007; Uyarra, 2010).

The concept of the “knowledge-based economy”, or “knowledge society”, parallels this shift in the academic ethos. New approaches toward economic development have emphasised the importance of collective learning processes to boost innovation and competitiveness. Acknowledgement came approximately thirty years ago in the inclusion of concepts like R&D, specialisation and innovation in policy for growth discourses, resulting in innovation becoming a predominant policy goal at multiple levels (Asheim et al., 2011; McCann & Ortega-Argilés, 2015). As major knowledge institutions, universities have been called upon to contribute toward this goal, namely by exerting their generative entrepreneurial vein, as exemplified in research commercialisation (e.g., patents, spin-offs), or through a more developmental form of societal engagement (Gunasekara, 2006b). Studies have tended to focus on university-industry relationships, however, with only punctual studies on isolated instances of university engagement with the policy sphere (Pugh et al., 2016). Nevertheless, academic research on these shifts has signalled the same exercise of self-reflection as in the opening quote of this chapter: one which seeks to understand the dynamics of innovation and economic development in specific contexts, and specifically universities’ contribution to this by, for example, creating knowledge that can be useful for policymakers in stimulating innovation-based development (Nieth, 2020).

This thesis will address current premises about universities’ roles at a particular territorial level – the region⁴ – building on previous works in innovation studies that have highlighted the regional scale as a useful analytical unit to assess knowledge spillovers and learning dynamics conducive to innovation (e.g., Cooke, 1992; Etzkowitz & Leydesdorff, 2000; Florida, 1998; Gunasekara, 2006a; Morgan, 1997; Porter, 1998;

⁴ “Region” is understood herein as a territorial context where local actors perform the phenomenon in question in this study, not as a rigid administrative unit. See Annex I for more detail.



Saxenian, 1996). Indeed, given increasing global issues, the region is seen as a manageable scale to study the systemic nature of innovation and create more tailored and targeted policies (Florida, 1998). In particular, the thesis will delve on the growing expectations of universities' engagement in regional innovation policy and practice. While the last few decades have seen several studies on universities' regional engagement, there is a proclivity to neglect this aspect of the 'third academic mission', which comes with specific pressures, constraints and demands on institutions reaching a potential "mission overload" (Brennan & Teichler, 2008). Similarly, as Etzkowitz et al. (2000, p. 314) argue, the "assumption of an active role in economic development leaves existing academic missions in place, but it also encourages them to be carried out in new ways", and these configurations must be investigated. Universities may be acquiescent, eager, or reluctant in participating in the policy sphere, so further exploration of motivations, organisational capacities and prospective impact is needed to assess the roles they can effectively and efficiently play.

1.2. Aim and Objective

Current innovation policy discourse emphasises collaborative methodologies for unlocking development potential in a region. This is preceded by a trend in public policy in integrating an increasingly more complex and interconnected web of actors, in order to tackle 'grand challenges' and boost growth and economic development. Policymaking is inevitably becoming more multidimensional as a result (Uyarra, 2010), relying on the collaboration of a diverse group of actors – higher education institutions, businesses and industry, third sector entities, etc. – to reach a common innovation and development agenda (Benneworth, 2007; Lester & Sotarauta, 2007). Innovation studies have put forth conceptualisations that reflect this 'coming together' of stakeholders, exemplified in the Regional Innovation Systems approach (Cooke, 1992) and the Triple Helix Model and its n-tuple iterations (Carayannis & Campbell, 2010; Etzkowitz & Leydesdorff, 2000). In these, knowledge spillovers are enabled by actor interactivity and different types of proximity (e.g., spatial, cultural, cognitive), boosting learning and therefore regional transformation (Morgan, 1997).

It is therefore unsurprising that several regional innovation policies have attempted to operationalise these theories and methodologies, with the paradigmatic example being the current EU Cohesion Policy framework. The Barca Report (Barca, 2009) provided a deeper appreciation for context, endogenous resources and local needs through its place-based approach. Concomitantly, the Smart Specialisation framework by the expert group 'Knowledge for Growth' (Foray et al., 2009) reinforced a place-based and



collaborative approach through an entrepreneurial discovery process (EDP) where strategic growth areas would be identified and developed in a recursive manner (Foray et al., 2011). Diverse stakeholders are thus summoned to form a coalition that can contribute to the design and implementation of a regional innovation strategy, and as key knowledge actors, universities are particularly emphasised in this process (Elena-Perez et al., 2017; Vallance et al., 2017).

Nevertheless, such collaborative processes are never straightforward since actors may not be biddable. Each carries their own motivations and capacities and is dependent upon being given the opportunity to participate. Universities are no exception, and despite being deemed as almost a pivot actor in these strategy processes, each context, organisation, and stakeholder network carries its own vicissitudes. Likewise, there might be misguided expectations regarding the potential of universities' engagement with policy, stemming from the complexity of the policy process, the fragmentation of universities as polycentric organisations and the variance of knowledge application itself (Almeida & Báscolo, 2006).

The overarching research question of "*How do universities engage as institutional actors in regional innovation policy and practice?*" is posed then to address this problematic. The question will guide the literature review section (Chapter 2), highlighting the elements that can make it approachable, and then using these to operationalise it through sub-questions, helping to tackle it in more practical terms and steering the studies in the empirical chapters (4 to 10). The research makes use of a qualitative methodological approach and a single and comparative multiple case-study design based on documents and semi-structured interviews of institutional actors across three universities and their regions – the University of Aveiro (Centro, PT), the Autonomous University of Barcelona (Catalonia, ES) and the University of Twente (East Netherlands, NL). Additional cases here included are a result of collaborative academic work for joint publications within the framework of the H2020 project RUNIN – The Role of Universities in Innovation and Regional Development (see Annex II). Analysis and discussion of findings considered innovation, governance, and institutional theories to help understand and explain dynamics in organisational change, university engagement and innovation/development strategy design. Ultimately, the objective of this research project is to build upon theoretical propositions and, through the analysis of empirical evidence, construct a more comprehensive framework of universities' engagement with regional government in matters of innovation policy formulation, implementation, and evaluation.



The thesis thus provides substantial evidence on these practices, issuing policy recommendations to enable their establishment and improvement.

1.3. Thesis structure

This dissertation is organised in three main parts. Part I introduces the rationale of the research, outlining both the scope and guiding research question (Chapter 1). This is followed by a detailed presentation of the state of the art and systematic literature review on the research topic (Chapter 2), namely discussing knowledge-based regional development, innovation policy and the role of universities in these regional dynamics. This enables the development of the conceptual framework in Chapter 2.4, as well as the formulation of sub-research questions to enable the operationalisation of the research. The methodological aspects framing this dissertation and the publications herein included are then presented (Chapter 3), with details about the researcher's philosophical positioning, the research design, data collection and analysis.

The empirics of the dissertation are included in Part II and approach the different aspects of the research questions put forth. This part is based on seven single and co-authored scientific studies that have been published either as peer-reviewed scientific papers in international journals or as book chapters in peer-reviewed and edited academic books and are herein included in the form of empirical chapters (Chapter 4 to 10). Each of these publications expand on the literature that has served as a jumpstart for this dissertation, and further detail the particular methodology utilised as well as research findings that will serve as a basis for answering this study's research question. To ensure the logical outline of the thesis, these publications have been included here in a different order than that of official publication. Except for the changes in title, figure and table numbering and overall layout, these studies are displayed in their published form.

Publication 1 (Chapter 4): Nieth, L., Benneworth, P., Charles, C., **Fonseca, L.**, Rodrigues, C., Salomaa, M. & Stienstra, M. (2018) Embedding entrepreneurial regional innovation ecosystems: reflecting on the role of effectual entrepreneurial discovery processes, *European Planning Studies*, 26:11, 2147-2166, DOI: [10.1080/09654313.2018.1530144](https://doi.org/10.1080/09654313.2018.1530144)

Publication 2 (Chapter 5): Salomaa, M., **Fonseca, L.**, Nieth, L., Benneworth, P. (2020) The Role of Universities in Building Dense Triple Helix Ecosystems in Sparse Regional Environments. In Farinha, L., Santos, D., Ferreira, J., Ranga, M. (eds) *Regional Helix Ecosystems and Sustainable Growth. Studies on Entrepreneurship*,



Structural Change and Industrial Dynamics. Springer, Cham. DOI: [10.1007/978-3-030-47697-7_2](https://doi.org/10.1007/978-3-030-47697-7_2)

Publication 3 (Chapter 6): **Fonseca**, L. (2019) Designing regional development? Exploring the University of Aveiro's role in the innovation policy process, *Regional Studies, Regional Science, Taylor & Francis Journals*, vol. 6 (1), pages 186-202, January. DOI: [10.1080/21681376.2019.1584050](https://doi.org/10.1080/21681376.2019.1584050)

Publication 4 (Chapter 7): **Fonseca**, L. & Nieth, L. (2021) The Role of Universities in Regional Development Strategies: A comparison across actors and policy stages, *European Urban and Regional Studies*, pages 1-18, April, Sage Journals. DOI: [10.1177/0969776421999743](https://doi.org/10.1177/0969776421999743)

Publication 5 (Chapter 8): **Fonseca**, L. & Salomaa, M. (2020) Entrepreneurial Universities and Regional Innovation: Matching Smart Specialisation strategies to regional needs?. In Daniel, A., Teixeira, A. & Preto, M. (eds), *Examining the Role of Entrepreneurial Universities in Regional Development* (pp. 260-285). Hershey, PA: IGI Global. DOI: [10.4018/978-1-7998-0174-0.ch014](https://doi.org/10.4018/978-1-7998-0174-0.ch014)

Publication 6 (Chapter 9): **Fonseca**, L., Rodrigues, C., & Capelleras, J.-L. (2020) The Organizational Adaptation of Universities to Smart Specialization: the emergence of strategic network interface units, *European Planning Studies*, vol. 29 (8), pages 1514-1537. DOI: [10.1080/09654313.2020.1854188](https://doi.org/10.1080/09654313.2020.1854188)

Publication 7 (Chapter 10): **Fonseca**, L.; Nieth, L.; Salomaa, M. & Benneworth, P. (2021). Universities and Place Leadership – A question of agency and alignment. In Sotarauta, M. & Beer, A. (eds) *Handbook on City and Regional Leadership, Geography, Planning and Tourism 2021*, Cheltenham: Edward Elgar Publishing, pages 226-247. DOI: [10.4337/9781788979689.00023](https://doi.org/10.4337/9781788979689.00023)

An overview of each publication's research focus, methodology used, and case studies analysed is provided in Annex IV. More detail on the contribution of each of these publications toward this project's research topic will be presented in Part I of this thesis, namely in Chapter 2.4 and 3.3.1. Finally, in Part III, the cross-case discussion (Chapter 11) advances on the conceptual framework developed from theoretical propositions in the literature review. In Chapter 12 the conclusions are presented, with final reflections to answering the research questions and evaluating the contribution of this thesis to literature and practice, reviewing limitations and opportunities for future work.



2. Literature Review and Conceptual Framework

In order to provide a solid theoretical foundation for the present research project, this chapter presents a frame of reference for it. The present chapter advances a conceptual framework to understand how universities can engage in regional innovation policy arenas and in related practices. It begins by introducing the concept of knowledge-based regional development, focusing on development trajectories, place-based approaches, and inter-institutional dynamics, introducing the discussion on the role of regional institutional actors in redirecting those trajectories.

Finally, the role of universities in these regional innovation strategy processes, and in public policy and governance more generally is detailed. The bidirectional effects this engagement in regional innovation policy arenas generates are discussed, namely how universities can influence the process as well as how innovation policy can impact upon universities institutional structures and mission. In particular, the potential for universities to become key pivots in these processes is argued, without disregarding how this may be hindered by organisational challenges within these characteristically “loosely coupled” and fragmented institutions (Birnbaum, 1991; Gunasekara, 2006a). Focus is given to the manners in which universities’ institutional structures may affect their contribution to these processes and the innovation dynamics they generate.

There have been few theorisations of universities’ institutional dynamics in regional innovation policy processes. Thus, this section will enable the development of a theoretical framework that allows for a better understanding of these dynamics, their challenges, and potential impacts. It is especially important to explore universities’ engagement with regional government, as it has been so far relatively understudied. There is therefore a need to consider elements of agency, leadership, and organisational adaptation, as universities must deploy or create mechanisms to enact these (new) roles. The conceptual model constructed through this literature review highlights the underexplored areas, or *lacunae*, that this dissertation argues as key elements that shape the contribution of universities to these collective strategy processes and to regional innovation dynamics more broadly. Namely, it considers that university collaboration with regional government in the innovation policy process can contribute towards overcoming regional tensions and barriers to development and innovation. Chapter 2.4 introduces this conceptual model, allowing the operationalisation of the focus of this research and the development of the research question.



2.1. Knowledge, innovation, and development

2.1.1 Development trajectories

In order to understand how institutions like universities can contribute toward regional development strategies and a region's innovation dynamics, it was important to explore how development is currently theorised and how it can occur in reality. Literature on governance, higher education and institutionalism inspired several aspects of this doctoral research. While focused on a type of institution and its engagement with the policy sphere, the current thesis also delves into both the economic and the geographic aspects framing this relationship, namely innovation and development in a regional context. Economic geography is thus one of main the lenses utilised to explore the present problematic, since unlike traditional economic analysis, it draws from a more interdisciplinary approach using insights from social, cultural and political sciences, and understands the importance of spatial agglomeration of economic activity and context specificity for explaining different development trajectories. More specifically, this thesis is framed within the field of Evolutionary Economic Geography (EEG), which by further combining this approach with natural sciences, geography of innovation, regional science and heterodox economics, it provides a more adequate perspective to understand the increasing complexity of regional development processes, namely development capacities and regional adaptation (Boschma & Martin, 2010; Kogler, 2017).

EEG provides a dynamic change model that can explain how an economic landscape changes over historical time while simultaneously revealing the processes that influence and drive this evolution. Specifically, it attempts to shed light on how geography and the micro-behaviours of economic agents matter in determining the development trajectory of the economic system (Boschma & Martin, 2010; Kogler, 2017). As Kogler (2017, pp. 4–5) succinctly puts it, “EEG highlights the important factors that initiate, prevent or consolidate the contextual settings and relationships in which regions and their respective agents (...) change over time”. Ultimately, EEG is concerned with the place and time-specific factors and forces that drive economic change, adaptation and novelty for developmental transformation, thus dealing with historical legacies in specific geographies, and the endogenous processes and mechanisms that enable an economy's self-transformation (Boschma & Martin, 2010; Hassink, 2010). In analysing regional-specific features that shape development and renewal, this approach allows for a rich comparative approach (Gong & Hassink, 2017).



More specifically, the path dependence theory of EEG frames this thesis. This concept considers that past experiences and competencies, i.e., historical legacies, shape the configuration of entities and the overall economy in a given spatial setting. More broadly, it considers the economic landscape as “an open system that evolves in ways shaped by its past development paths” (Boschma & Martin, 2010, p. 8). The considered use of this framework allows for exploring and explaining regional growth disparities and to identify potential ‘triggers’ that allow for divergence in those development trajectories (Martin & Sunley, 2010). In this, it is important not just to analyse institutional performance, but also regional agents’ interaction, as they are all a part of a self-reinforcing configuration. Similarly, diversifying and/or building upon existing knowledge bases and competences is a necessary determinant in creating or reformatting long-term development trajectories (Tödtling & Trippl, 2013).

Concretely, path development is understood in this thesis as a term encompassing various typologies from the literature in the last decades (Hassink et al., 2019), influenced by both constraining and enabling mechanisms and intention (or lack thereof) in the spurring of change. Path development can ultimately be seen as an outcome of cumulative actions and events that involve multiple diverse actors, either endogenous or exogenous to the region (Tödtling & Trippl, 2013). This can result in three main typologies of pathways in regional innovation systems: path renewal, e.g. the revitalisation of regional industry through the regional knowledge infrastructure; path formation, i.e. the endogenous or exogenous-driven broadening of a region’s already present competences and economic base (e.g., through diversification); and path creation, consisting of a more radical shift in the development trajectory of a region resulting from the creation of new industries or changes in technological and organisational structures and processes (Tödtling & Trippl, 2013).⁵ In contrast, path inertia can occur where the lack of certain capacities or the existence of institutional rigidity may limit innovation and therefore the development of new pathways.

In the end, regional development must be considered against this backdrop of history and setting to understand what enabled certain development paths over others, and what can influence change in future pathways. This is particularly important for this study as one of its axes – regional development strategies – is an assemblage of institutional agents’ vision to (re)shape a region’s development. Understanding how development

⁵ Other typologies or terms have been discussed in the literature, such as path adaptation and transformation (Baumgartinger-Seiringer et al., 2021; MacKinnon, 2008). However, the three main types presented above provide a sufficient general understanding of the path dependence theory for the purposes of this thesis.



may present itself and has evolved in different regions is thus crucial to explain how an institutional actor's contribution – in this case a knowledge actor like universities – may shape regional development in a given setting.

2.1.2 Knowledge-based regional development

Knowledge and innovation are central concepts to the framework of evolutionary economics, with knowledge being considered as endogenous to the underlying process of economic evolution. In itself, knowledge is dynamic, constantly being created, adapted and transformed, and thus enabling economic growth to evolve accordingly (Boschma & Martin, 2010). As mentioned above, the introduction of new knowledge in a regional economy may alter its development trajectory.

The concept of the knowledge-based economy is a central one to this thesis as it emphasises the role of knowledge in innovation dynamics and, especially, the heightened role of institutions that deal with knowledge production and distribution – like universities – in this dynamic. Despite the concept's abstract and buzzword character (Smith, 2002), it has served to draw policymakers' attention to science and technology issues and their role in the economy (Godin, 2006). The concept emerged in the mid-1990s, based on the work of Foray and Lundvall (David & Foray, 1995; Foray & Lundvall, 1996; Lundvall, 1992), and with the OECD as its main promoter (Godin, 2006). Nevertheless, intangible investment in knowledge transmission and accumulation had already been acknowledged by the World Bank earlier that decade as a decisive element for development, broadening the scope beyond physical capital investment (Freeman, 2002; World Bank, 1991). Knowledge thus became recognised as “the most fundamental resource in the modern economy” (Lundvall, 1992, p. 1), and thus a critical component of economic growth and innovation.

The importance of knowledge was emphasised by Lundvall in his theorisation of National Systems of Innovation (NSI) (Lundvall, 1992). This concept not only integrated institutions into economic theories and models, but it also highlighted the importance of interactivity among actors for the innovation process, therefore attributing it a systemic view. In its definition, the NSI “is constituted by elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge” (Lundvall, 1992, p. 2), and thus also enabling learning to occur. Foray criticised the emphasis on national institutions and economic growth and turned the focus toward the distribution of and access to knowledge, considering it as a “sine qua non condition for increasing the amount of innovative opportunities” (David & Foray, 1995, p. 40).



Learning and the learning economy are concepts inextricably tied to that of knowledge in the knowledge-based society, but that take it beyond the simple stock of information (Lundvall & Archibugi, 2002). As Maskell & Malmberg (1999) denote, the capacity of firms and institutions to learn and adapt their processes and structures to changing and emerging pressures is an important factor in achieving economic growth. Learning results from the production and introduction of new knowledge through some form of interaction, and it is through this capability to learn that the knowledge base in an economy can be expanded and thus lead to innovation. Overall, it is a dynamic concept that considers actors and institutional interaction, and a more experiential knowledge production and dissemination. This interactive learning perspective considers more than codified knowledge – or know-what, e.g., data. It emphasises hybrid knowledge, namely tacit knowledge – know-how (skills), know-who (networking) and know-why (experience) – which is dependent on interpersonal relationships, trust and cooperation, and is often localised (Goddard & Chatterton, 1999).

Indeed, the knowledge and learning economy has been linked to the regional scale, as this geographical proximity is argued to enable regular, repeated contact that can facilitate tacit knowledge flow between institutional actors (Florida, 1998; Pinheiro et al., 2012), as exhibited in cluster research (Pino & Ortega, 2018). Interest in the regional scale is also linked to the recognition that regions differ in their industrial pattern and innovation performance, and that knowledge spillovers are spatially bounded (Tödting & Trippel, 2005). The very evolution of the concept of the National Systems of Innovation to the Regional Systems of Innovation (RIS) accompanied EU-wide regionalisation trends that demanded differentiated investment and innovation approaches in geographical spaces larger than cities, but smaller than nations (Cooke et al., 1997). While both perspectives argue that knowledge is local and implicit, organisations (such as firms) are more easily embedded and linked to regional innovation conditions (Pino & Ortega, 2018). Ultimately, the region is argued as a more manageable scale to study the systemic nature of innovation, and the so-called “learning region” has been referred to as a mechanism that can link regions to the global economy (Florida, 1998). The concept also contains an institutional or associative perspective of collaboration and learning between regional partners (Rutten et al., 2003).

Differentiated regional innovation and development approaches are thus needed for tackling innovation problems and learning barriers, since these materialise in diverse combinations depending on the historical legacies of each region. As previously mentioned regarding EEG and its path dependency theory, the experiences or legacy of



a region greatly influence its current social, political, economic and institutional context, and therefore the future development pathways available (Grillitsch & Trippl, 2016). Not all regions can access, produce, or potentiate the knowledge and learning capacity required for the creation of new and successful development pathways.

Studies have shown that the nature of innovation activities varies in regions and countries with different levels of income (Aghion et al., 2013; Radosevic, 2018). Moreover, various types of development or transformational failures have been identified as being more abundant in certain types of regions. These refer to, for example, R&D and innovation activities and productivity, interaction between economic and institutional agents, and the capability to promote institutional learning (Malecki, 2007; Radosevic, 2018; Trippl et al., 2014). This follows Schumpeter's (Aghion et al., 2013) growth theory which argues that drivers of growth (e.g., R&D) will play out differently in economies with different levels of development. For instance, certain middle-income economies may grow sufficiently by imitating the activities and technologies of high-income economies, but a shift to a high-income group would require taking the frontline in technological activities (Radosevic, 2018; Tsipouri, 2018).

Different types of regions will thus demonstrate different shortcomings and advantages that will affect their potential/capacity for innovation and learning. Namely, less developed regions have a higher probability of displaying market, system and capability failures (Radosevic, 2018; Tsipouri, 2018) and along with peripheral regions they tend to lack, for example, absorption capacity, and sufficient and/or efficient research and development activities (Bonaccorsi, 2016; Tödting & Trippl, 2005). On the other hand, old industrial regions may risk having a narrow orientation toward specific and dominant industries and trajectories, and metropolitan regions are often considered innovation hubs building on spatial proximity, but are argued to have fragmented and weak innovation networks and lack complementary knowledge bases (Tödting & Trippl, 2005). Table 1 provides an overview of the main innovation tensions and learning barriers identified in the literature for different categories of regions.

Table 1 - Tensions and barriers to innovation in different types of regions

Region type	Tensions and barriers to innovation	Authors
Metropolitan and more developed regions	- Lack of a specialised industrial pattern including complementary knowledge bases for learning and innovation networks (fragmentation);	Tödting & Trippl, 2005



	<ul style="list-style-type: none">- Many industries/services but high profile and knowledge-based clusters often missing;- Many and high quality, but often weak industry links.	
Old “industrial” regions	<ul style="list-style-type: none">- Risks of ‘lock-in’ as existing strong networks, organisations and knowledge-providers are narrowly oriented to old/traditional industries and technological trajectories;- Many and specialised transfer organisations, but weakly coordinated.	Tödtling & Trippl, 2005; Benneworth & Hospers, 2007; Coenen et al., 2015
Peripheral and less developed regions⁶	<ul style="list-style-type: none">- Low level of R&D and innovation due to a dominance of SMEs in traditional industries;- Weakly developed firm clusters and industrial infrastructure;- Few knowledge providers and innovation support institutions;- Insufficient and/or inefficient locally based R&D activities;- Lack of highly skilled workers and entrepreneurship;- Lack of absorptive capacity for R&D by local firms, i.e., mismatch between supply and demand for innovation;- Weak or fragmented entrepreneurial ecosystem, with a lack of interaction between economic and institutional agents (organisational thinness);- Lack of resources in local government.	Tödtling & Trippl, 2005; Bonaccorsi, 2016; Krammer, 2017; Huggins & Johnston, 2009; Rodríguez-Pose et al., 2014

Source: Author's own elaboration.

⁶ Development or innovation barriers or peripheral and less developed regions are often conflated in the literature. These are set in a dichotomy versus the more developed or “core” regions – central in an economy, with good communications, high population density, capital, authority, and knowledge potential. See more on the core-periphery model as well as the polarised system of regional development in Szajnowska-Wysocka (2009).



2.1.3 Contemporary approaches to regional innovation and economic development: place-based policy and collaborative methodologies

In an attempt to bridge development gaps across EU regions, the concepts of knowledge economy, learning and innovation have been introduced to regional policy in the last decades. This followed a general recognition of the significance of knowledge capital in economic development theories, as well as of the general potential of both knowledge and innovation in significantly shaping a region's development pathways. Concomitantly, the need to abandon 'one-size fits all' policies and provide a differentiated approach to regional development was highlighted in economic geography (Tödting & Tripl, 2005). Policy concepts incorporating these notions have thus emerged, increasingly more aware of problematic past generalisations based on "best practice models" derived from high-tech areas and well performing regions (Tödting & Tripl, 2005). These policy concepts and experiments went beyond the traditional repertoires of inward investment and physical infrastructure provision to promote learning and draw from the expertise of regional networks of public, private and intermediate organisations (Henderson, 2000).

The regional innovation systems model is an academic concept that frames this differentiated and interactive approach and has inspired EU innovation policy. It is an approach that identifies and develops regional typologies based on their structural characteristics, knowledge and innovation capacities and policy challenges (Asheim et al., 2016; Grillitsch & Asheim, 2018). Similarly rooted are policy concepts like the place-based approach, Constructing Regional Advantage (CRA), and Smart Specialisation. All these concepts demonstrate the increased interest by policymakers in the potentiation of a region's development and competitiveness through the activation of agency and interaction between regional institutional actors and the identification and promotion of unique regional economic pathways. They form a 'new' approach to (industrial) innovation policies, characterised by no single agent having a complete overview of the economy, and an endogenous policy process designed to lead the self-discovery of new pathways and specialisations by regional agents (Grillitsch & Asheim, 2018; Radosevic, 2017) and thus preventing institutional rigidity (Rodríguez-Pose, 2013) and potential lock-in, i.e. a continuity of structures instead of transformation. These policy concepts will be discussed in the following sub-sections.

2.1.3.1 Place-based approach

The place-based approach is a counterpoint to what have been designated as 'place-neutral' policies, i.e. policies or strategies that disregard space in favour of more general, umbrella-type interventions. Often these strategies would consider sectoral interventions



and disregard the territorial dimension. Decision-making would be mainly in the form of top-down directives, with a tendency to reinforce in the strategy the dependency upon financial support and subsidies. These policies would also often follow a standard based on more developed or successful contexts, generating very different spatial effects in a diverse set of regions, each with their own specific development needs (Barca et al., 2012).

On the other hand, the place-based concept introduced a differentiated approach to regional policy. This started being introduced in the early 90s (Bolton, 1992), but the argument was consolidated in the late 2000s with the Barca report (Barca, 2009) on *An Agenda for a Reformed Cohesion Policy*. The report argued that place-based or place-sensitive policies are the ideal interventions to bridge regional development gaps in Europe and tackle “persistent underutilisation of potential” (Barca, 2009, p. 7). Two central aspects to this approach are promoted: (1) the importance of geographical context, understood here as social, cultural, and institutional characteristics; (2) knowledge and inter-institutional interaction as key factors in policy intervention to tackle underdevelopment traps, or path inertia. Place-based approaches insert themselves within an institutional framework, thus considering that the specific institutional arrangements of a given context enable the embedding of economic activity (Barca et al., 2012). Place-based entrepreneurship and innovation policies are also argued to drive “positive structural changes” by promoting diversification pathways in a region’s economic activity, and thus future competitiveness (Grillitsch & Asheim, 2018).

2.1.3.2 Constructing Regional Advantage

CRA emerged in the wake of this need for more place-based and differentiated regional innovation policies, building on the Regional Innovation Systems and learning regions (Asheim et al., 2020). It has influenced current industrial and innovation policy thinking by promoting public-private partnership, knowledge transfer, endogenous and bottom-up approaches.

An Expert Group within the Directorate-General for Research and Innovation was launched in 2004 and tasked with developing a strategy that considered more fully the heterogeneous economic and innovation landscape of regions in Europe – this strategy was published in 2006 and called ‘Constructing Regional Advantage’ (Cooke et al., 2006). The proposed approach centred on promoting competitive regional advantage by creating unique products and services and/or creatively applying existing knowledge and regional capabilities in new ways. For new path development under CRA, regions should



first base their competitive strategy on traditionally successful industries, and then on a strategy of 'related variety', combining complementary knowledge bases for new applications (Asheim et al., 2011, 2020). A certain deliberate *construction* would therefore be envisaged in this perspective depending on the needs of different contexts.

Specifically, the CRA model understands the increasing complexity of knowledge transfers and learning, as these are becoming more diverse – with a larger variety of knowledge sources available – and interdependent – with more organisations at play and engaging in collaboration, forming a dynamic interplay (Asheim et al., 2011). It posits that learning between different industries or sectors is more likely to happen (successfully) when these are *related*, i.e. when they have complementarities or technological similarities. A certain degree of cognitive proximity is required to ensure effective communication between actors. However, there should not be too much proximity for an overlap of competences and to generate possible lock-in – a certain *variety* in knowledge bases must be present, allowing for the expansion and renewal of the regional knowledge bases (Asheim et al., 2011).

The CRA proposes the careful consideration of endogenous knowledge resources for the construction of a differentiated and tailored localised policy platform and competitive advantage based on each region's unique regional pathways. However, the model also highlights the need for interaction with external expert and specific knowledge to assist in the management of knowledge spillovers and potential lock-ins. It thus leaves room for learning from other cases, while seeking to prevent the simple imitation of solutions from one region to another (Asheim et al., 2011).

2.1.3.3 Smart Specialisation

Following the trend of spatially sensitive, endogenous-based, discursive and learning-oriented approaches to regional policy, in which institutional actors define development problems and solutions interactively, the Smart Specialisation framework emerged. This approach was introduced to the EU by the 'Knowledge for Growth' advisory group (Foray et al., 2009), later being integrated into the 2014-2020 Cohesion Policy Framework and continuing to the 2021-2027 period. The concept of Smart Specialisation is characterised by a tailored and place-based approach. It proposes both national and regional policy interventions and investments in strategic areas to potentiate competitiveness (Foray et al., 2009), arguably revolutionising innovation policy (Capello & Kroll, 2016; Hassink & Gong, 2019) in the introduction of four key elements: (1) investment and interconnection in related but varied domains (related variety) (Richardson et al., 2014); (2) focus on existing or potential areas of regional uniqueness and strength for strategic investment;



(3) bottom-up collaborative entrepreneurial discovery process (EDP) between diverse stakeholders (e.g. government authorities, knowledge institutions, businesses, third sector organisations) (Foray et al., 2011); (4) emphasis on universities' regional economic governance role (Elena-Perez et al., 2017; Goddard et al., 2013). Additionally, its inclusion in Cohesion policy meant regions were required to design regional smart specialisation strategies, or Research and Innovation Smart Specialisation Strategies (RIS3) as a condition to access structural funds, meaning the framework was applied all over Europe, thus facilitating comparative analysis. The policy framework of smart specialisation has thus provided an EU-wide platform for the promotion and implementation of a broad-based innovation policy – a first in the history of the EU (Asheim et al., 2011; Cooke, 2012; European Commission, 2014; Grillitsch & Asheim, 2018).

There are two particularly relevant aspects for this thesis regarding the Smart Specialisation framework. First, in the promotion of EDPs, the concept emphasised inter-institutional collaboration as a fertile ground for the promotion of regional development. Economic agents are propelled to the foreground in this approach, with policymakers taking more of a mediating backseat (Foray et al., 2011). Namely, regional stakeholders, imbued with specific knowledge and expertise, are appointed to identify potential research and innovation domains for their region's development. This involves not just recognising opportunities, but also obstacles for development (Boschma, 2013). Designating this as a process serves to highlight the recursive aspect of these strategies, meant to continuously be adapted in consideration of new developments, discoveries, and results. Therefore, an emphasis is placed upon monitoring to enable adaptation as challenges and opportunities emerge, and on entrepreneurs as 'path finders', in accordance with EEG principles.

Second, its emphasis on the role of universities in the process underlines the centrality of the concepts of knowledge and innovation, as well as the potential of these institutions to enhance not only their regional innovation contribution, but their very engagement in the strategy process and policy arena. Indeed, universities are encouraged to play different roles in RIS3, being recognised as regional stakeholders especially capable to: (1) identify and develop regional knowledge assets and priority domains; (2) contribute to institutional capacity-building, network access and associative governance; (3) guide and broker strategy processes and (4) match diverse regional assets (e.g. research and industrial) to boost development (Elena-Perez et al., 2017; European Commission, 2014; Foray et al., 2012; Vallance et al., 2017). While RIS3 processes are meant to be guided



and framed by regional government authorities, with them providing the arena and supporting instruments⁷ to implement the strategy, the emphasis on universities' roles and capacities recognises their unique capabilities in a knowledge-based or learning economy, in particular in managing the knowledge base and regional network. However, it also places an additional burden of expectation on their engagement with the policy sphere and overall regional development.

The Smart Specialisation approach has thus been argued to promote innovation in diverse regional contexts by introducing a “clear policy-prioritisation logic” (McCann & Ortega-Argilés, 2015, p. 1292), an alluring quality that has earned it a quick adoption in policy circles (Foray, 2016; Foray et al., 2011). It has nevertheless remained a fuzzy concept in its policy integration and implementation (Hassink & Gong, 2019), namely in lagging and peripheral regions with little absorptive capacity and supportive institutional structures (Boschma, 2015; Capello & Kroll, 2016; Pugh, 2017). There are also arguments that highlight not just the more definite and linear character of the strategies' design, by domains being pre-identified and the recursive, adaptive and open-ended elements of the process being ignored (Crespo et al., 2017). Additionally, when considering the heightened role of certain actors in the EDP (like entrepreneurs and universities), there is a potential that this may lead to a monopolisation of the strategy process, and even to regional path inertia or lock-in in the support of older, and perhaps declining, sectors (Hassink & Gong, 2019; Sotarauta, 2018).

2.2. Universities in (innovation) policy arenas

2.2.1 Universities' contribution to regional development and innovation

As mentioned in previous sections, the knowledge and learning economy are concepts that have become central to regional innovation and development theories. Consequently, as scientific knowledge suppliers, the role of universities has been emphasised (Benneworth et al., 2010), with increasing expectations regarding their regional engagement and contribution to innovation dynamics. When linking universities to learning regions, regional engagement is an opportunity to exchange and apply knowledge (Morgan, 1997), thus symbiotically helping to make both the regional economy and the university more competitive (Goddard & Chatterton, 1999). When considering the uneven development levels of regions, and the role universities have played in potentiating the knowledge assets of the most well-performing places (e.g.,

⁷ Further details related to the Smart Specialisation framework and the policy instruments therein can be reviewed in the Smart Specialisation Platform website (European Commission, 2020).



Silicon Valley, US and Cambridge, UK), it is unsurprising they figure as prominent institutions in the analysis of economic success and regional development trajectories (Pinheiro et al., 2012).

Universities have been increasingly acknowledged as nexus of regional innovation. They are considered key actors in innovation systems (Jiao et al., 2016), embedding global knowledge in the region (Rutten et al., 2003), providing developmental impacts and asserting themselves as primary institutions in economic regulation alongside industry and the state (Gunasekara, 2006a). Increased interest in universities' regional roles has led to multiple studies focused on different facets of their contribution. The regional roles of universities have materialised in concepts like RIS (Cooke et al., 1997; Lundvall, 1992), the Triple Helix model of industry, government and university (Etzkowitz & Leydesdorff, 2000) and, inclusively, in university institutional models like the entrepreneurial and engaged university (Etzkowitz et al., 2000; Uyarra, 2010) (see sub-sections 2.2.4 and 2.3.1 for more information on these). These hypothesise the benefits of universities in stimulating knowledge flows in interaction with other public and private actors (Aranguren et al., 2012). Universities have been valued as 'economic entities' in the region in their roles as enhancers of human capital, producers of (commodified) knowledge, and developers of entrepreneurship – therefore a more supply-side analytical focus (Audretsch, 2014; Boucher et al., 2003; Guerrero & Urbano, 2012; Kempton et al., 2021; Thanki, 1999). These roles have been documented to generate long-term effects in terms of average incomes, regional GDP per capita and new firm creation (Bonander et al., 2016; Budyldina, 2018), with university-based spin-offs having a more positive economic impact (Vincett, 2010). But universities' contribution can also impact on more demand-side dimensions and socio-cultural factors, namely by helping develop the associative, innovative, and strategic capacities of other regional institutional actors through their network involvement (Aranguren & Magro, 2020; Arbo & Benneworth, 2007; Boucher et al., 2003; Elena-Perez et al., 2017; Goddard et al., 2013; Gunasekara, 2006b; Kempton et al., 2021; Pugh et al., 2016). With multiple instances proving the value of universities' engagement in regional innovation dynamics, the 'third academic mission' of engagement has even been argued as a regional responsibility of universities, building on the more traditional missions of teaching and research (Charles & Benneworth, 2001).

This academic interest in universities' regional engagement was, therefore, accompanied by firms' and government authorities' acknowledgement of the potential of HEIs and scientific knowledge for innovation, economic growth and social development (Arbo & Benneworth, 2007; Karlsen, 2007; Uyarra, 2010). With the New Public



Management model reinforcing, in parallel, the social accountability of institutions benefitting from public funds, this led to a strong policy push for the promotion of universities' societal and regional mission, thus increasing demands of their contributions (Karlsen, 2007; Rutten et al., 2003). The creation and management of strategic dialogue between universities and their regions is argued to provide wider and mutual socio-economic benefits for the university, the territory and the other stakeholders therein (Pinheiro et al., 2012). While traditional perspectives were focused on a more direct, knowledge transfer from universities to society through teaching and research activities, namely in university-industry collaboration, the broadening of the analysis on universities' regional engagement has demonstrated their potentially beneficial roles in other activities and collaborative configurations (Pugh et al., 2016).

2.2.2 Universities' engagement with regional government: innovation and development policy and strategies

Universities' collaboration with firms and industry has been a matter of extensive study throughout the years, partly explainable because this collaboration is a primary source of funding for higher education institutions. Contract research, research commercialisation, patents, spin-offs, among others, have supported universities' existence and figure as measurable indicators for research excellence and university competitiveness on an increasingly global stage (D'Este & Perkmann, 2011; Perkmann et al., 2013). However, academic engagement is broader than university-industry collaboration. Given their relevance in regional innovation dynamics, universities engage with a panoply of actors at multiple levels, with a prominent one being the state in the form of regional government (Gunasekara, 2006a). The university-state interaction in a broader sense, and the university-regional government in a narrower sense, thus require more academic exploration.

While under-researched, universities engagement with the state – and more specifically for this thesis with regional government authorities and the innovation policy process – is not new. More generally, terms such as 'rational decision-making', 'evidence-based policy' and 'strategic research' express this need for scientific knowledge in the policy arena (Almeida & Báscolo, 2006). Demonstrably, they highlight the need for an awareness of social reality to increase the effectiveness of the policy process. In what concerns the topic of this research, from an historic and growth perspective, attempts to bridge regional economic gaps through industrial and innovation policy have demanded a more comprehensive understanding of the regional context and an informed policy process (Arbo & Benneworth, 2007). As such, universities are considered uniquely



capable to provide this scientific and expert knowledge to policymakers to enhance competitiveness, trumping over experiential and lay knowledge. Academic concepts have often shaped innovation policy discourse and been converted into 'buzzwords' (Godin, 2006), as exemplified in the case of regional innovation systems and smart specialisation (Foray et al., 2011).

Nonetheless, university contribution to public policy and regional development and innovation policymaking goes beyond academic concepts. Universities' contribution to regional governance has been explored by Charles & Benneworth (2001), with them identifying four key areas of university involvement: (a) representation of interests in, for example, planning and land use practices; (b) governance support services like consultancy and governance network management; (c) entrepreneurial activities; (d) engagement by university staff in civic communities and other networks. The panoply of university contributions to governance has been further explored in a comparative case study on universities' regional developmental roles, in which Gunasekara (2006c) argued how these institutions were promoting associative governance, i.e. a decentralization of decision-making by incentivising a networked and collaborative approach based on mutual trust. Pugh et al. (2016) have also demonstrated how a UK university was engaging in regional economic governance, acting as an intermediary between different levels of government and providing support beyond the contracted terms. These are therefore more active, though often indirect, societal roles undertaken by universities in parallel to the more technology transfer type of activities, and frequently categorised under developmental roles (Gunasekara, 2006b) and the engaged and civic university models (Uyarra, 2010).

Therefore, beyond knowledge provision, universities have the potential to act as mediators and 'animateurs' of regional governance networks (Pugh et al., 2016). They do so by acting as so-called 'honest brokers' (Gunasekara, 2006c) in collaborative initiatives – like strategy processes – and by providing support to regional stakeholders and developing regional institutional capacity (Rodrigues et al., 2001). The emphasis of universities in smart specialisation strategy processes points toward this argued potential. A region's competitiveness and steering capacity to transform their economic pathways thus have the potential to improve with universities' contributions and participation in the governance of regional development and innovation (Goldstein & Glaser, 2012). Table 2 shows some of the argued university contributions to regional governance and policymaking.



Table 2 - University contributions to regional governance and the policy process

Universities' governance/policy roles	Authors
Provoker of reflection, interactive learning and regional problem-solving	Pugh et al., 2016; Goldstein & Glaser, 2012; Rodrigues & Teles, 2017
Identify needs/gaps and provide information and analysis to support decision-making	Gunasekara, 2006; Arbo & Benneworth, 2007; Goddard et al., 2013; Aranguren et al., 2012; Vallance et al., 2017; Kempton et al., 2021; Rodrigues & Teles, 2017; Breznitz & Feldman, 2012
Network enabler at/between multiple geographical levels and honest broker/neutral intermediary in networking	Benneworth & Hospers, 2007; Bonaccorsi, 2016; Goddard et al., 2013; Gunasekara, 2006; Pugh et al., 2016; Vallance et al., 2017; Thanki, 1999; Rodrigues & Teles, 2017
Multi-level external representation in decision-making and advisory bodies	Goldstein & Glaser, 2012; Vallance et al., 2017; Rodrigues & Teles, 2017
Contribute to regional institutional capacity building	Gunasekara, 2006; Goddard et al., 2013; Vallance et al., 2017
Assisting in designing, delivering, and managing economic development programmes	Pugh et al., 2016; Vallance et al., 2017; Rodrigues & Melo, 2013; Rodrigues & Teles, 2017
Fund holding, distribution, monitoring and evaluation.	Pugh et al., 2016; Aranguren et al., 2012; Rodrigues & Teles, 2017
Participation and (co)leadership in regional governance and strategy processes	Gunasekara, 2016; Bonaccorsi, 2016; Arbo & Benneworth, 2007; Goddard et al., 2013; Goldstein & Glaser, 2012; Marques et al., 2019; Raagmaa & Keerberg, 2017; Vallance et al., 2017; Boucher et al., 2003; Kempton et al., 2021; Rodrigues & Melo, 2013

Source: Author's own elaboration.

2.2.3 Engagement challenges related to the policy sphere and collective strategy processes

From an EEG perspective, universities are an institutional actor with the potential to shape the region's development trajectory (Benneworth, Young, et al., 2017). Namely, alterations in development paths are associated with changes in the knowledge



infrastructure, making universities key players (Tödting & Tripl, 2013). Their insertion in regional strategy networks and processes propitiates the creation of new development pathways, especially when they play an active role in the enactment of the regional vision. However, while universities are increasingly expected to engage in regional development strategy processes and innovation policy design, certain aspects to this engagement need to be considered, namely related to network management and the policy sphere.

First, while cooperation between multiple regional institutional actors for the creation of a single regional vision is desirable, it is not easily achieved. Each actor is driven by specific interests and strategic goals that might not be aligned with other regional agents, and even aligned with their own institution (Benneworth & Pinheiro, 2017). As fragmented polycentric institutions, university representatives may particularly struggle to voice a variety of interests. Similarly, universities may also focus on research areas in which they are already strong in, disregarding potential growth areas that could be of interest for future economic related diversification. Inter-institutional conflicts may emerge in these collective processes (Capello & Kroll, 2016; Sotarauta, 2018).

Second, it is important to note that policy environments, and especially those dealing directly with markets and the economy, are inherently characterised by concentrations of power (Aranguren et al., 2012). Democratic and representative mechanisms in themselves are flawed, unable to accurately depict the whole range and diversity of interests in society (Aranguren et al., 2012). This is especially the case in regional development strategies, where participants are directly invited by regional government authorities, depending thus on the awareness of them and of their capacity to provide expert knowledge on existing domains of potential future trends. This could possibly result in the omission of relevant, but small, stakeholders from the process. There are, therefore, dangers of policy capture or monopolisation of these strategies by powerful and/or typical actors – such as large businesses and even universities – which may lead to biased priority identification, hinder implementation, and result in path inertia or lock-ins (Hassink & Gong, 2019; Sotarauta, 2018). Accordingly, several authors have emphasised the need for more agency and promotion of collective leadership in these processes, as well as an analysis centred on the micro-processes of regional development and institutional economic geography (Asheim et al., 2017; Uyarra et al., 2017).

Third, policy environments are heterogeneous, which suggests the context of interaction is crucial to analyse collaboration and tensions. Namely, this includes the policy level at which interaction occurs (local, regional, national), the policy area (e.g., macro or



microeconomic, entrepreneurship, social, cultural), although these may be interrelated (Aranguren et al., 2012), and the policy stage (formulation, implementation, evaluation). Furthermore, in what concerns university-regional government engagement, it is important to consider the history and tradition that has established that relationship in that policy environment. Institutional characteristics play a role here, as well as personal or professional networks between individuals. As pointed out by Aranguren et al. (2012), case analysis presents itself as a pertinent methodology to explore these types of issues.

2.2.4 Limitations to university contributions

2.2.4.1 *Contextual, policy and institutional factors*

Despite heightened expectations, the presence of a university does not necessarily guarantee regional economic growth and innovation (Serra et al., 2018). Universities' regional engagement and overall contribution to regional development and economic growth are heterogeneous and non-linear, highly variable across different contexts and institutional structures. According to Pinheiro et al. (2012), interactions between higher education institutions and their regions are greatly dependent upon institutional characteristics, but also on their performance and relationship with their surroundings, which have generally been shaped by regional and institutional historical legacies.

This argument is echoed and further explored in the research of Boucher et al. (2003) and Kempton et al. (2021), who suggest multiple and different links can form between a higher education institution and its region depending on several factors: the age and size of the higher education institution, the configuration of the higher education system in the region (i.e., whether it only has one university or multiple), the regional context (more or less developed), the higher education policy context (nationally or regionally determined) and the governance context (centralised or devolved). For example, sole universities in peripheral and/or less-developed regions tend to have a stronger regional orientation, establishing a regional engagement mission centrally in their organisation, and consequently leading to it being portrayed as a critical regional actor (Boucher et al., 2003; Kempton et al., 2021). Boucher et al. (2003) provide the example of the University of Twente here, where the university plays a central role in innovative activities (a case study explored in the empirical chapters 4, 5, 7 and 10 of this thesis). On the other hand, while young universities (less than 100 years) tend to highlight their regional orientation, international engagement tends to be prioritised in older (over 100 years), more traditional universities, with regional engagement in these being left to the disposition of individual staff members (Kempton et al., 2021).



Thus, the regional context greatly impacts universities' regional engagement, with some regions presenting challenges to this (e.g., the lack of absorptive capacity for R&D by local firms as seen in Table 1 above) or shaping universities' engagement opportunities. While some regions may seek to stimulate strategies based on universities' research and innovation potential for new path creation, others focus on HEI contributions that can enable the broadening of existing economic bases for path formation or adaptation (Kempton et al., 2021). Similarly, the role a university chooses for itself – as well as the agency of its staff – inevitably determine the success of its regional engagement strategies (Bercovitz & Feldman, 2007; D'Este & Perkmann, 2011; Kempton et al., 2021). Depending on the university organisational structure, certain faculties may also be more oriented towards regional engagement than others (Bonaccorsi, 2016), prioritising different sets of actors.

2.2.4.2 Institutional capacity for regional engagement

With regional engagement being argued as a responsibility of universities and an essential institutional mission (Charles & Benneworth, 2001), there are tendencies to downplay the strain this can have on university overall functioning. Mutual benefits can be produced by regional interactions, and expectations by regional actors and policy inevitably shape the university as an institution, which can generate tensions (Pinheiro et al., 2012). Several authors (Breznitz & Feldman, 2012; Huggins et al., 2008; Wright et al., 2008) have argued that the increasing addition of new roles and tasks for universities, especially regarding regional development, may create so-called “mission overload” (Brennan & Teichler, 2008), or “mission stretch” (Scott, 2007), and accentuate dichotomies in universities' institutional ethos. These include a tension between maintaining relevance and competitiveness on a global stage by meeting international academic excellence standards, and “remaining locally rooted” by responding to regional needs and demands (Benneworth et al., 2017; Pinheiro et al., 2012, p. 13). Territoriality is an ambivalent concept for institutions such as universities, which are generally autonomous and far-looking and thus often characterised by low levels of local embeddedness (Chatterton & Goddard, 2003). This is exemplified in Bonaccorsi's (2016) study on research excellence in peripheral regions, which shows a mismatch between regional needs and university research strengths and focus. University resources may not be complimentary to the region, failing to build upon regional assets, and the reverse may also be the case with the region lacking absorptive capacity (Benneworth, 2018; Oughton et al., 2002). Complementarity may in this case be enhanced with partners in



other settings (besides the local or regional), but benefits may also therefore not be locally embedded in the territory.

Other tensions relate to research commercialisation or the production of knowledge for its own sake, a civic versus a more entrepreneurial outreach, and differences in disciplinary approaches to transmitting, producing and exchanging knowledge (D'Este & Perkmann, 2011; Geuna & Muscio, 2009; Lam, 2011; Rodrigues, 2008). Policy frameworks – like that of Smart Specialisation – may also demand too much from universities, pushing them to perform tasks or roles they may not be capable in or suited for, and failing to sufficiently support their engagement function. This may generate undesirable effects (e.g., diminished benefits) on the institutions involved in those policy frameworks and regional development strategies, and on the very strategies and regional dynamics. Albeit having the potential to engage at multiple levels with a panoply of actors through different activities, universities may therefore be overextending themselves at the risk of not being capable to respond effectively to the demands placed upon them. There are thus those who argue against the validity of the idea of a regional mission (Christopherson & Clark, 2010), while others maintain that by understanding motivations, arriving at a confluence of mutual interest, and developing a strategic management interface between the university and the region, – and especially regional policymakers – the process can become more effective (Chatterton & Goddard, 2003; Pinheiro et al., 2012).

Besides this, universities themselves are limited by an institutional path dependence. Those that have from early on assumed a proactive regional engagement stance are more experienced and aligned with regional needs, and therefore more prepared to adapt to related emerging demands (Gunasekara, 2006b). History of engagement, the types of regional businesses and the degree of alignment between university research and regional needs inevitably have an impact on the degree and effectiveness of engagement (Boucher et al., 2003; Gunasekara, 2006b; Kempton et al., 2021). Similarly, universities' regional engagement and contributions may vary depending on the regional context and development and innovation dynamics, with more difficulties to match university research to the regional needs of less-developed and peripheral regions (Bonaccorsi, 2016; Hughes & Kitson, 2012), and also more competition between HEIs in more developed regions (Table 3).

Table 3 - Tensions and barriers to universities' regional engagement in different types of regions

Region type	Tensions and barriers	Authors
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More developed and core regions	<ul style="list-style-type: none">- Generally, more institutions present, leading to less overt demands placed on HEIs, less regional alignment and inter-institutional competitiveness;- Greater emphasis placed on universities' national/international role and hierarchy, less on regional role and engagement;- Weak (trust-based) innovation links and networks;	Kempton et al., 2021; Boucher et al., 2003; Tödting & Tripl, 2005; Dornbusch et al., 2012
“Old” industrial regions	<ul style="list-style-type: none">- Emphasis on technical skills may hinder relevance of higher education qualifications;- Large firm dominance in regional networks;- One-sided production structure, specialised in heavy industries.	Tödting & Tripl, 2005; Benneworth et al., 2006
Less developed and peripheral regions	<ul style="list-style-type: none">- Low level of infrastructure and industrialisation may severely limit the ability of universities to establish productive relations;- Lack of absorptive capacities to use R&I resources effectively;- “Thin” structure of knowledge generation, diffusion and transfer and lack of specialised services;- Low level of interaction between academic and non-academic actors mainly due to low business sector demand;- “Pockets” of university research excellence that may not be aligned with regional needs;	Bonaccorsi, 2016; Chatterton & Goddard, 2000; Martinez-Sanchez & Pastor-Tejedor, 1995; Sánchez-Barrioluengo, 2014; Tödting & Tripl, 2005; Kempton et al., 2021



- University regional engagement dependent on staff individual motivations.

Source: Author's own elaboration.

Besides the influence of the regional context on universities' external engagement, the very heterogeneity of universities may lead to these assuming varied strategic visions, roles, and activities in their region. As Uyarra (2010, p. 3) argues, while higher education institutions have an inherent complexity and diversity, they are often seen through a "monotypic vision" which conflates them and attributes to them the same capacities and willingness to perform regional roles. Different universities will thus assume different roles and engage different with their regions. Uyarra (2010) highlights different types of universities and engagement models, such as the entrepreneurial university and the engaged university. These and other university engagement models will also be approached in sub-section 2.3.1. Nonetheless, Table 4 below provides a non-comprehensive literature review of the engagement modes of different types of universities. It is worth noting that while there may be a predominant type and mode in an institution, several may coexist depending on the autonomy of bodies within the organisation (Bercovitz & Feldman, 2007; Bonaccorsi, 2016).

Table 4 - Regional contribution and drivers for engagement in different types of universities

University type	Regional engagement modes	Authors
Knowledge "factory"	Unidirectionality of engagement, mainly with high-tech firms, and based on knowledge production and quantitative innovation outputs (e.g., patenting).	Uyarra, 2010;
Relational	Bidirectional engagement, mainly with large manufacturing firms, promoting linkages and knowledge exchange. Society-oriented model which prioritises knowledge application.	Uyarra, 2010; Castro-Spila, 2018
Entrepreneurial	Active technological innovation, commercialisation and generative role in bi-directional engagement with large manufacturing firms and spin-offs. Intermediaries and incentives used to ensure links. Economic dimension of regional development.	Uyarra, 2010; Gunasekara, 2006; Goddard et al., 2016; Audretsch, 2014; Clark, 1998;



		Etzkowitz et al., 2000; Trippi et al., 2014
Systemic	Network-based and triple helix model of engagement, with regional clusters and regional SMEs as main links. Economic dimension of regional development thought with wider set of knowledge transfer activities beyond commercialisation. Emphasis on boundary-spanning role of universities.	Uyarra, 2010; Trippi et al., 2014
Engaged or civic	Developmental role with universities responding to regional needs and assuming regional/local leadership roles. Engagement with a variety of regional stakeholders and promotion of university governance role. Oriented toward community development.	Uyarra, 2010; Gunasekara, 2006; Trippi et al., 2014; Breznitz & Feldman, 2012
Transformative	Place- and stakeholder-oriented university aiming to create societal transformation to materialise sustainable development. Sustainability problem as catalyst for large scale collaboration with diverse stakeholders.	Trencher et al., 2013

Source: Author's own elaboration.

Ultimately, it is important to consider that universities are complex organisations that may struggle in delivering a well-articulated response to regional needs and collective strategic priorities (Pineiro et al., 2012). Both formal and informal means must be taken into account by the university to face emerging challenges and opportunities (Pinto et al., 2013), as a single approach can fail in encompassing the rich variety of the different university communities. Thus, there is a need to explore the inner working of these complex institutions, with diverse interests, drivers, and dynamics, and how this may be affected and shaped by the regional engagement (in our case, university-regional government) itself.

2.2.5 Addressing limitations and demands through universities' engagement with regional government

The previous sections have sought to demonstrate the clear potential for universities to engage with various stakeholders and coalitions, namely in regional development and



innovation governance, and to thus contribute to their region. The positive impact of universities' regional contributions and engagement with regional government and policymaking is argued to be able to be developed by varied types of higher education institutions and to materialise in different regional contexts. Nonetheless, awareness of existing tensions and possible barriers to this is necessary to revise engagement and further extend its potential benefits stemming. Despite any restrictions or hindrances generated by these tensions and barriers, universities have been argued to, through their more passive or active roles, enable regional development and therefore contribute to the construction of new successful pathways for their region (Arbo & Benneworth, 2007). This thesis argues that universities' collaboration with regional government in the innovation policy process can generate broader benefits for the region and its actors and overcome at least some of the existing tensions. Namely, by potentiating inter-institutional learning, activating resources, and enabling collective leadership. Table 5 takes the tensions and barriers identified in the literature review tables 1 and 3 and provides possible responses universities can have to these challenges through their governance roles and innovation policy engagement referred to in Table 2, and expanded on based on broader university roles and the author's assumptions.

Table 5 - Potential of university governance/policy roles in addressing tensions and barriers to innovation

Tensions and barriers	University contribution
<ul style="list-style-type: none"> - Lack of specialised industrial pattern or overly narrow orientation to certain technological trajectories; - Lack of highly skilled workers 	<ul style="list-style-type: none"> - Provoker of reflection, interactive learning and regional problem-solving; - Creation of industry support infrastructure; - Creative knowledge combination; - Improve education alignment with regional needs
<ul style="list-style-type: none"> - Lack of entrepreneurship and absorptive capacity for R&D&I; - Insufficient and/or inefficient locally-based R&D&I activities and complementary knowledge bases; - Weak coordination of knowledge transfer organisations and activities 	<ul style="list-style-type: none"> - Contribute to regional institutional capacity building; - Participation and (co)leadership in regional governance and strategy processes; - Improve research alignment with regional needs and develop knowledge exchange and support structures (e.g., technology transfer offices)



<ul style="list-style-type: none">- Lack of resources in local government	<ul style="list-style-type: none">- Provide knowledge and support to decision-making;- Assist in programme management, design and delivery;- Fund holding, distribution, monitoring and evaluation;- Multi-level external representation in decision-making and advisory bodies.
<ul style="list-style-type: none">- Weak or fragmented entrepreneurial ecosystem (e.g. lack of development, links and/or coordination between actors, dominance of SMEs);- Dominance of a particular type or group of actors (large firms)	<ul style="list-style-type: none">- Network enabler at/between multiple geographical levels and within advisory bodies;- Honest broker/neutral intermediary in networking;- Contribute to regional institutional capacity building

Source: Author's own elaboration, based on tables 1 through 3 of this thesis.

A challenge remains in how to effectively activate academic knowledge and university resources, which may often go underutilised by regional partners, whether private or public. This is particularly relevant in the context of less developed and peripheral regions, where there may be a mismatch between the local demand and the research, development and innovation resources supplied by the university (Bonaccorsi, 2016). However, it is interesting to note that in the same less developed and peripheral regional context, universities are considered key institutional actors supporting regional government and mobilising associative governance (Boucher et al., 2003; Gunasekara, 2006c; Kempton et al., 2021). This may then be related to not just to the regional context, but also to institutional orientations (e.g., university engagement mode and outward mission) and to how the regional partners themselves articulate their needs (Jongbloed et al., 2008). Therefore, there is scope to explore university contributions in different contexts, particularly regarding their engagement with regional government and innovation governance processes and how this dialectic can occur and how it can influence both institutional spheres.

2.3. Lacunae and Conceptualisation

This section explores three important gaps in universities' regional engagement that emerged from the literature review on university-regional government collaboration in innovation policy processes. These *lacunae* derive from the intention to explore the forms



of engagement of universities that pursue this collaboration, namely how these are activated and sustained, and the related roles universities can play. Moreover, these gaps were also identified from the nature of regional innovation processes, which involve a collective engagement that requires a certain university positioning among other regional stakeholders.

The literature presented in this state-of-the-art section, namely in sub-sections 2.1 and 2.2, demonstrate perspectives from economic geography, regional studies and higher education that can intersect to explore this thesis' topic. However, they are also bodies of literature that tend to demonstrate an optimistic view of university capacities, contributions, and regional roles. There is a tendency to assume universities will automatically and easily contribute to regional development and know how to effectively navigate these stakeholder relationships, addressing barriers, network and institutional rigidity and path inertia. Similarly, focus on best practices, straightforward coalition processes and more quantitative aspects of innovation and development in regional studies may disregard the challenges and opportunities other contexts and cases present. While this thesis proposes a more optimistic potential of these university-regional government collaboration, it seeks to expand on these bodies of literature to further investigate this topic's contextual features, operational elements, and implications, in all their facets. Therefore, the tensions and barriers that restrict this collaboration, as well as the directed efforts required to build, support, and maintain it, are considered in the development of this research.

The following sub-sections describe gaps in the literature that concern:

- a) the insufficient exploration of the aspect of university-regional government engagement in interaction models of innovation;
- b) the lack of attention given to the micro-processes in regional innovation strategies, namely within the concepts of agency and place leadership for the enactment of change and regional transformation;
- c) understudied constraining factors and micro-processes in the policy environment.

2.3.1 University-region engagement models

In recent years, several attempts have been made to create illustrative conceptual frameworks and models that can demonstrate the dynamic and interactive nature of innovation. Similarly, university engagement models have emerged depicting the different strategic orientations and collaboration links and activities they are involved in.



Some of these have been referred to in previous sections, like the Regional Innovation System model, the Triple Helix model, and the entrepreneurial and engaged university engagement modes. These have contributed towards an overall understanding of the innovation process, but also of the role and contribution of HEIs to knowledge flows in interaction with other actors, and overall, to local and regional development (Aranguren et al., 2012). However, these models have failed to fully reflect (or give insufficient attention to: a) the impact of the regional context (economic, social, political); b) the policy environment for higher education and territorial development; c) the diversity of university management and leadership structures; d) and, especially, the different aspects and vicissitudes of the collaborative link between the university and the state/regional government. This sub-section will delve on these interaction models, describing their shortcomings and suggesting the need for a new approach which considers university-regional government collaboration more comprehensively.

2.3.1.1 Innovation System

Concepts on the innovation process have evolved from more linear or sequential models – from research to use, with stages such as invention and design in between – to more dynamic and interactive models, showcasing the creative, learning-based, and collaborative character of innovation.⁸ These interactive models have formed the basis for the innovation systems theories (see also section 2.1), which constitute “the first explicit innovation policy approach” (Asheim et al., 2020, p. 4) that emphasise the system and territory rather than just the sector, and the strategic role of multi-level long-term relationships between key stakeholders – namely university, firms and government – can play in promoting innovation and competitiveness (Asheim et al., 2020; Edquist, 1997). In an innovation system, information, learning and other types of resources (e.g., flows of funding or authority) would circulate in multiple directions and in an interactive and dynamic manner (Charles, 2006). These links could be hypothesised to vary in strength, formality, and regularity, thus shaping the system in different ways.

In the innovation systems theory, firms are central actors, with others playing more adjunct roles (Zhou & Etzkowitz, 2021). Nonetheless, universities form an essential component of such systems, since they are considered key institutions contributing to a system’s knowledge-base and innovation capacity. Buesa et al. (2006) highlight universities as one of four main factors that have an impact on regional innovation capacity; and Zhao et al. (2015) recognise both research institutions and universities as

⁸ For more information on innovation process models, refer to Kotsemir & Meissner (2013).



part of the four protagonists (alongside government and firms) in a RIS, providing technical capacity and useful knowledge that can support the learning process.

However, in the RIS literature the usefulness of universities is perceived mainly in terms of knowledge transfer or support that they can provide to firms. Indeed, the first appearance of the innovation system concept relates it to knowledge producer and knowledge user interaction, and more specifically to university-industry linkages (Pino & Ortega, 2018). This relationship is thus seen as the main one supporting innovation and competitiveness in a RIS, with government acting in turn as a policy and regulatory entity providing the right incentives for these relationships to occur and thrive. Institutional approaches to RIS have focused on actor interactions and the role of policymakers in the development of the institutional environment (Pino & Ortega, 2018). Despite this, and while the role of universities is emphasised in the RIS concept, limited exploration has been given to university-regional government links.

2.3.1.2 Triple Helix Model

The Triple Helix Model (THM) is argued as a process or tool to realise the innovation system (Zhou & Etzkowitz, 2021). Nonetheless, it has developed the innovation systems concept and operationalisation by expanding on the role of government and actor interactions, and arguing that “government [is] an essential part of the innovation equation” (Etzkowitz & Zhou, 2006, p. 77). Therefore, in the THM, firms/industry, university and state are the three main helices or spheres of society whose mutually beneficial interactions and hybridisation (e.g., in the form of science parks or incubators) can support innovation. Stimulating a quality exchange and relation between actors in the Triple Helix spheres also helps reinforce the role of these organisations within the innovation system (Pino & Ortega, 2018).

Whereas in the innovation systems concept firms were the central actors, the THM holds universities as the primary source of future economic and social development (Etzkowitz & Zhou, 2006), seeing them also as catalysts of interactions and negotiations among triple helix actors (Etzkowitz et al., 2000). Indeed, the THM emerged from the analysis of the entrepreneurial university (namely the MIT) and attributes an economic development mission to universities (Zhou & Etzkowitz, 2021). Because of this entrepreneurial focus, quantitative university outputs and university-industry links are still seen as primary goals and objects of analysis in this model. Conventional THM models have thus been criticised for this reductionist view of the university to an “entrepreneurial function”, as universities have been involved in policy coalitions to deliver multidimensional policy outcomes beyond economic development (Marques et al., 2019).



Because of this focus on research commercialisation, the applicability of the THM has also been questioned in the context of less developed regions (Kempton et al., 2021; Marques et al., 2019), where university-government links, capacity building and broader societal goals could be more beneficial as the focus of such actor interactions. Similarly, THM has focused on productive relationships that have emerged from best practice cases (MIT and Silicon Valley), which can obfuscate regional and institutional specificities and the broader policy environment and historical path dependency.

The model suggests the strength of university-government interaction depends, mainly, on the higher education policy and the government's general influence and relationship with universities. Government would thus have a greater influence on university and research as the main funding source (Etzkowitz, 2008). Circumstances such as wartime would also likely increase this tie between government and university, namely through concentrated funding on needed areas. University-government relationships have thus not been greatly elaborated or analysed in the THM conceptualisation and literature, with funding and more tangible assets considered the main driving factor and goal of these links. Questions of power balance across these three spheres are also not greatly explored, but need to be considered where the policy sphere and prominent institutions such as universities and large firms are included (Asheim et al., 2020).

Broader stakeholder involvement has been suggested through the expansion of the Triple Helix constellation to quadruple or even n-helices, with the latter being considered in the Smart Specialisation framework. However, while the goal of these expansions has been to promote actor integration in these interactive innovation processes, the Triple Helix has remained as the quintessential interactive model of innovation, and linkages beyond university-industry have been largely unexplored through this model.

2.3.1.3 University engagement modes

Uyarra (2010) has identified five university engagement models that illustrate different university roles, spatial aspects of interactions and mechanisms in university engagement. Trencher et al. (2013) has also suggested the emergence of the transformative university engagement model. In their relational and interactive nature, these models thus help ascertain the organisations and activities universities delve in and focus on in their strategic vision and external collaboration. Considering the growing demands placed upon universities to engage with regional actors to boost innovation capacity, it would be expected that these models of engagement would have evolved to reflect multifaceted (and even multi-level) collaboration activities with various types of



actors and institutional spheres. Nonetheless, university-(regional) government links still have limited representation in these models:

University as knowledge factory. Demonstrates a more unilateral contribution of universities to regional firms, though a more linear innovation model going from research input to economic output. This is thus considered a more outdated model, that does not consider the multilateral flow of knowledge and resources and the multifaceted impacts of universities. It also does not consider university-government knowledge transfer or other forms of collaboration.

Relational university. While considering bidirectional links, the relational engagement model still focuses only on university-industry links and the economic competitiveness and innovation impact of university knowledge transfer. It nonetheless considers that the most important forms of collaboration between universities and firms are open channels, namely publications, informal links, and consultancy activities, which sets a precedent for the consideration of broader forms of interaction between the university and other societal spheres.

Entrepreneurial university. Follows the perspective set forth in the THM, with a focus on a generative university role, based on knowledge transfer and research commercialisation. To provide these services, entrepreneurial universities must create boundary-spanning organisations, such as technology transfer offices and science parks. These may involve government bodies, but the model mainly considers university-industry links. There is little to no consideration of university-government collaboration or of the broader socio-cultural impact the university could have, as well as the institutional and structural capacity of regions to benefit from these activities.

Systemic university. Also based on the RIS concept and the THM, considering the territorial context and embeddedness of networks and organisations. It nonetheless focuses on the promotion of links with firms, only expanding this narrow engagement to clusters and supply chains. More immaterial interdependencies are still largely ignored. Focus is thus still on entrepreneurialism.

Engaged university. Contrasted against the THM in that its focus is not on entrepreneurial activities (though it still considers them) but on responding to regional needs in a broad manner, and through formal or informal roles and links. University-regional government links are considered here, namely in university representation in local authorities and government consultation bodies, and other contributions to regional coalitions and associative governance. This mode may still overestimate university



capacity and willingness to adapt their functions to these external signals, as well as overall evidence on associated mechanisms and impacts.

Transformative university. Considers the three university missions of education, research, and external engagement overlap and reinforce each other, potentiating co-creation for sustainability. Universities would also actively seek participation of a broad range of non-specialists and civil society. Government links are considered here and may act as drivers of transformation projects with universities.

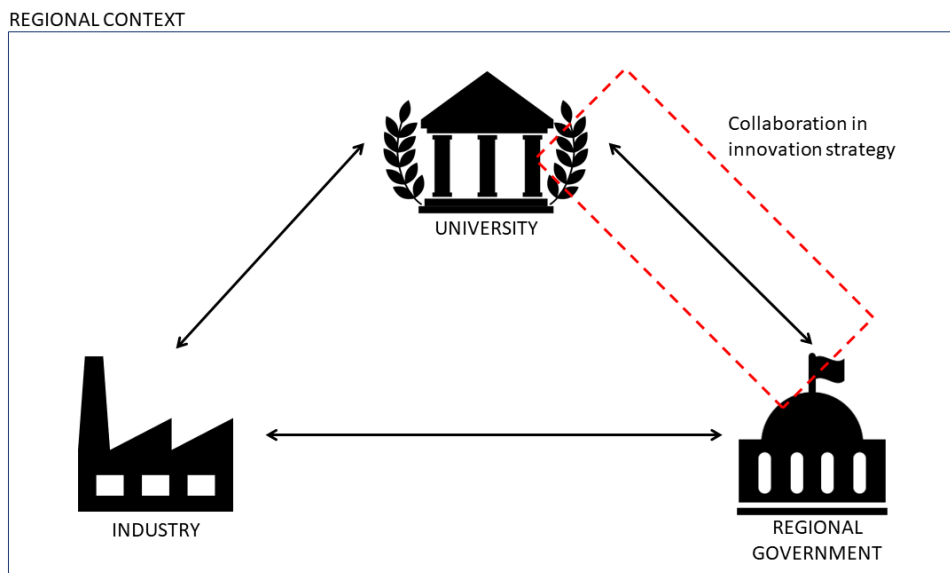
Some of these engagement models (e.g., knowledge factory, relational and transformative) have not gained as much traction and, therefore, few assumptions can be made regarding their comprehensiveness and applicability. Nonetheless, there is a very limited consideration and exploration in these models of university-government engagement. As Charles (2006, p. 122) writes, “support for innovation in business is perhaps the least controversial area of university regional engagement”, thus benefitting so far from more academic discussion and political attention.

There is clearly a gap in the literature on interactive models. The innovation systems approach largely sees universities from a knowledge producer and transfer perspective, and government as a regulatory entity. In this, it ignores university-government collaborations and the potential regional impact of this link. This is reflected also in the Triple Helix Model, that while considering government as an important sphere in a triadic relationship, still greatly sees universities through this entrepreneurial role. These models do not consider the diversity of universities and their organisational structures, nor fully explore the impact of the regional context and the policy environment. University engagement models have mostly followed the trend of prioritisation of university-industry links for regional development and innovation, with only the more recently introduced models of the engaged or civic university and the transformative university considering a broader set of university engagement activities and therefore also university-government collaboration.

While emphasising the role of universities and placing several demands on their external engagement and regional role, there is also an underestimation in theory and practice of their broader forms of collaboration and impact in the territory. These go beyond the most technical fields to the social sciences, to other forms of contribution beyond commercialisation and to links with other societal spheres besides industry. This thesis

proposes to explore the link between universities and regional government, and therefore also attempts to fill part of this identified gap (Figure 1).

Figure 1 – Depiction of focus of study on university-regional government collaboration in innovation strategy.



Source: Author's own elaboration, based on regional innovation interaction model.

2.3.2 Agency, leadership, and change

Having highlighted that university-government links are an aspect of innovation dynamics and university external engagement that needs to be explored, it is necessary to assess its micro-processes, namely how this collaboration can emerge and develop in an effective manner and for the nurturing of successful regional development pathways. For this reason, this sub-section will focus on matters of agency, place-leadership and organisational change, that while have emerged in the literature in recent years, still require further exploration regarding university-regional government relationships and need further analysis to how they manifest in different regional and institutional contexts.

As previously mentioned, both scholars and policymakers have argued for a collective and interactive approach to regional innovation and development strategy processes (see sub-section 2.1.3), as this can stimulate identification and discussion of needs and opportunities, learning, and institutional capacity (Asheim et al., 2016; Grillitsch & Asheim, 2018; Radosevic, 2018). Moreover, by including diverse regional actors in a strategy process, this becomes more inclusive, democratic and with a lower risk of policy capture (Sotarauta, 2018). By creating and agreeing on a regional vision and pathway together, there is a higher chance that this will materialise. Activating stakeholder agency and



collective leadership is key to enable a purposeful participation of regional actors in these processes (Asheim et al., 2017; Sotarauta, 2018; Uyarra et al., 2017), and universities can play a crucial role in this (Etzkowitz et al., 2000).

While agency is a rather abstract concept (Grillitsch & Sotarauta, 2019), in the current debate on regional path development it can be characterised as “the actions or interventions to produce a desired social effect” (Jolly et al., 2020, p. 6). The concept is also embedded in distinct temporal and spatial contexts: it is informed by the past but oriented towards the future, with previous decisions and unsuccessful paths shaping present agency for the future materialisation of a more successful path (Jolly et al., 2020) – therefore also including an experimental and learning dimension (Uyarra et al., 2017). Agency can therefore be a powerful force of transformative change for a region and its institutions, shaping capabilities, networks and breaking with established pathways and structures (Asheim et al., 2020; Grillitsch et al., 2019; Grillitsch & Sotarauta, 2019; Jolly et al., 2020).

Distinct agency types have been identified in the literature. Namely, Grillitsch and Sotarauta (2019) suggest a ‘trinity of change agency’: innovative entrepreneurship, in which path-breaking innovations are triggered by key actors; institutional entrepreneurship, consisting of individuals, organisations or groups of actors or organisations that are able to shape preconditions and mobilise the resources and competencies to either modify existing structures and institutions or create new ones (Asheim et al., 2020; Morgan, 2016); and place-based leadership, which pools and/or builds up actors and resources toward collective and long-term transformative action that goes beyond individual interests to benefit a place (such as a region) more broadly.

This thesis will focus on the latter two types of institutional entrepreneurial agency and place-based leadership, which are considered “essential for constructing opportunity spaces and nourishing emerging new growth paths” (Grillitsch & Sotarauta, 2019, p. 718). It argues universities, regional government and the individual actors that comprise them can mobilise resources and networks and drive regional change and path development processes through their collaboration in innovation strategy processes. Even though institutions have been known for reproducing culturally embedded understandings and procedures and therefore changing slowly (Asheim et al., 2020; Grillitsch & Sotarauta, 2019), they still largely possess the power and capacity to orient action and resources. Regarding university agency, there is a need to ascertain the extent of its contribution to the regional innovation strategy process and the impact thereof, as well as the different types of agents (e.g., university managers or academic staff) that may drive and



potentiate this collaboration. This is reflected in the argument by several authors for the need to further explore the role of agency and the micro-level processes that shape new path development, as well as how a given context limits or extends opportunities for agency and change (Asheim et al., 2016; Boschma, 2017; Grillitsch & Asheim, 2018; Grillitsch & Sotarauta, 2019; Uyarra et al., 2017). Besides institutional-level agency, investigating micro-level processes and actor agency is particularly important as individual actors may act accordance to their own interest and those of their institution, which can in turn influence the collective strategy process. As Flanagan et al. (2010) describe, agency is “enabled, shaped and constrained by other actors and by institutions”, making this exploration essential for a more comprehensive understanding of a regional strategy process.

Leadership is also a key factor in the “sub-national development puzzle” (Sotarauta et al., 2017, p. 188). It goes beyond the role of individuals and their formal positions regarding power and authority to other, less visible forms of leading that can still greatly influence wider structures (Sotarauta et al., 2017). For example, this can manifest in a significant leadership role in a strategy process by specific university actors that are not necessarily in a top-management position. Moreover, place-leadership considers broader distributed, collective, and pro-active forms of leadership for transformative action. The concept has emerged in relation to both agency and territory to help explain “how actors seek to rebuild territories by constructing new collective territorial innovation assets, networks and social capital” (Beer & Clower, 2014; Benneworth, Pinheiro, et al., 2017, p. 236). Place-based leadership is therefore a shared form of leadership, where independent actors come together, exercise mutual influence and negotiation, and build consensus to deliver on collective goals (Benneworth, Pinheiro, et al., 2017). Leadership can be distributed and collective, but leaders may also be individuals, organisations or groups that possess the assets and the commitment to advancing the region (Grillitsch & Sotarauta, 2019). The concept has remained undertheorized in what concerns micro-processes, interests, organisational dynamics and leadership-enabling arrangements (Sotarauta et al., 2017). And while universities have been argued as drivers of regional change, there have been few explorations of the modes of leadership they employ in this context (Goddard et al., 2016; Goddard & Vallance, 2014; Sotarauta et al., 2017).

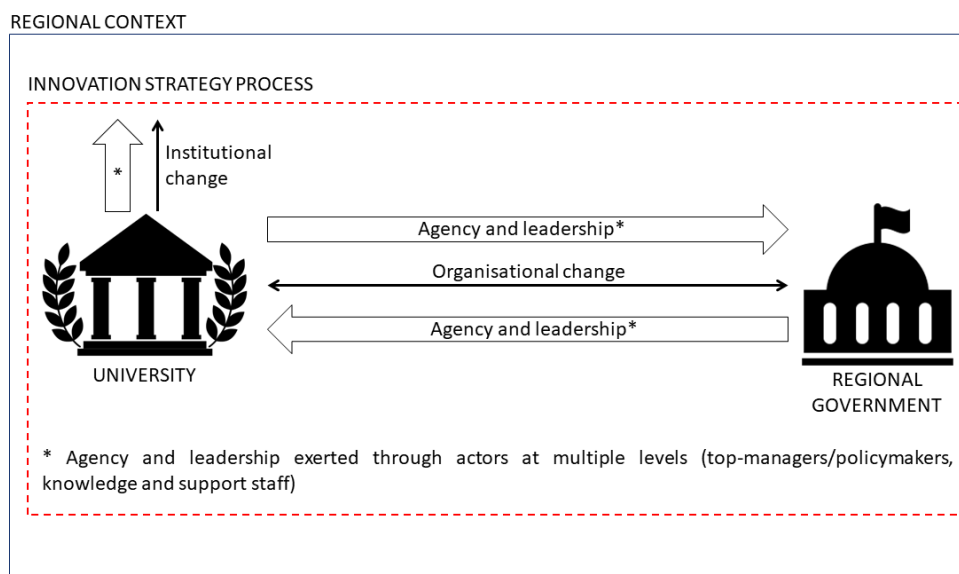
Additionally, as loosely coupled institutions, universities are highly dependent on the interests and priorities of the individuals and groups that compose them, which may differ from the overall strategic direction (Bercovitz & Feldman, 2007; Kempton et al., 2021). Explicit formal engagement commitments by university managers may not have a direct



reflection in the day-to-day activities of the organisation and is not necessarily a sign of more engaged universities. In turn, beyond university top-management and formal channels, broader university staff activities may contribute to regional innovation capacity (Benneworth, Pinheiro, et al., 2017; Pinheiro et al., 2012). Benneworth et al. (2017) have partly delved into this, proposing an analysis of university place leadership and strategic agency by focusing on the roles of senior leaders, support agents, knowledge agents, and interaction arrangements. These micro-level dynamics will be further explored in this thesis regarding university regional engagement.

Moreover, universities can themselves be shaped and change their organisational arrangements and engagement as a form of adaptation to external demands and leadership. Namely, engagement in strategy processes and other place-based leadership activities, as linked to institutional change processes, can help resolve internal tensions, restructure, and align these polycentric institutions towards a more cohesive mission. University place-based leadership has been found to promote alignment with regional needs and emerge from engagement in strategy processes like that of Smart Specialisation (Benneworth, Pinheiro, et al., 2017). As Kempton et al. (2021) emphasise, the relationship between a university and its region is bidirectional, meaning that the university not only shapes the region, but is shaped by it. While universities are known to create organisational bodies and strategic institutional mechanisms to support their engagement activities, this has been largely associated to university-industry links (Benneworth, Pinheiro, et al., 2017; Etzkowitz et al., 2000; Geuna & Muscio, 2009). There is therefore a need to explore whether their collaboration with regional government and participation in place-leadership processes has led to the emergence of other organisational changes within these institutions, even though these may just be materialising. Figure 2 illustrates how these concepts are inserted within this thesis' conceptual framework.

Figure 2 - University-regional government relationship in the innovation strategy process analysed through the lenses of agency, leadership and change.



Source: Author's own elaboration.

2.3.3 Policy arena

The final gap this thesis will approach is the analysis of an institution, like the university, when integrated into a policy arena and when fulfilling governance roles. As previously discussed, universities' collaboration with regional government has been the focus of very few studies, with limited exploration of what being involved in the policy sphere may involve in terms of expectations, resources and skills (Aranguren & Magro, 2020). Furthermore, the policy arena is a particularly difficult collaboration space (see section 2.2.3), with policy environments characterised by their heterogeneity and context-specificity, by concentrations of power with sometimes flawed representativeness, and by the difficulty to build consensus among actors with varied interests (Aranguren et al., 2012; Capello & Kroll, 2016; Sotarauta, 2018). Analysing how a university navigates these spaces is therefore important and an understudied aspect of this engagement in a strategy process.

Besides organisational and broader institutional change for guiding a region to more successful development paths, the term policy change has also emerged as another aspect that should be considered. According to Uyarra et al., (2017, p. 561), policy change is "a process involving the generation and destruction of 'policy monopolies'", taking into account common political understanding – e.g., a regional vision – and the institutional arrangements needed to reinforce that vision. This is usually enforced by agency and leadership, as defined above. It also requires attention to how relationships and policy agendas are set and the role of both individuals and organisations in shaping



them over time (Uyarra et al., 2017). This thesis thus seeks to reinforce the argument that state and non-state actors, specifically universities, have the potential to enact agency and shape these systemic innovation processes, and are therefore not simple passive actors in these processes (Flanagan et al., 2010).

Besides their potential for agency and change, this thesis also seeks to further the analysis of the micro-processes of policymaking, namely the actors involved, the (multiple) roles they can play, and the policy stages they contribute to (or not). This follows the argument of several authors (Almeida & Báscolo, 2006; Aranguren & Magro, 2020; Flanagan et al., 2010; Uyarra et al., 2017) that characterise previous analyses of the (innovation) policy process as too simplistic and linear, downplaying agency, variety within actor categories and the different needs and expectations required throughout the various stages of policymaking.

Finally, the policy process is moving towards a more associative form that involves several actors in a mode of self-regulation and with the responsibility to mobilise and activate resources. However, actors involved in the policy process may not behave in a way policymakers expect (Aranguren & Magro, 2020). Collaboration in this context therefore relies also on aspects of trust, culture and values, or what Goddard & Chatterton (1999) denote as soft infrastructure. It is therefore useful to go beyond the more tangible contributions and impacts of university-regional government collaboration and consider also the more intangible aspects that shape this relationship and are shaped by it.

2.4. Summary & operationalisation of research questions

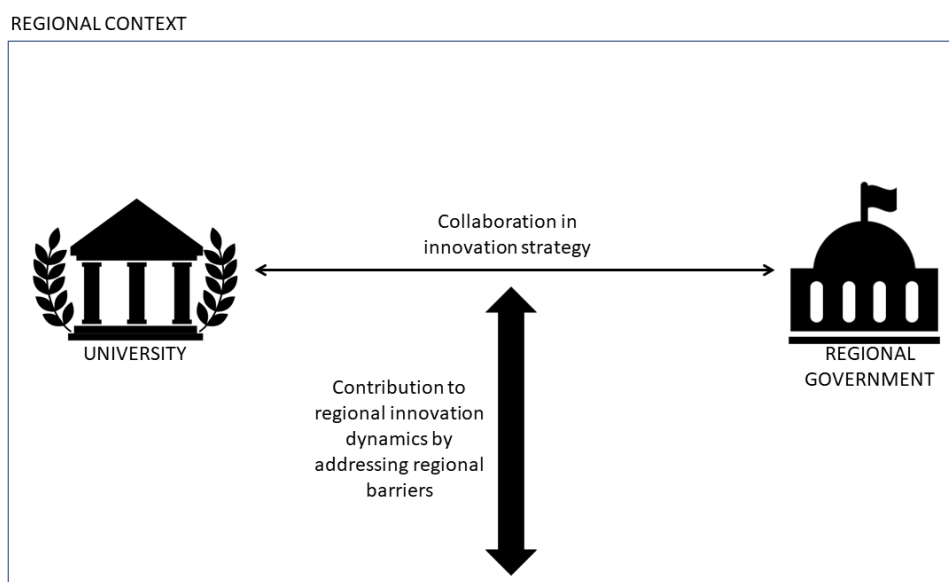
This thesis focuses on the growing expectations of universities' engagement in regional innovation policy and practice. It specifically aims to explore whether university collaboration with regional government in the innovation policy process can contribute towards overcoming regional tensions and barriers to development and innovation. Section 2.1 of this thesis used the Evolutionary Economic Geography field of study to ascertain the barriers of different regional contexts face when seeking development and economic renewal. The argument is that if these barriers remain unaddressed, namely if regions cannot access, produce, or potentiate the resources, knowledge and capacity required for the creation of new and successful development pathways, this may result in stagnation, i.e., in path inertia, institutional rigidity and lock-in.

In turn, section 2.2 highlights the role of universities as knowledge institutions that have been argued as uniquely capable to address these development barriers at the regional

level. The claim is that through universities' contribution to regional innovation strategy processes and enactment of governance-related roles, activated through their collaboration with regional government, these regional barriers to development can be overcome. This requires a capable navigation through university engagement barriers and the policy sphere, and the agency and leadership to break with existing structures and seek positive transformation for the region. The extensive literature review conducted has led to the revisiting of the original Chapter 1 research question of “*How do universities engage as institutional actors in regional innovation policy and practice?*” to

“How and under which conditions can university engagement in regional innovation policy processes address regional development barriers?”

Figure 3 - Illustration of operational research question.



Source: Author's own elaboration.

To clarify and operationalise this research question, the following sub-questions are proposed, further narrowing this thesis' object of study.

Sub-question 1 (RQ1) – *How and under which conditions can universities effectively engage in the regional innovation policy arena?*

Studies on university engagement have focused on university links with industry. Nonetheless, higher education institutions engage with a panoply of other regional actors in a multifaceted way. This sub-question will allow for the exploration of the motives, manner, and conditions shaping university engagement in the regional innovation policy process. Limitations have been identified within universities, the policy arena and the



regional context that can influence the form in which/if this engagement takes place. This sub-question will enable the analysis of path dependencies, territorial and institutional characteristics, policy environment and micro-processes (actor agency and autonomy) that can constrict or promote this type of engagement.

Sub-question 2 (RQ2) – *How do universities support regional innovation and development dynamics in their engagement with regional government in the innovation policy process?*

This question will enable the analysis of university contribution to the regional innovation system and the transformation of development pathways through its engagement with regional government in innovation strategy processes. It is therefore concerned with mapping the activities and roles that the university (as institution and considering its individual actors) are involved in concerning this policy process, followed by the broader impact this collaboration has on regional actors and the development of the region. The focus here is on multi-level micro-processes (territory, actors, policy stages), and the potential for and manifestation of agency and place leadership.

Sub-question 3 (RQ3) - *How does engagement in the regional innovation policy process shape universities' institutional and organisational structures?*

Considering that collaboration and engagement in the innovation policy process is largely bidirectional, this sub-question focuses on how universities may be shaped or adapt in accordance with the demands and opportunities stemming from their collaboration with regional government in innovation strategy processes. The focus is on the institutional and organisational arrangements that may be adapted, created, or dismantled to allow universities to fulfil these new expectations placed upon them. The analysis will consider, for example, new methodologies introduced by the regional innovation policy framework and processes, and funding priorities that may function as incentives to higher education institutions.

Sub-question 4 (RQ4) - *How and under which conditions can universities address regional needs and further innovation goals in different regional contexts?*

Finally, one of the essential aspects approached in this thesis is the regional context in which a university is situated, which can greatly influence the development barriers the institution may face in its engagement and contribution to regional innovation strategy processes. This sub-question therefore focuses specific regional barriers, and on the way in which universities can overcome these and address regional needs. Analysis here



is addressed through in-depth case-studies and comparative analyses, focusing on the wide set of university engagement and contributions. Aside from considering regional context and barriers, analysis here will also address institutional constraints and collaborative dynamics.

The seven empirical chapters of this thesis (Chapters 4 to 10) will attempt to contribute towards addressing the identified gaps and improving the academic and practical understanding of this problematic. These chapters/publications will cover the four sub-questions in the following manner:

Table 6 - Operationalisation of research questions in publications.

	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 9	Chapter 10
RQ1	X	X	X	X	X		
RQ2	X	X	X	X	X	X	X
RQ3		X	X	X	X	X	X
RQ4	X	X	X	X	X	X	X

By addressing the sub-questions to different extents, the empirical chapters will contribute to the operationalisation of the main research question, and the argumentation of this thesis. Tackling each of these questions will also lead to a more comprehensive and multifaceted understanding of the problematic at hand, and to a more dynamic model based on the findings (delineated in Chapter 11) that will enable answering the research questions in Chapter 12.



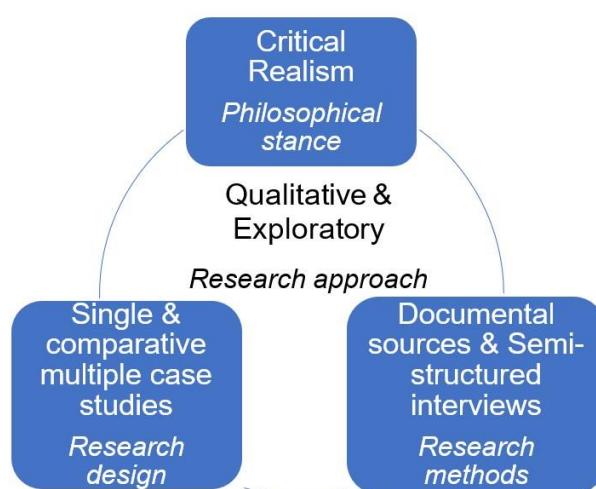
3. Designing a methodological approach

The present dissertation is an exploratory study on universities' roles in the regional innovation policy process. It seeks to understand how they engage with regional government authorities in the design of regional innovation and development strategies, and how, through this engagement they may be able to contribute to meet regional needs and guide the region toward more successful development paths. Previous studies (Aranguren et al., 2012; Aranguren & Magro, 2020; Elena-Perez et al., 2017; Goddard et al., 2013; Pugh et al., 2016; Rodrigues et al., 2001) suggest that active participation of universities in the regional innovation policy process and engagement with regional government authorities could enable institutional capacity-building among at least collaborating stakeholders, promote evidence-based policy, enhance associative governance and lead to a more effective strategy process overall. Nonetheless, as discussed in the literature review, there are few studies that provide a comprehensive and multiple case study analysis on this form of engagement, with even fewer focus being given to the organisational aspects of universities that must be activated for this engagement to occur effectively. Additionally, there are numerous challenges related to universities' engagement activities in governance and inter-institutional collaboration in the tension-filled power stage of policy/strategy processes.

Given the promotion of the knowledge and learning economy for the boosting of regional innovation assets, as well as the encouragement of collaborative methodologies that highlight the potential for universities as key regional stakeholders in strategy processes, a series of exploratory, in-depth case studies on universities' engagement in regional development strategies, their regional impact and the organisational and institutional elements that may thus be involved can provide further insights. The objectives of this thesis have guided the philosophical stance, methodological choices, and research design (Figure 4). A qualitative approach was thus employed, given the need to provide an in-depth understanding of the phenomenon studied herein. This included content analysis of policy documents to examine the inner workings and the positioning of institutions, and to assess the regional strategies produced. These can offer a rich data set on the actions, values and strategies of particular groups. Namely, regional innovation strategies like those of Smart Specialisation can detail the contributors to their design, the priority axes defined and the vision for the region, thus contextualising and framing institutional action, governance initiatives and shedding light on the decision-making process. Nevertheless, data collection took primarily the form of semi-structured interviews with a diverse set of regional stakeholders and university staff to ensure data

triangulation in the inclusion of multiple perspectives on the topic. The aim of this study is examined through single and comparative multiple case studies across three European case universities and their regions – the University of Aveiro (Portugal), Autonomous University of Barcelona (Spain) and University of Twente (The Netherlands). The studies presented herein as publications aim to explore universities' engagement in regional innovation policy processes and form the basis to produce a stylised framework of this dynamic. The study builds on documental sources and a series of semi-structured interviews, which provide a base for the analysis of these multiple case studies, the identification of regularities and tendencies.

Figure 4 - Summary of the research framework.



Source: Author's own elaboration, based on Nieth (2020).

The papers presented in this dissertation have an integrated methodology section that clarifies the methodological options selected for each study. Nevertheless, this chapter provides further detail into the rationale behind these methodological choices, as well as some aspects that, due to word count constraints imposed by academic journals and publishers, might have been left out. This section will provide a thorough account of the methodological approach and the rationale for the choices made, while still trying not to be overly repetitive of what is already detailed in each paper. This chapter discusses methodological considerations that have shaped this dissertation. It starts by explaining the philosophical stance permeating the project and detailing the methodological approaches utilised throughout this dissertation to better support the research, namely in regard to the data collection and analysis process. Finally, it provides an overview of the data sources, the contribution of the publications and the ethical considerations involved in the conduction of this research.



3.1. Philosophical stance

To provide a comprehensive explanation on the conduction of this study, it is important to detail the philosophical stance and the researcher's vision of the world. The framework and research questions introduced for this study demonstrate the aim of developing a thoughtful understanding of the role of universities in regional innovation policies and practices, identifying patterns, explanations, and a rationale for the dynamics of regional development in which they participate. The exploratory and more qualitative character of this research seeks to understand the subtle workings of this process and the inevitable implications on what is a complex and uncertain system. An explanatory approach or the sole use of quantifiable data is therefore not adequate for the operationalisation of a study within this framework.

The philosophical stance of this study is not restricted to observable facts or the identification of "generalizable laws" and statistical relationships that characterise positivism (McEvoy & Richards, 2006, p. 67). Despite this study's interest in the interpretation of the socially constructed beliefs of actors, demonstrated, for example, in the exploration of interviewees' perceptions of universities' engagement activities, it also goes beyond interpretivism by exploring the underlying social structures or contexts of meaning that influence individuals and the phenomenon (Fossey et al., 2002; McEvoy & Richards, 2006). Therefore, this study adopts the perspective of critical realism, understanding that, while knowledge of the world is only attainable through existing and available discourses, empirical feedback can be used to better assess them (McEvoy & Richards, 2006). In critical realism, the generative mechanisms constitutive of a phenomenon may not be directly observable, but they "can be admitted into theoretical accounts on the grounds that their effects are observable" (Bryman, 2012, p. 72). A consideration of context is crucial in this stance as it interacts with these generative mechanisms and produces an observed regularity in the social world (Bryman, 2012). Thus, critical realism is the most suitable to expose the nuances of the processes researched herein and therefore develop a deeper understanding of their predictabilities while accounting for contextual asymmetries. By employing the ontological lens of this paradigm, this study asserts that an objective reality exists, though access to it is limited, and influenced by the researcher and interviewees' subjective views and understanding (Lincoln & Guba, 2005).

Bhaskar (2008), the author that ideated the critical realist paradigm, put forth therein a tacit distinction between three different ontological domains of reality: the empirical, or



that which is concerned with experiences, observation and data; the actual, i.e. the events we may or may not experience; and the real, referring to the mechanisms and structures that can generate those events (Bhaskar, 2008). He argued that enduring social structures and processes of reality can be registered empirically and pre-exist any kind of agency. However, it is through the filter of human agency, experience and interpretation that these are reproduced and transformed (Bhaskar, 2008; Fletcher, 2017).

Critical realism proposes that social science is constrained in its ultimate goal to explain and apprehend reality by the 'fallible' observations and the diverse interpretations of researchers, research participants and theorists (Fletcher, 2017). The complexity of reality deems it in the critical realism paradigm as an 'open system', characterised by uncertainty and ambiguity and by tendencies rather than causality (Bhaskar, 2008). In this context, the researcher must go beyond the empirically observable and focus on capturing different fragments of reality to assemble a larger puzzle, building on the existing pieces previously identified and discussed – namely in the research community. Consequently, through this iterative process of reproducing, transforming or rejecting existing theories, a critical realist approach can provide a more comprehensive and accurate explanation of reality (Fletcher, 2017) that can then act as a base for the transformation of society (Fossey et al., 2002).

The conceptual model presented in Chapter 2 will therefore be systematically related to the concepts and dynamics approached in Part II of this thesis, focused on the empirical data. A comparison between the conceptual framework based on the empirics and the one based on the theory (Chapter 2.4) will thus be generated. This will result in a reconceptualization of the conceptual framework initially presented, with modifications being suggested in light of the cross-case synthesis of the findings (Chapter 11.4).

3.2. Methodological approaches

3.2.1. On the research approach

Critical realism is a research paradigm that informs qualitative research methodologies (Fossey et al., 2002). Given the need to provide an in-depth understanding of the phenomenon studied herein – namely an exploration of the roles of certain institutions (universities) in the broader regional system through the policy process, as well as the experiences of the people involved therein, a qualitative research design was deemed the most suitable methodological approach for the majority of this study. Being centred



in a critical realist perspective, the qualitative approach enables the interpretation of such discourses and experiences while taking into account broader enduring structures (e.g., society).

While the quantitative research approach is concerned with collecting and analysing numerical data to obtain accurate and objective measurement, suitable for a positivist philosophical stance and a more deductive reasoning, qualitative research deals with the “interpretation of subjective meaning, description of social context and the privileging of lay knowledge” (Fossey et al., 2002, p. 723). In this, it follows primarily an inductive process towards a descriptive end product (Merriem & Tisdell, 2015). Here theory-building can be reached through the exploration of processes within social groups, in particular, and the identification of patterns and connections in the data (Bryman, 2012; Fossey et al., 2002), with the researcher as the main instrument of data collection (Merriem & Tisdell, 2015).

The qualitative research process most commonly involves the following steps: (1) the proposal of a general research question to guide the study leads to (2) a selection of relevant subjects and data, to its (3) interpretation, to the (4) elaboration of conceptual and theoretical work and, in the final stages, to a (5a) refinement of the research question that could then lead to the (5b) collection of further data, (6) a readjustment of the framework and the (7) writing up of findings and conclusions (adapted from Bryman, 2012). This type of research, where the research questions are fine-tuned in response to the setting and research process and different elements can be interdependent or overlap, is thus flexible, interactive, creative and context-sensitive (Fossey et al., 2002). This view of qualitative inquiry thus falls into a more postmodern perspective, in that knowledge is not just something waiting to be discovered, but is context-bound and perspective-dependent (researcher’s perspective included) (Saldaña, 2011).

While this research follows a qualitative approach for the most part, one of the publications framed within it includes quantitative data, more specifically in Chapter 8. The data utilised is also detailed in the methods section of this chapter, below. This is in line with the case-study research design that will be explained further in the next section.

3.2.2. On a comparative case-study research design

These characteristics, combined with the exploratory nature of qualitative inquiry, thus help underpin the research design. Looking to address the aim of this study, namely the analysis of the complex phenomena of universities’ engagement with the regional innovation policy process, both comparative and in-depth case study approaches were



chosen. Case studies are well-suited to explore and understand the uniqueness of a particular context, set of conditions and relationships (Yin, 2009). And while this may limit the extent of practical generalisation to other contexts, case study research enables the logical extrapolation to theory and social processes that could be useful for other settings (Yin, 2009). In its intensive examination of a setting, it is also a recommended approach to assessing causation (Yin, 2009), by providing insights into the underlying mechanisms influencing the phenomena in analysis.

Easton (2010) argues that the ontological position of critical realism is useful in the undertaking of case study research. This is because “case studies are more suited to how and why questions which can be explanatory in nature”, thus seeking to identify these operational links and analyse the complexities of entities and processes (Easton, 2010, p. 119). Case study research is thus in line with the critical realist search for tendencies and regularities (Bhaskar, 2008). Furthermore, a critical realist case approach is considered by Easton as particularly suited for the study of “organisations, interorganisational relationships or nets of connected organisations” (Easton, 2010, p. 123), in which this study falls into.

A comparative design which includes multiple case studies additionally enables the consideration of variances in mechanisms and relationships in different contexts (Bryman, 2012), through a constant compare and contrast method (Taylor & Bogdan, 1998). This allows for evaluating the concepts and dynamics analysed in these processes in a non-context-dependent way. In the essence of critical realism, this enhances the researcher’s sensitivity to identify differences, patterns and causal mechanisms, improve theory-building and further working to better understand reality (Bryman, 2012).

The multiple case-study design utilised in this dissertation was facilitated by the international research project that frames it (Annex II). This originally included a secondment or research stay at another partner university, with intentions to conduct comparative research across the two cases. However, the researcher(s) were given the opportunity to conduct a second research stay, and thus a third case to the PhD study. These research stays were arranged by the researcher(s) in consideration of the case selection criteria (Chapter 3.2.4) and to improve the richness of the research project.

According to Dyer & Wilkins (1991), a multiple-case study approach can mean there is more attention in the contrasting of the cases than to the specific context. For this reason, individual chapters/publications within this dissertation provide more in-depth case-



studies (Chapters 6, 8), and another publication provides a comparison across only two cases (Chapter 9) – so as to produce more thorough knowledge about certain relationships and dynamics. This will still enable an account of regularities that, when compared to cases in other contexts, add to the discussion of the framework. The other publications herein included will utilise a comparative multiple case-study approach across three or more regions (Chapter 4, 5, 7 and 10).

3.2.3. Defining the methodological process: literature review

A review of the existing literature, or the state of the art on the subject, is a first essential step in the research process. This allows for a comprehensive understanding of what came before so as to build on that existing knowledge on the subject and contribute toward a better understanding of it. Therefore, the design of the study is dependent on the identification of existing literature on the phenomena under study (Miles et al., 2014). As such, the research process that resulted in the publications included in this dissertation was first based on a literature review. This enabled underpinning the overall study within a broader trend of universities' engagement in regional governance and examine the institutional and organisational positioning and the dynamics and effects of interinstitutional collaboration in light of the regional innovation and development policy context implemented across EU member states.

For this effect, readings on EEG, innovation studies, governance theories, university engagement and institutionalism allowed to contextualise the study, assess the need for further research and identify the appropriate research design. Implicitly this has also enabled discounting other theories and research hypothesis for a more sharpened research focus. Specifically, the literature review allowed for identifying what had already been done on this particular topic, namely the studies that had focused on universities' engagement with regional government and their role in innovation policies (Aranguren et al., 2012; Aranguren & Magro, 2020; Benneworth, Pinheiro, et al., 2017; Elena-Perez et al., 2017; Gunasekara, 2006c; Pugh et al., 2016; Rodrigues et al., 2001). These studies are scarce, but have become more frequent, pointing to the relevance of this investigation at this time. The publications included in this thesis analyse the same phenomenon and share common points of interest. However, they provide different perspectives and accounts, with the focus relying on not just the internal and external positioning and roles of universities in this engagement, but also the mutual influence that occurs with this exchange. In this, they also consider topics such as the alignment of universities' internal structure with regional strategic priorities and regional needs, the type of people/staff that have participated in this form of engagement, the perspective of



other regional stakeholders (outside of government authorities and HEIs) on the universities' engagement, the rationale for engagement at different stages of the policy process, and the effect this engagement has on regional development and innovation and on the universities' institutional stance and organisational structure. The analysis is therefore taken further to enable a deeper characterisation of this dynamic.

3.2.4. Defining the methodological process: the research sample

The next step in the research process, following the identification of the gaps and problematic, would be to select the suitable cases from which to gather the data to fill those knowledge gaps. In this case, the selection was based on the following criteria:

- (a) Case studies should figure regions that have demonstrated development efforts, specifically regarding the improvement of the regional innovation environment. Namely, these efforts should be demonstrated in the development of innovation policies/strategies with the collaboration of regional stakeholders in the process, specifically universities;
- (b) The universities under study should include a regional dimension in its engagement activities, and share similarities in its institutional path (e.g., relatively young entrepreneurial universities with an existing or potential role in regional policy engagement);
- (c) Cases should be heterogeneous regarding their regional and institutional setting, i.e., different universities in somewhat diverse regional contexts (e.g., less-developed, peripheral or more developed regions) in different countries.

The case universities were selected through both a homogenous multiple-case sampling (Miles et al., 2014), seeing as they have similar institutional paths. Namely, the case organisations – University of Aveiro, Autonomous University of Barcelona, and the University of Twente – are relatively young, self-entitled entrepreneurial universities with a strong regional focus since their creation. While their individual institutional paths have been similar, they are somewhat different in regard to their larger settings, more fitting of the maximum variation case sampling. The UA is located in a less-developed peripheral region of Portugal; the UT is in a more developed region, but quite peripheral in the Netherlands; the UAB is located in a more developed region and only in the outskirts of Barcelona, the second largest metropolitan area in Spain. UA is the only HEI in its sub-region, and one of three in the larger Centro region; UT is one of three HEI in the sub-region of Twente, and one of three universities in the larger region of East Netherlands; and the UAB is one of 11 public universities in Catalonia. The selection of these similar



universities in contrasting settings allows for attaining a broader understanding of the phenomenon, taking into account different regional needs, linkages and opportunities for the universities to interact with regional government. The selection process was thus guided by the universities' comparable institutional and organisational history and previous track record in university-region engagement, but attention was paid to the potential for contrast in regard to their region to help reveal some of the basic mechanisms and challenges associated with the phenomenon.

Additionally, the selection process was guided by the access of the researcher to the data, which in research terminology is named as a sampling by 'convenience' (Bryman, 2012). As discussed previously, the RUNIN project's (Annex II) support for international exchanges promoted comparison across partner universities, as well as access to informants (Chapter 3.2.5.2 and 3.2.5.3). The selection was thus partly guided by the programme proposed in the project, which foresaw a research stay at the UAB, as well as the researcher's placement at the UA. The opportunity to realise a second research stay was thus at the discretion of the researcher, and thus the selection of the UT was done according to the criteria above and taking into consideration the comparability with the other case universities. It is also important to highlight that the RUNIN project was in great part inserted within the European Consortium of Innovative Universities (ECIU), emphasising these universities entrepreneurial character. Informants of these universities can thus provide key knowledge of their engagement activities in regional innovation and stakeholder collaboration. The cases selected have thus proven to be suitable for the application of a comparative case-study research design, offering complimentary elements discussed further in the publications herein included. The three universities and their respective regional settings are introduced in further detail in the empirical chapters of this thesis in Part II (see also Table 7 and Table 18).

Table 7 - Overview of case study universities (adapted from Fonseca & Nieth, 2021, Chapter 7)

Name	Universidade de Aveiro (UA)	Universitat Autònoma de Barcelona (UAB)	Universiteit Twente (UT)
Link	www.ua.pt	www.uab.cat	www.utwente.nl
Creation	1973	1968	1961
Students	13 675 (2018)	36 578 (2019)	11 136 (2019)
Staff	2 093 (2019)	6 190 (2019)	3 150 (2019)
Strategic Foci	<ul style="list-style-type: none"> • Teaching, research & cooperation with society; • Entrepreneurialism; • Innovation; 	<ul style="list-style-type: none"> • Innovation; • Internationalisation; • Social responsibility; • Knowledge transfer 	<ul style="list-style-type: none"> • Entrepreneurship • Societal Impact • "High Tech Human Touch" • Internationalisation



	<ul style="list-style-type: none"> • Regional development 		
Engagement Support Structure	<ul style="list-style-type: none"> • Pro Rector for Regional Development • Vice-Rector for University-Society Relations • Technology Transfer Office (UATEC) • University-Business Office (GUE) • Research Park • Business Incubator (IERA) 	<ul style="list-style-type: none"> • Research park; • Vice-manager's office for Research; • Hub B30 	<ul style="list-style-type: none"> • Department for Strategy & Policy • Strategic Business Development Office • Design Lab • Novel-T (incl. tech transfer, science shop, etc.) • Science Park 'Kennispark'
Further relevant education institutions	<ul style="list-style-type: none"> • 4 other Polytechnic Schools that are a part of UA (Design, Health, Management, Accountancy). 	<ul style="list-style-type: none"> • 11 other higher education institutions (detailed list at Generalitat de Catalunya 2016) 	<ul style="list-style-type: none"> • Saxion University of Applied Sciences • Art institute ArtEZ • 2 two further education colleges (ROC Twente / AOC Twente)

3.2.5. Data gathering methods

As characteristic of qualitative research, the samples are generally small, non-random and purposeful, resulting in richly descriptive and comprehensive findings (Merriem & Tisdell, 2015). Also embedded in a case-study design, and focusing on regional innovation strategies and public policy, as well as higher education studies, this research inevitably makes use of policy documents as part of its main data sources. It is a natural source to examine not only the institutional positioning of universities regarding its third mission of engagement (Vorley & Nelles, 2009), but also necessary for assessing the regional strategies for which they have contributed to.

Semi-structured interviews were also another important data source, namely conducted with university staff (top-management, academics, administrative staff) involved with regional government in strategy processes, staff and policymakers from regional government authorities, and other stakeholders involved in the collaborative strategy processes (businesses, associations, third sector organisations, consultants). Utilising multiple data sources and methods guarantees that a spectrum of diverse perspectives are captured (Saldaña, 2011), overcoming potential limitations in utilising a single data gathering method. This 'triangulation', i.e. the use of three or more viewpoints on the issue (Saldaña, 2011; Yin, 2009), can further reinforce the creditability of the study.



Therefore, to ensure the richness of the data set utilised for this study, key policy documents at multiple levels (institutional, regional, national, supranational) were analysed. These include, for example, documents pertaining to the universities' institutional priorities, the regional Smart Specialisation Strategies, national documents on the higher education system, and EU reports related to the current Cohesion Policy framework. A large set of semi-structured interviews function as a primary data source. Access to literature, documents and interviews was particularly facilitated for the researcher in the UA case, seeing as, unlike other PhDs in the RUNIN project, the researcher was in her native country and thus capable of conducting interviews in the informants' language and gaining access to individuals and information that might have otherwise been barred to her. Similarly, in the UAB case, the knowledge of the language granted ease of access to the researcher. Data sources will be further discussed in the following sub-sections.

3.2.5.1. *Policy documents*

Policy documents are a primary source of data that can offer a rich data set on the actions, values and strategies of particular groups (Hogan et al., 2009). As in other qualitative research methods in the social sciences, language is key for a clear understanding, contextualisation and analysis of policy documents and the steering of critical thinking. In particular, policy documents and the concepts therein can be effective in creating order and providing classifications and constructions for reality that enable abstract thinking. Policy documents can often be perceived as tools to understand the inner workings in an organisation, namely helping uncover its cultural identity and *ethos* (Bryman, 2012). This view would see documents as data sources that act like “windows onto social and organisational realities” (Bryman, 2012, p. 554). However, through this research's philosophical stance, reality cannot be discovered in this way.

According to Atkinson & Coffey (2011), the examination of documents needs to account for: (a) the context in which they were produced, (b) their target audience or implied readership, and (c) inter-textuality, i.e. their links to other documents. They can be significant in accomplishing this, and the researcher must examine them aware of the impression the document wants to convey (e.g., favourable to the authors/organisation they represent) (Atkinson & Coffey, 2011; Bryman, 2012). The reality that is therein represented cannot, therefore, be considered as a 'given', and must be connected to the context (construction) and the effects such documents may have – e.g., a policy document would thus be related not just to the policymakers and stakeholders involved in creating it, but also to the target/setting of that policy and to the actions resulting from



it. Policy documents have, nonetheless, an important role in helping to describe current policy objectives and challenges. Thus, if policy documents are contextualised, they can be key data sources to describe the state of the art and encourage social practices. For example, the regional strategies that emerge as a result from the process of university-regional government collaboration could not have been disregarded from the study, as they operationalise potential chains of impact from this relationship. Nonetheless, it is important to emphasise the competing viewpoints that figure in the complex phenomena under analysis. Because of this, causes and effects are difficult to pinpoint both in the study of higher education and public policy and governance. Instead, policy documents are textual artefacts that provide a view into a discursive, tense, and collaborative process. This dialectic is demonstrated in several of the publications included in this dissertation (e.g., Chapter 6).

3.2.5.2. *Interviews*

Given the limitations of policy documents, interviews were selected as the primary data source of the study to provide a more in-depth and comprehensive view of the phenomenon. As a prominent method for data collection in the field of social sciences and qualitative research (Bryman, 2012), interviews are thus a suitable for this research. The focus of the study is on processes, practices and the circumstances of certain contexts, namely the understanding of the dynamics of universities' engagement with regional government in the context of developing a regional innovation strategy and shaping regional development. As previously mentioned, these processes are discursive, and led by different stakeholders, enacting their agency. While some relevant information may not be included in policy documents, the people that have taken part in these dynamics can describe them and explain the rationale behind them, which can then be reconstructed retrospectively. This aligns with the critical realist approach in that the ideas and meaning held by individuals can be equally valued to physical objects and processes in data collection and analysis (Maxwell, 2012).

Through qualitative interviews the researcher is able to draw from conversations with informants to learn more about a unique perspective, setting and situation, thus getting detailed interpretations and in-depth descriptions (Weiss, 1995), even if retroactively (Bryman, 2012). Subjectivity is unavoidable in the qualitative research approach, and especially in interviews. Despite criticisms, this method enables tapping into 'raw' materials "generated in vivo" (Van Maanen, 1979, p. 520), and gain insight on opinions and beliefs – on an individual's social world and personal experiences (Saldaña, 2011). Their subjective quality can be an asset in allowing for the discovery of unknown



elements (namely those not figuring in policy documents) that may enrich the research narrative. The researcher, however, should not ignore its limitations and controversies, but similarly contextualise those accounts through critical thinking.

The choice of informants was based on respondent-driven or snowball sampling (Bryman, 2012), in which an initial group of relevant interviewees was identified through their explicit role in universities' engagement activities, in particular with regional government, or through their direct involvement in the design of the regional innovation strategy. The informants were thus not only able to discuss their involvement and interaction in a detailed manner, but were able to identify other potential informants that they had either interacted with directly or that they knew had been involved in some capacity in this phenomenon. Saldaña (2011) argues that twenty interviews may be enough to provide comprehensive analytical data, though a larger interview set may be desirable to secure a rich analysis. In this study, interviews ceased when the point of saturation was reached, i.e., new insights or informants were no longer being generated/recommended. Each case study followed this same procedure of narrative closure. An overview of the data sources utilised in this study can be seen in Table 8 below:

Table 8 – Data sources utilised for this dissertation.

Data source	Method of data collection
Interview transcripts <ul style="list-style-type: none"> • 41 in Aveiro; • 21 in Catalonia; • 26 in Twente. 	A total of 88 semi-structured interviews through snowball sampling
<ul style="list-style-type: none"> • Regional strategy documents (e.g. action plan, assessment, workshop reports); • Project reports; • Minutes from meetings; • Scientific publications; • Grey literature; • Cooperation agreements; • University, faculty and intermediary bodies' mission statements & strategies; • Newspaper articles. 	<ul style="list-style-type: none"> • Informants' suggestion; • Internet search for key words (e.g. "university + Aveiro + region + agreement"); • Universities and regional authorities' website.

Between the data collection phases of the interviews, there was extensive work on individual and comparative case-studies for the publications included in this thesis. There was therefore a constant back and forth between office and fieldwork, with the advantage of reflecting further on emerging themes to guide the data collection further (Rapley,



2011). Fieldwork was conducted in three main stages, dependant on the timeframe in which the researcher organised its secondments/research stays at the universities in questions. There were also two pilot phases in two of the cases (UA and UT). The one at UA was done within the frame of a PhD course and taken as an opportunity to test the interview guide and assess the main themes to pursue in the later study. The pilot phase at UT was framed by a RUNIN project summer school focused on the university's regional engagement. The interviews were short (approximately 15 minutes) but enabled preliminary insights on the case study. Given the valuable accounts, interviews conducted during the pilot stages were included in this dissertation. Table 9 contains an overview of the intensive data collection periods in each case-study.

Table 9 – Interview data collection phases in each case study.

Case-study	Interviewing phases
University of Aveiro	<ul style="list-style-type: none">• Pilot study in April and May 2017;• Main study in Spring 2018.
Autonomous University of Barcelona	<ul style="list-style-type: none">• Fall 2017;• January and February 2019.
University of Twente	<ul style="list-style-type: none">• Pilot study in June 2018;• Main study in March and April 2019.

Interviews took a semi-structured format as it enabled more flexibility than the closed questions typical of structured interviews, but still following a considered a loose interview guide that, through subtle prompting, ensured the information was kept relevant to the agenda and research topic at hand (Bryman, 2012). They consisted of a pre-determined set of general or background questions, as well as more topic-specific ones, and lasted between 20 and 120 minutes. The proper requirements related to anonymity and confidentiality were followed in accordance with EU guidelines (more on this in Chapter 3.3). Interviews were recorded and transcribed by the researcher(s) and translated into English when needed.

3.2.5.3. Interview guide and demographics

As mentioned, despite the choice for semi-structured interviews to enable a more flexible dialogue between interviewer and informant, interviews still followed a loose interview guide where specific information was sought to enrich the data set of the research project. The interview guide was adapted to fit to the individual cases, but more importantly to the type of informant. In this way, a university representative/staff would not be presented



with the same exact questions as a policymaker, or another type of external stakeholder. The main aims of the interviews were to explore the context of the system of innovation in the region, to understand the dynamics of universities' participation in the regional innovation/development strategy and ascertain its level of involvement in the innovation policy sphere, and finally, to identify points of tension and potential opportunities in this model of engagement. Recurring themes included the university's engagement orientation, key initiatives undertaken at a regional level, involvement with regional government in strategy formulation, implementation and evaluation and dynamics of collaboration. A general interview guide is exemplified here:

Table 10 – General interview guide with examples of questions.

Main themes	Sub-questions	Examples
Profiling of the interviewee	<ul style="list-style-type: none"> • Position and institutional affiliation; • Background and engagement profile. 	<i>What is your role within the organisation and what brought you here?</i>
University in the region	<ul style="list-style-type: none"> • University missions, strategic axes and engagement orientation; • University-region engagement; • Mechanisms for engagement. 	<i>What role does the university play in the regional innovation system?</i> <i>How is regional engagement by the university?</i>
University in regional innovation policy	<ul style="list-style-type: none"> • Partnerships with government authorities at local and regional level; • Role of university in innovation policy process; • Engagement dynamic in strategy process; • Project-level engagement. 	<i>Are there existing partnerships between university and local and regional government authorities?</i> <i>What mechanisms are utilised for this engagement?</i> <i>What role has the university played in the regional innovation policy process?</i>
Trends, challenges and opportunities	<ul style="list-style-type: none"> • Distinguishing university factor; • Integration of the university in regional innovation system; • Impact on regional innovation system; • Future work. 	<i>What distinguishes the university in this type of regional engagement?</i> <i>How could this engagement improve?</i> <i>What are future expectations regarding this engagement?</i>



The interviewer encourages informants to provide their own personal account, starting with the profile of the interviewee. This allows for the building of the narrative throughout the data collection and analysis, but also to its contextualisation in the interviewee's own perception of the phenomenon. As the research project and data collection process progressed, the interview guide was internalised by the interviewer, giving way to a more open dialogue with informants. The semi-structured format provided the flexibility needed to combine experiences and existing ideas with new interpretations and notions (Fletcher, 2017). These interviews were conducted with a variety of regional stakeholders and university employees, at both top-management, intermediate and project level. The demographics of the interviews are summarised in Table 11 below:

Table 11 – Overview of the number of interviews utilised in this dissertation by case study and interviewee type.

Type of interviewee	UA	UAB	UT
Uni. Top-management	7	1	3
Uni. Administrative staff	3	3	10
Academic	8	5	3
Intermediate bodies (e.g. TTOs)	7	3	4
Local/regional policymaker	8	5	3
Local/regional gov. authority staff	2	3	3
Businesses	3	0	0
Other stakeholders (e.g. civic or commercial associations)	3	1	0
Total per case study	41	21	26
<i>Total interviews n= 88</i>			



3.2.5.4. *Regional SF Operational Programme data*

One of the publications in this dissertation (Chapter 8) made use of a quantitative data set in order to assess universities' role in the implementation of structural funds' projects. The Regional Structural Funds grant management portal utilised (CENTRO 2020, 2019) provided consistently updated information on the SF funds allocated and projects granted. In particular, this dataset was utilised to assess the engagement of the University of Aveiro in SF projects, as the portal allowed for identifying the beneficiaries of the SF funds and projects. Despite the usefulness in this evaluation, there was the limitation that the university was only identified as a participating entity in the projects where they were the lead beneficiary. This restricted the utility of the dataset in that it was not possible to assess the broader contribution of the university to other projects, nor the extent of the collaboration networks, since not all stakeholders involved were identified. When the university was the single beneficiary of the projects the indirect contributions of other (internal or external) stakeholders were still disregarded in the portal, even though these projects were meant to be collaborative in nature and involve different partners in their implementation.

As another data source, this dataset was a good point of departure, acting as a supportive tool in data triangulation and enabling the identification of broader societal patterns, as is characteristic of statistical and numeric data (Saldaña, 2011). Nonetheless, interviews were needed to better understand and assess the underlying mechanisms and issues in these projects and activities.

3.2.6. *Analysis*

First-hand transcription allowed for the researcher(s) to get familiar with the case in question, and facilitated the analysis through a first highlighting, condensation, and categorisation of the data. The datasets are thus in the form of transcriptions that were analysed and utilised in different ways throughout the publications that comprise this thesis. Each publication/chapter (Part II) contains detailed descriptions of the analysis process applied for that particular study. This has also been summarised in Annex IV.

A constant comparative method of analysis was applied in this comparative multiple case-study, involving sorting the data into categories that co-evolve over time. The theoretical framework evolved dialectically with the empirical data, with research literature being resorted to throughout the research process, as is also evident through the use of publications in this dissertation. Theoretical propositions, categories and descriptions from the data were then reviewed at different stages, as enabled by the



gradual data collection process. As in the precepts of qualitative research, the findings were presented often in the forms of themes, concepts or categories, with supporting evidence in the form of quotes, mainly from interview transcripts (Merriem & Tisdell, 2015). Nonetheless, the categorisation has also loosely followed the theoretical framework and literature conceptualisations that have emerged in this research (see Chapters 2.3 and 2.4). The theoretical propositions as described in the literature review have thus guided abductive reasoning – the (potential) roles of universities in regional innovation policy processes.

The critical realist ontology that permeates this thesis has given rise to a few similarities in the analytical approach throughout the publications that can be described here. Critical realist analysis consists of a few steps that are not necessarily linear (Fletcher, 2017). The first analytical step taken in this thesis was the identification of ‘demi-regularities’ and first level tendencies at the empirical level of reality (Fletcher, 2017). This was done through qualitative data coding and thick description. The triangulation of the data outlined above also enabled theoretical redescriptions (Fletcher, 2017) or synthetic reconstructions of the case dynamics. Namely, it allowed obtaining complementary perspectives to reach a more complete depiction of the phenomenon. Additionally, it provides a basis for confirmation of the research findings, by enhancing their reliability and validity. It can thus allow for “making retroductive inferences” about the dynamics and tendencies in a situation (McEvoy & Richards, 2006, p. 72). Therefore, the publications that make up this dissertation contain interpretations or stylisations of the facts (Hirschman, 2016) that allow for tackling the research questions. The discussion and conclusion chapters detail the understanding reached of the overall tendencies and regularities.

3.3. Ethics and data management

In accordance with H2020-MSCA guidelines, an ethics’ approval and data management plan was formulated before the start of the data collection process. All informants who took part in research interviews were given information letters and required to provide a written signature of consent forms. The verbal consent of interviewees was also made possible and recorded. Consent included permission to record the interview and to allow for the withdrawal of the interviewees’ contribution from the research project, which was not requested. No vulnerable target groups were included in this study, and interviewees had no dependencies with the project but participated as experts in the topic and allowed to provide their own account, with confidentiality and anonymity being granted. Consideration was also given to data storage, with interviews being coded under aliases



and kept under password protection and encryption on the researcher's personal computer.

3.3.1. Material and project dependencies

As previously mentioned, this PhD thesis is a part of a larger project (Annex II) that harbours other early stage researchers under the umbrella topic of the Role of Universities in Innovation and Regional Development (RUNIN). Detailing the interdependencies generated across different projects and stakeholders was therefore important, to ensure full disclosure on the data management procedures taken in a partly collaborative work.

Research interviews were generally carried out between the researcher and one informant. However, there were other instances where more than one researcher (at a maximum of three) jointly conducted the interview. This was possible given the collaboration spurred by the RUNIN project, in particular within the Work Package 4 on Policies and Interventions, of which the researcher of this dissertation was a part of. This was mostly the case in Aveiro and Twente, where one third to half of the research interviews were carried out in tandem. Data collection benefitted from this in several ways. First, given the thematic similarity between research topics inserted within WP4 – namely research on universities' role in the implementation of structural funds (e.g., Salomaa & Charles, 2019), and universities' role in regional innovation coalitions (e.g., Nieth, 2019) – synergies were enabled for attaining more background knowledge and varied perspectives on the topic, with related issues enhancing the “basic literacy” on the research (Saldaña, 2011, p. 34).

Additionally, this provided the opportunity for collaborative research, evident in the publications herein included, which benefitted from the co-authorship of colleagues from the same work package. Shared interviews were previously prepared and discussed amongst researcher(s) to allow for the consideration of the different research needs across the projects and to maximise the value of the discussion for all involved. In these joint publications, the researcher has contributed at different levels, namely to conceptualisation, design, data collection and analysis and finally abstraction and theorisation. Table 12 provides details on the researcher's ownership of the joint publications, in order of appearance in this thesis. These are comparative works that have benefitted from the insight of other researchers and their expertise on external cases to this dissertation. As such, these cases are not included in the final chapters of this dissertation, seeing as the work was conducted by other researchers.



Table 12 – Approximate calculation of contribution to co-authored publications in this thesis. Source: Author's own elaboration

Publication	Contribution
Nieth, L., Benneworth, P., Charles, C., Fonseca, L. , Rodrigues, C., Salomaa, M. & Stienstra, M. (2018) Embedding entrepreneurial regional innovation ecosystems: reflecting on the role of effectual entrepreneurial discovery processes, <i>European Planning Studies</i> , 26:11, 2147-2166, DOI: 10.1080/09654313.2018.1530144	30%
Salomaa, M., Fonseca, L. , Nieth, L., Benneworth, P. (2020) The Role of Universities in Building Dense Triple Helix Ecosystems in Sparse Regional Environments. In Farinha, L., Santos, D., Ferreira, J., Ranga, M. (eds) <i>Regional Helix Ecosystems and Sustainable Growth. Studies on Entrepreneurship, Structural Change and Industrial Dynamics</i> . Springer, Cham. DOI: 10.1007/978-3-030-47697-7_2	30%
Fonseca, L. & Nieth, L. (2021) The Role of Universities in Regional Development Strategies: A comparison across actors and policy stages, <i>European Urban and Regional Studies</i> , pages 1-18, April, Sage Journals. DOI: 10.1177/0969776421999743	50%
Fonseca, L. & Salomaa, M. (2020) Entrepreneurial Universities and Regional Innovation: Matching Smart Specialisation Strategies to Regional Needs?. In Daniel, A., Teixeira, A. & Preto, M. (eds), <i>Examining the Role of Entrepreneurial Universities in Regional Development</i> (pp. 260-285). Hershey, PA: IGI Global. DOI: 10.4018/978-1-7998-0174-0.ch014	85%
Fonseca, L. , Rodrigues, C., & Capelleras, J.-L. (2020) The Organizational Adaptation of Universities to Smart Specialization: the emergence of strategic network interface units, <i>European Planning Studies</i> , DOI: 10.1080/09654313.2020.1854188	90%
Fonseca, L. ; Nieth, L.; Salomaa, M. & Benneworth, P. (forthcoming 2021). Universities and Place Leadership – A question of agency and alignment. In Sotarauta, M. & Beer, A. (eds) <i>Handbook on City and Regional Leadership</i> , Cheltenham: Edward Elgar Publishing.	35%

3.4. Summary

This chapter provided a detailed overview of this dissertation's framing methodological approach, philosophical stance, and research design. The philosophical framework of critical realism sustained the qualitative approach and methodological choices. As is used frequently in the social sciences, and to reflect the aim to understand a social phenomenon rooted in broader reality, a case-study research design, through both comparative multiple case studies and single case studies, was chosen based on documental sources and semi-structured interviews. This design provides the in-depth exploration of the phenomenon at hand while taking into account contextual determinants, contributing to the identification of wider patterns across regions and countries while still maintaining comparability across institutions. Other studies on



universities' engagement in regional development policies have mainly focused on single case-studies. The present dissertation thus contributes to enriching the debate by exploring the phenomenon across three case study universities and their regions. The publications herein included make use of these case studies to answer the research questions, namely seeking to understand how and under which conditions can university engagement in regional innovation policy processes address regional development barriers (Chapter 2.4).



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Part II – Results and Discussion

Publication I

Publication II

Publication III

Publication IV

Publication V

Publication VI

Publication VII



Universidade de Aveiro
2022



PUBLICATION I

4. Embedding entrepreneurial regional innovation ecosystems: reflecting on the role of effectual entrepreneurial discovery processes

Abstract

Collaboration between regional stakeholders is increasingly emphasized in innovation policy as a way to activate the inherent agency in a regional innovation system. Partnerships of diverse stakeholders have been identified as critical, being able to envisage and implement future pathways that in turn bring change to a region. Thus, the knowledge of various stakeholders is supposed to be combined in novel ways in order to define regional assets and possible future pathways. Nevertheless, it has been recognized that these agency activation approaches often fail to realize these long-term visions initially agreed by partners. We here draw on Sotarauta's notion of policy 'black holes', where regional partners repeat past superficial successes rather than driving into systemic change. We seek to understand the conditions under which regional stakeholders can build realistic and adaptable strategies that shift regional development trajectories. We explore this via a qualitative approach comparing entrepreneurial discovery processes in three peripheral regions, namely Twente (Netherlands), Aveiro (Portugal) and Lincolnshire (UK). We reflect on the potential value of more effectual (opportunistic/ flexible) approaches to entrepreneurial discovery. We argue that black hole problems may arise from the way agency activation strategies conceptualize long-term strategy development, if partners' mind-sets are too causal and lacking flexibility to continually reorient strategies during implementation better towards these collective visions.

Keywords

Entrepreneurial discovery; agency activation; partnerships; causal and effectual approaches

Reference

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4.1. Introduction and Problem-Setting

The encouragement of collaboration between regional stakeholders is increasingly emphasized in innovation policy as a way to activate the inherent agency in a regional innovation system (Grillitisch & Sotarauta, 2018). Partnerships of diverse stakeholders have been identified in a range of different literatures as critical, being able to envisage and implement future pathways that in turn bring change to a region (Cooke, 2005). This phenomenon of stakeholder partnerships is variously referred to as regional innovation networks (Rodrigues & Teles, 2017), regional innovation coalitions (Benneworth, 2007), or multi-level partnerships (Morgan & Nauwelaers, 2003). Related to these theories are a set of corresponding policy prescriptions – such as smart specialization or constructed regional advantage – that seek to identify desirable future opportunities and reorient regional activities using policy interventions that build towards these desirable futures. But there is a problem in that ‘local knowledge which is dispersed, decentralized and divided’ (Foray, 2016, p. 1433). These agency activation approaches expect actors to come together in coalitions and combine their dispersed knowledge to identify and implement promising micro-level solutions, which then affect macro-level regional development paths.

This special issue is intimately concerned with how regional innovation strategies can achieve embedded change and ensure material changes that stimulate innovation-based territorial growth. We identify that one of the kinds of knowledge that may be missing in regional strategic processes is the architecture of embeddedness – existing connections between partners that can facilitate knowledge exchange and allow spill-over effects to emerge. A risk here is that regional strategies underplay the importance of these embeddedness architectures, promoting instead superficial strategic connections, with partners falling into what Sotarauta (2016) terms a metaphorical ‘black hole’. In such situations, subsequent policy cycles may merely repeat earlier shallow successes, rather than embed those successes into more systemic change. A substantive challenge in using these agency activation theories is in understanding the conditions under which regional stakeholders can, through a process of constructive dialogue, build realistic and adaptable strategies that are then implemented to shift regional development trajectories. Likewise, developing regional innovation strategies that help embed activities to create effective entrepreneurial regional innovation systems requires addressing this ‘black hole’ problem. We therefore argue that this issue may arise from a lack of regional capacity to build upon existing embeddedness, something that we frame as being a tendency towards causal rather than effectual reasoning by



regional strategic partners (see Nieth & Benneworth, 2018). The overall research question we pose is: 'are effectual approaches to regional innovation strategy a way to encourage the development of regional embeddedness?'.

We begin by examining the interplay of agency activation approaches and the issue of regional embeddedness, here conceptualized in terms of the topology of existing regional connections that facilitate knowledge spill-over, and how attempts to strategically manage new sectoral strengths can exploit these regional connections. Noting a tendency in these regional stakeholder partnerships to seek to create new industries rather than genuinely new combinations exploiting existing embeddedness (Hospers, 2006), we argue that this is potentially a consequence of a dominance of causal reasoning processes over effectual approaches in regional strategic processes. Focusing specifically on one of these agency activation approaches, namely smart specialization, we reflect on whether there are also the possibilities for more effectual (opportunistic/flexible) approaches to entrepreneurial discovery. To answer our question, we use a qualitative case study approach comparing entrepreneurial discovery processes in three peripheral regions, namely Aveiro (Portugal), Twente (Netherlands) and Lincolnshire (UK), drawing on interviews with key stakeholders as well as analysis of process reports and policy documents. We highlight that there are three main kinds of effectual reasoning repertoire that emerge, using strategies as pathways, creating new flexible organizations and retaining institutional entrepreneurs even where they move to other jobs in a region. On this basis, we argue that there is a prima facie case for a more comprehensive inclusion of reasoning approaches within regional innovation strategies (RIS) literature, as well as to work to remove more causal thinking approaches from policy-prescriptions.

4.2. Towards a theory of effectual entrepreneurial discovery

In the last ten years there has been increasing interest in building understanding of how regions can use policy interventions to create new economic development trajectories and pathways; in this article we focus specifically on the case of smart specialization as a leading agency activation approach. A key mechanism within smart specialization is the 'entrepreneurial discovery process' in which various stakeholders come together to reveal their knowledge and identify potential new knowledge combinations; a 'local concentration and agglomeration of resources and competences in these domains' that might lead to regional competitive advantage (Foray, 2016, p. 1431). Central to entrepreneurial discovery is discovering new fields of opportunity related to existing



strengths, networks and capacity, and therefore can be understood as seeking to exploit existing regional embeddedness. Successful strategic management of this process depends on successful input from regional stakeholder partnerships, which may lack the detailed knowledge of the manifold connections and social relations from which new regional advantage can be created (Yoon, Yun, Lee, & Phillips, 2015). We contend that this might potentially drive the use of causal reasoning, and in this paper, we seek to reflect the outlines of a more opportunistic/flexible approach, what we here refer to as effectual entrepreneurial discovery. We therefore propose a framework for distinguishing causal entrepreneurial discovery process behaviours from more effectual as the basis to understand whether effectual behaviours associate more strongly with more successful agency activation strategies.

4.2.1. Evolutionary approaches to regional economic development & the risk of the black hole

Following the evolutionary regional development approach, we regard places as evolving over the long-term along particular trajectories. In this perspective, the fortunes of their dominant industries drive either investment and growth, or disinvestment and shrinkages. Evolutionary economic geography distinguishes four kinds of regional capacity (Isaksen & Jakobsen, 2017):

- path extension (small changes over time within the same industries/technological paths);
- path upgrading (major changes within an existing path, triggered through the use of new technologies or new modes of organization);
- path renewal (new paths as results of the recombination of existing activities and related/unrelated knowledge);
- new path creation (new industries/technological paths for a region can rely on 'imported knowledge' or the results of R&D activities).

These repertoires are sequentially more complex, with path renewal and path creation depending on regional actors able to envision and implement collective change through a process of mutual negotiation, compromise and coordination. In a recent study on path creation in Denmark, it was concluded that the renewal of paths is a result of joint contributions through 'social action by knowledgeable pioneering individuals, universities, companies and/or governments' (Simmie, 2012, p. 769).

Policymakers seek to influence those developmental trajectories in various kinds of ways, particularly those regions undergoing or at risk of becoming locked into disinvestment-



shrinkage, what we here refer to as sparse regional innovation environments (after Johannisson, 1993). Policymakers seek to upgrade their regional trajectories through concerted programmes of investment in regional innovation, underpinned by regional innovation strategies (RISs). These strategies seek to strengthen interaction within the regional innovation systems, directing the inflow of ideas and investments, and the outflow of knowledge and productions, both building on existing regional embeddedness but also supporting an extension and upgrading of that embeddedness. The smart specialization policy model contends that regional strategies should be driven by mobilizing regional agents (for path renewal and creation) working together around entrepreneurial discovery processes. These entrepreneurial discovery processes seek to best contribute constructively to regional embeddedness, both drawing on and making use of existing embedded networks but also ensuring that activities drive towards embeddedness.

But whilst appealing in a limited number of best practice examples, in reality, smart specialization and entrepreneurial discovery do not always work smoothly in practice. Although partners may easily agree on the overall final destination (the regional innovation strategy) and a first round of interventions, as the strategy develops, they may resort to repeating those approaches initially adopted in the first strategy round. This is problematic because innovation policy is a learning process, in regions with less tradition of innovation policy, a first round of a strategy may involve simple activities that intend to build capacity between partners, for example by giving every partner some projects in which they learn how to participate in collective activities. The rational step then in subsequent rounds is to exploit these connections to leverage the deeper networks within which the various actors are embedded (for further examples see Sotarauta, 2018). However, if there is no strategic collective knowledge of the networks within which partners are embedded, then this can undermine agreeing on collective developments, diluting investments, with the result that the region does not move forward, but stagnates or backslides (see Figure 5).

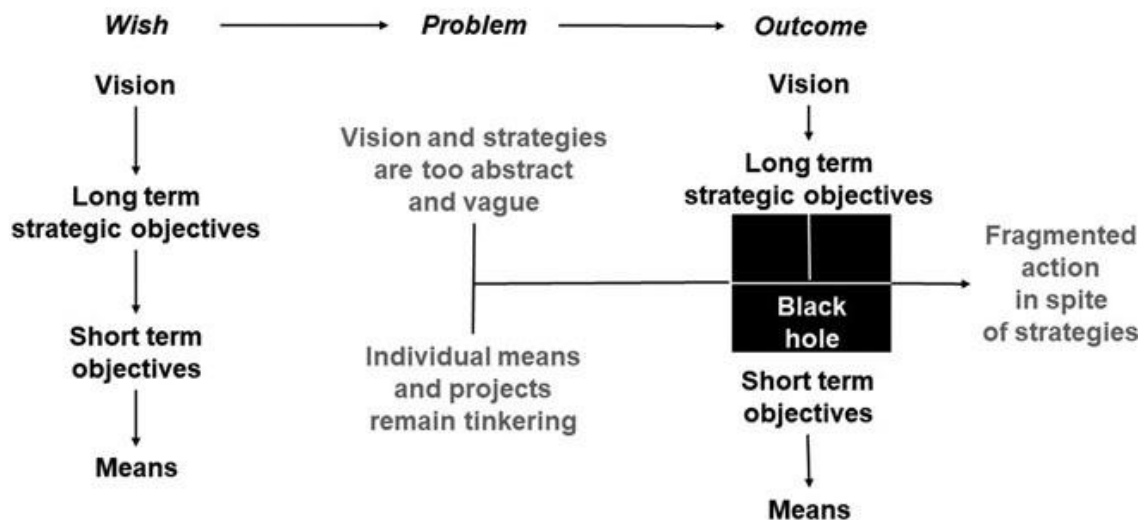
4.2.2. Distinguishing causal & effectual approaches to entrepreneurial behaviour

Our diagnosis here is that there is a systematic mismatch between plausible end goals (creating a new regional trajectory) and the immediate choice of strategic options that emerge through the entrepreneurial discovery process. In particular, there is an issue that the long-term vision fails to take into account the existing networks and structures, and therefore in developing strategies, projects and route-maps neglects existing embeddedness and collective assets in favour of more generally appealing interventions.



We can here see that this entrepreneurial discovery process seems to be echoing a more general issue in entrepreneurship, of entrepreneurs trying to create new businesses in the split between causal and effectual mind-sets in the new venture creation process (Sarasvathy, 2001). Sarasvathy argued that a common mistake of starting entrepreneurs was that they identified the desirable endpoint and then set out strategies to get to those endpoints. An example here is that technology businesses typically are regarded as requiring venture capital to grow, and therefore starting entrepreneurs are often seen to develop a business plan to acquire venture capital, what Sarasvathy terms causal reasoning. By contrast, more experienced entrepreneurs would realize that they needed to acquire resources to grow the balance sheet and would look around for the most readily available resources given their own personal situations and contacts, an effectual reasoning approach. Causal entrepreneurs typically have great problems and inflexibility in adjusting to circumstance when reality does not follow their causal trajectory to the desired end-state. Conversely effectual entrepreneurs have the flexibility to respond opportunistically by continually reviewing the opportunities and resources they command and then developing iterative strategies that will bring them closer to the desirable end-state.

Figure *Error! Unknown switch argument.* - Simplified illustration of the black-hole of classical strategy development.



Source: Sotarauta (2004)

Her current analytic framework distinguishes causal and effectual approaches in terms of five overarching attitudinal differences which manifest themselves in six categories (see Tables 1 and 2 below). Causal entrepreneurs pick their desired future and seek to realize that, whilst effectual entrepreneurs try to move towards more desirable future end points and away from less desirable future situations. There are a number of different



kinds of belief that characterize causal entrepreneurial reasoning (i) the future can be predicted, (ii) goals can be selected and then delivered, (iii) risks are best managed in terms of their expected returns (iv) uncertainties and difficulties should be avoided and (v) success requires being competitive with reference to other partners. Conversely, effectual entrepreneurial reasoning believes (i) the future is at least partly creatable, (ii) the achievability of goals primarily relates to personal resources, (iii) risks are best managed in terms of the expected affordable losses, (iv) uncertainties and difficulties are regarded as inevitable and (v) success requires alliances as well as competition with other companies. The distinctions between causal and effectual reasoning are summarized in the following table:

Table *Error! Unknown switch argument.* - Key distinctions between causal and effectual reasoning in entrepreneurial processes.

Issue	Causation	Effectuation
View of the future: prediction vs control	The future can be predicted based on past experiences; knowledge obtained in the past serves to predict the future. It is necessary and useful to accurately predict the future.	There is no need to predict the future; focus on the extent to which you can control the means available to you. Wilful agents pre-commit to the new venture so that markets can be co-created.
Givens: goals vs means	Goals are given. Growth based orientation with a vision of desired ends. Goals determine who to bring on board. Sub-goals come from main goals.	Means are given: who I am (traits, abilities), what I know (personal experience, training, education) whom I know (personal network; family, business school professors).
View of risk and resources: expected returns vs affordable loss	Expected returns: pursue new opportunities based on risk-adjusted expected value. Financials such as loans and investments needed to reach the upside potential.	Affordable loss: invest what you are willing and able to lose. Small bets to invest in adequate opportunities with a focus on limiting downside potential.
Attitude towards unexpected events: avoid contingencies vs embrace contingencies.	Avoid contingencies: take aversive action to avoid obstacles and plan to reduce risk to a minimum.	Embrace contingencies: do not avoid risks, leverage them into new opportunities. Surprise is good for discovering new directions.
Outsiders: competitive behaviour vs partnerships	Competitive behaviour: limit ownership of outsiders. Competitive analysis needed to protect and maximize share of the opportunity.	Partnerships: self-selected stakeholders shape the direction of the new venture. Both parties acknowledge and share rewards and risks.

Source: Authors own elaboration after Dew, Read, Sarasvathy, & Wiltbank, 2009, Read, Dew, Sarasvathy, Song, Wiltbank, 2009, Sarasvathy, 2008, and Sarasvathy & Dew, 2005.

4.2.3. Transposing the causal/effectual model to entrepreneurial discovery processes

We here see that these black holes could potentially emerge in regions when initial strategic discussions produce new opportunities that may not perfectly align with the desired ends, but at the same time are well embedded into regional networks. Viewed through a causal reasoning lens, these assets may have little value because they do not align well with the desired end goal, even if they may represent a perfectly acceptable



stepping-stone towards one desirable future (i.e. they are visible through an effectual lens).

This provides a *prima facie* explanation for Sotarauta's 'black hole' problematic, namely that if entrepreneurial discovery processes in regions adopt a causal entrepreneurial reasoning approach rather than an effectual entrepreneurial reasoning approach, they may overlook capacities and incremental gains embedded within existing innovation collective assets in the pursuit of a distant desirable future.

We regard the reason for this situation in that the regional innovation strategy approach in Europe has emerged to emphasize logic, structure and reason, providing a controlled approach for regions to follow to avoid copying supposedly best practice regions (Boekholt, Arnold, & Tsipouri, 1998). Indeed Boekholt et al.'s model of what was then called the Regional Technology Plan approach has been seamlessly transposed into regional innovation strategy approaches in which causal reasoning is central (IRE, 2007; Socintec, 2004). The approach involves systematically developing strategies that collectively agree desirable directions of travel and regional futures. To deliver that desirable regional future, regional partners follow a strictly prescribed process mapping assets, identifying potential linkages and gaps and, finally, proposing policy interventions to fill those gaps. On the basis of Table 13 above, we distinguish the ways that this structured reasoning could differ in the outcomes depending upon the association with causal and effectual entrepreneurial reasoning. Drawing Foray's (2015) characterization for entrepreneurial discovery processes, we produce two stylized models of entrepreneurial discovery processes, summarized in Table 14 below:



Table **Error! Unknown switch argument.** - Stylized distinctions between causal and effectual reasoning in entrepreneurial discovery.

Issue	Causation reasoning in entrepreneurial discovery	Effectuation reasoning in entrepreneurial discovery
View of the future region: prediction vs control	The future region can be predicted based on past experiences and with input from external consultants regarding future trends that allow an accurate future picture to emerge.	Future trends may create opportunities that might benefit or penalize the region; it is important to harness the region to trends that will lead to growth-investment scenarios, and policy can co-create these futures.
Givens: goals vs means	The purpose of a regional strategy is articulated in its goals and visions, setting concrete and measurable targets with means being chosen to deliver those desirable targets (e.g. high-technology job creation).	The purpose of a regional strategy is to articulate assets and capabilities, and in particular the capabilities within networks to create potentially competitive new combinations.
View of risk and resources: expected returns vs affordable loss	Selection of projects and instruments based on return to public investment and leverage against the desired headline targets.	Selection of projects and investments on the basis of what is most necessary to support the regional entrepreneurial ecosystem and to stop negative domino and shadow effects from failures.
Attitude towards unexpected events: avoid contingencies vs embrace contingencies.	Avoid contingencies: take aversive action to avoid obstacles and plan/ select activities to reduce risk to a minimum.	Embrace contingencies: do not avoid risks, leverage them into new opportunities. Surprise is good for discovering new directions.
Outsiders: competitive behaviour vs partnerships	Focus on supporting individual actors to maximize their private gains from innovation activities	Focus on building partnerships and shared collective assets that help to stimulate regional knowledge spill-overs that densify the regional innovation ecosystem.

Source: Authors' own elaboration.

The framework above provides means to address the question of whether there is an association between causal entrepreneurial discovery processes and a failure to develop strategies that embed collective innovation assets through strategic investment programmes. We would hypothesize in this case that these failures to develop embeddedness would be associated with particular kinds of strategic behaviour in RIS processes, namely: attempting to predict a desirable future; operationalizing a pathway to that future with clear targets; selecting processes that deliver against those targets; avoiding risky activities that do not necessarily immediately deliver against those targets; and channelling public investment resources to individual companies to generate those targets. In this paper, we therefore ask the operational research question of 'what are the factors that encourage entrepreneurial discovery processes in less munificent regional environments towards causal rather than effectual forms of entrepreneurial activation?'

4.3. Methodology & introduction to the case-studies

To answer that question, we adopt an exploratory-hermeneutic approach in which we examine a limited number of entrepreneurial discovery processes associated with regional smart specialization. We have proposed a conceptual distinction between two



kinds of entrepreneurial discovery process, and we are thus seeking to understand whether those features are found in reality and what are the underlying dynamics of those situations. We apply a case study approach in which we seek to generate a deep understanding of the chosen situations to be able to effectively characterize the nature of those entrepreneurial discovery processes and relate them back to the ability to progress in smart specialization.

The three case study regions are wrestling with issues of path-creation due to the decline of their traditional industries (textiles and agricultural products). In these regions, regional policy actors have sought to bring together new networks of innovative companies and their universities in an attempt to generate new sources of regional competitive advantage. The case study in each region was based on a similar approach, seeking to understand the policy and strategy processes by focusing on the minutiae of the development of regional innovation strategies. In each region there was a mix of primary stakeholder interviews and secondary documentary analysis within the framework of a larger comparative research project. In this paper we have selected the material relating to their entrepreneurial discovery processes, to stylize those regional processes through a thick description approach. On that basis, we produce a schematic reading of effectual and causal entrepreneurial discovery processes, which in turn provides us with the material to answer our research question.

4.3.1. Aveiro

Located in the Centro region of Portugal, Aveiro is comprised of 11 municipalities of roughly 370,000 inhabitants. Its economy is primarily industrial in the sectors of food, metallurgical, chemical, non-metallic minerals, automobile, electric and IT sectors, with significant exports and a strong SME base (Rodrigues & Teles, 2017). The lead administrative body in Aveiro is the intermunicipal community CIRA, formed following Law 11/2003 which allowed legal personality for municipal associations. CIRA has a non-elected leadership and is associative in character, with its member municipalities granting it certain competencies in regional development to deliver common interests. The University of Aveiro (UA), as a key innovation actor, has encouraged CIRA to build relationships between local and regional actors, such as local governments, higher education and research institutions, firms and industrial agencies. CIRA has promoted a set of key strategic projects around sustainability, innovation, competitiveness and overall development of Aveiro, articulated through CIRA's Territorial Development strategies (2008–2013 and 2014–2020). The first of these was inspired by the Triple Helix model (Rodrigues & Melo, 2013; Rodrigues & Teles, 2017) whilst the latter applied



the principles of the smart specialization framework to ensure compliance with European Structural Funds requirements (Rosa Pires, Pinho, & Cunha, 2012).

4.3.2. Twente

The Twente region, located in the Eastern Netherlands, emerged as a centre of textile and engineering industries, which steadily declined in the post-war period. The region is formally constituted by 14 municipalities – five primarily urban and nine rural – within the Province of Overijssel and shares a border with Germany. Since the early 1990s Twente has developed technology systems and materials industry as an extension of its engineering industries, with some sectors around mechatronics developing high-technology innovative clusters. Yet, Twente persistently lags behind the Dutch average in terms of unemployment and economic growth. The Twente region had formal legal competencies in regional economic development until 2014, when a new national law handed those competencies to the higher provincial level, and in Twente what remained was a purely voluntary group seeking to exert informal leadership. This involved an inter-municipal regional organization, the province and a regional economic development board involving business, government, education and public services. In 2007, regional actors developed a collective Regional Innovation Strategy entitled the ‘Agenda of Twente’ with ‘high-tech’ as an all-embracing theme, aiming to make Twente a top-five European knowledge region. Since 2014, regional partners have developed a new strategy, the ‘Agenda for Twente’, as an investment process with similar but not identical aims for the Agenda of Twente.

4.3.3. Lincolnshire

Lincolnshire is a rural region with significant economic, social and environmental diversity (HEFCE, 2001) dominated by very small-scale, less innovative businesses with North and North East Lincolnshire having a more industrial heritage; Lincolnshire has 41,000 SMEs as well as Siemens’ largest UK manufacturing plant (linked to the University of Lincoln, UoL). The region is primarily agricultural, producing 25% of the UK’s vegetables, and its most dynamic sectors are manufacturing, engineering and agri-food, something reflected in the regional development strategy as well as UoL’s strategic plan. Until 2010, Lincolnshire was part of the East Midlands region, and economic development was the responsibility of the East Midlands Development Agency (EMDA), abolished in 2012 and replaced by a local enterprise partnership (LEP) with substantially reduced resources. Lincolnshire LEP was smaller than EMDA both in terms of its budget and its responsibilities and operated on a voluntary bottom-up basis as a partnership of local authorities and business partners (with rather less representation for the universities than



they enjoyed within the RDAs⁹). In Lincolnshire there is the peculiar situation that parts of the region are in two LEPs, with the Greater Lincolnshire LEP (GLLEP) formed by Lincolnshire County Council along with North Lincolnshire and North East Lincolnshire councils, whilst these latter two authorities are also part of the Humber LEP.

4.4. Entrepreneurial discovery processes in the three regions

Each of the three regions – Aveiro, Twente and Lincoln – has developed a regional innovation strategy in recent years. Partners in all three regions were motivated by a desire to access European regional funds, although none of the regional authorities developed a RIS3 strategy to meet the ex-ante conditionality requirement to access structural funds, being covered by smart specialization strategies at a higher administrative level. In all three regions, there was a genuine desire by regional partners to stimulate a change of regional direction, to create new kinds of innovative business activities that might contribute to improving the innovativeness of regional industry and the wealth of the region more generally. In this section, we present a brief overview of the smart specialization process in each region with particular focus on the entrepreneurial discovery process. In section 4.5 we then turn to consider whether these represented causal or effectual approaches to entrepreneurial discovery.

4.4.1. Aveiro

The 2014–2020 regional strategy of the region of Aveiro built upon the collaborative momentum that came from earlier initiatives. More precisely, the THM-inspired strategy from the previous period of 2008–2013 is considered the first attempt to develop interaction between regional innovation stakeholders, creating the Urban Network for Competitiveness and Innovation. This network brought together CIRA, UA and two major entrepreneurial associations who, for 12 months, participated in active collective dialogue on local innovation challenges and opportunities (Rodrigues & Melo, 2013).

In the more recent period, structural funds shaped the mode of stakeholder cooperation (Rodrigues & Teles, 2017). In the design of the strategy, an entrepreneurial discovery process was attempted with the engagement of a mixed range of regional stakeholders for the discussion, identification and definition of priorities for the development of the region (CIRA, 2014). Besides all the local governmental authorities represented in CIRA, this entrepreneurial discovery process also involved a joint protocol with UA and an Industry Association. It thus represented the Triple Helix approach with government,

⁹ Regional Development Agencies.



higher education institutions and industry all involved in formulating a common strategy for shared goals, underpinned by a joint protocol applied by all partners (CIRA, 2014).

The strategy was explicitly oriented towards accessing European Cohesion funding, therefore adopting European regional innovation policy principles, emphasizing the strengthening of the regional innovation system, and with programmes and actions for the promotion of development, growth, social inclusion and employment. The areas of smart specialization identified consist of: 'Sea and Aveiro Lagoon', 'Information and Communication Technologies', 'Materials' and 'Agri-Food and Forest' (CIRA, 2014). However, while the collaborative nature of this strategy emerged from a certain relative pre-existing context of partnerships and joint initiatives across multiple sectors, the summary of participation in the entrepreneurial discovery process to three major actors indicates the lack of a comprehensive engagement and articulation of stakeholders. CIRA's Council of Mayors¹⁰ and UA were namely the ones that identified and proposed the specialization areas. The entrepreneurial discovery process took place over a two-year period (2012–2014) with discussions dominated by CIRA and UA, a situation also formalized in a protocol that defined the joint ownership of the initiative. The Council of Mayors nominated a team of members and researchers to design the strategy, and the process was approached in three main stages (CIRA, 2014; Rodrigues & Teles, 2017). The first stage involved an analysis of the regional entrepreneurial ecosystem within its wider international context, alongside a survey of regional stakeholders from academia, business, the public sector and civil society. The second phase was a multi-level tuning process, particularly with Centro's RIS3 strategy, Portugal 2020 and the EU Cohesion framework 2014–2020, incorporating assessments of previous regional instruments; priorities and innovation potential was included in this phase, with various regional stakeholders participating in this activity, led by representatives drawn from participating municipalities. The third phase involved developing the action plan and monitoring mechanisms for the projects to permit cross-sectoral and multi-level investments.

Although this procedure benefitted from previously established routines of interaction and cooperation, the greatest tension in this process was in broadening the network of engaged regional stakeholders (Rodrigues & Teles, 2017). Following previous initiatives in Aveiro, the territorial development strategy and the programmes that followed had become extremely reliant upon the 'governance architecture' established by two main

¹⁰ The Council of Mayors is composed of the mayors of each of the municipalities of the region of Aveiro, namely Águeda, Albergaria-a-Velha, Anadia, Aveiro, Estarreja, Ílhavo, Murtosa, Oliveira do Bairro, Ovar, Sever do Vouga, Vagos.



agents, CIRA and UA, who were able to mediate through decision-making deadlocks. While both witnessed an expansion of their institutional role and the scope of their missions, overall modes of participation in the policy process suffered no significant change and call for the engagement of stakeholders remained mostly top-down, not expanding to a more inclusive and bottom-up process. The shift in the policy process needed an enhanced governance arrangement with additional structural capacity, but evolution was restricted to transitioning towards a more complex co-production system (Rodrigues & Teles, 2017).

4.4.2. Twente

In the case of the Twente region, at the end of the first strategic cycle, regional actors believed that any new agenda should be more strategic and regionally relevant, involving more significant stakeholders and avoiding the dilution of priorities that had allowed the expenditure of €1M on a swimming pool under the heading of regional branding. The process was handed in the first instance to a newly constituted Twente Board, a collaborative body formed between 2012 and 2014 with 10 representatives from industry, government and higher education institutions. Although the Twente Board had not been involved in the previous strategy, their mandate was very similar, namely to propose regional strategy that enhanced regional economic development and internationalization, focused upon technology, entrepreneurship and the labour market. The Twente region has long been criticized for its plethora of boards, platforms and valleys that perform largely identical functions, and it was hoped to bypass this institutional tangle by giving the Twente Board overall responsibility, rather than being driven by the regional body under oversight of the municipalities, which had characterized the first strategy.

The process of developing the new strategic agenda for the region started in earnest in 2015, when the Twente Board was first asked for advice on the potential contours of a new strategy, with concrete input for a new agenda collected from January 2017. This first exploratory phase included feedback and constructive contributions from diverse regional actors, with the first draft including input from stakeholders like municipalities, business representatives, educational institutions and civil society. This framework document identified a number of key issues for Twente, including the low skills level, declining rural quality of life, a lack of attention for agriculture and recreation, accessibility, talent retention, regional profile/ branding and strengthening regional co-operation. On this basis, a set of objectives and four action lines were proposed for the next 5 years (2018–2022), building on this exploratory phase, and there were serious attempts in



creating the second regional strategy to address some of the issues that had emerged in the first strategy round (see Table 15).

Table Error! Unknown switch argument. - Examples of the weaknesses of the AvT1 and proposed solutions for the AvT2.

Problem in AvT1	Proposed solution for AvT2
Not all the financed activities were actually beneficial for the region as a whole (e.g. swimming pool, soccer fields)	<ul style="list-style-type: none"> • Clear focus on projects/activities in line with the strategic infrastructure of the region; • Proposed activities have to be in line with the 4 overall action lines and undergo a process of revision of the one of the 4 'action line tables', a financial committee and the Twente Board.
The HTSM sector is a very specific sector, that not everybody, and especially not every project, can identify with	<ul style="list-style-type: none"> • The new focus/spearhead is 'technology' as a whole and not HTSM as a specific top sector; • Technology it is supposed to be an enabler for other things to happen, it is described to be in 'Twente's genes' and can make the region competitive on the long-term.
Very scattered or missing governance and monitoring	<ul style="list-style-type: none"> • The TB will act as a steering and decision-making body that oversees project choice, implementation agendas, etc.; • There will be public tables for each action line which discuss topics and activities within their line and have the power to evaluate and recommend projects; • Interviewee: 'you want to have an interrelation between those different initiatives, so they make each other stronger and you get more impact ... going from short-term to long-term ... not everyone doing something ...'

Source: A'thors' own elaboration.

There were various critical moments and problems in the process of developing the new agenda that showcase the difficulties the diverse stakeholders have encountered. One key problem that emerged was that attempts to sharpen the focus of the strategy raised resistance from participating municipalities. The Twente region has long been characterized by a fear of the outlying municipalities of a domination through the urban municipalities, and particularly the primate city of Enschede. The second strategy proposed to target investments more on the urban areas and more on high-technology areas, and by implication less on the rural areas. At the time of writing, two municipalities had announced they would not participate in the Agenda for Twente, the smallest of the three cities (Almelo) and the western rural municipality of Hellendoorn.

4.4.3. Lincolnshire

In the case of Lincolnshire, the strategic process from 2012 developed a LEP strategy for the first time, with little direct inheritance from EMDA's processes. For the purposes of this case, Greater Lincolnshire LEP's Strategic Economic Plan is the key strategy seeking to influence regional innovation and economic growth. The LEP emerged in a relative hurry because of national political pressure to abolish the regional development agencies, and in the absence of existing strong real networks, developing the strategic plan was a hasty process. The strategy was produced as a result of engagement with



'hundreds of businesses, local authorities and trade bodies'¹¹. However, in this emergent process, the University of Lincoln (UoL) assumed a highly important role. The university's own background endowed it with close links to the County Council. As the University of Humber had opened a campus in Lincoln in 1996 with strong County Council support, which had later become the university's main campus (with its Hull campus closing down entirely). UoL had been a strong advocate for the County Council in bidding for LEP status, and UoL employees were involved in many of the working groups developing the Strategic Economic Plan (SEP), sometimes on partial secondments (Regeneris Consulting, 2017). At the time of writing UoL chaired GLLEPs Innovation council, a subgroup of experienced innovators providing input into the regional innovation elements of the SEP.

UoL emerged as a key player in this SEP and ensured that the regional key priorities were strongly linked back to the university's core areas. The SEP identified three main sectors as priorities – agri-food, manufacturing and engineering and the visitor economy. These were simply identified as the major sources of value added in the region – agri-food is well above the UK average, manufacturing and engineering is a little above average, and the visitor economy whilst near the UK average in size is particularly important to the coastal towns. Additionally, three emerging sectors were identified based on the existence of specific projects or local assets – low carbon, ports & logistics and health & care – areas where there was potential in regional industry as well as research base. Whilst these latter three sectors in particular potentially fit with the principle of smart specialization, they were apparently identified by the LEP board through a top-down process rather than a bottom-up entrepreneurial discovery process, led by local businesses in the sectors. None of these sectors are particularly research-driven, although the university is active in several, supporting local industry through skills and knowledge transfer. UoL has strong links to Siemens in its Lincoln campus, as well as to agri-food through the National Centre for Food Manufacturing located at the Holbeach Campus, with the university undertaking much activity in business services and incubator structures.

The GLLEP developed a strategy for delivering the European Structural and Investment Funds whose innovation focus drew on 'university-led research supporting key sectors; effective knowledge transfer and good quality education and skills development' (GLLEP, 2016, p. 49), as well as greater use of broadband technology. GGLEP claimed that the

¹¹ See: www.greaterlincolnshirelep.co.uk/priorities-and-plans/strategies-and-plans/.



innovation strategy had been developed in accordance with European smart specialization guidance 'driven by analysis of our knowledge/research and development assets, sectoral strengths and competitive advantage' (2016, p. 53). Despite these claims, there was a sense that the strategy emerged as a very traditional horizontal regional innovation strategy, drawing on the university as the main source of local expertise, in an area lacking other research facilities. Indeed, the innovation programme was subcontracted to the university to deliver and focused primarily upon supporting all eligible SMEs with research and development projects, innovation vouchers and advice, rather than targeting in line with smart specialization.

There were two main issues with a more developmental approach to smart specialization in Lincolnshire. The first was the absence of long-term academic networks with a strong regional focus; the relative sparseness of the academic environment made it hard for researchers to maintain an academic profile whilst working with regional businesses, and researchers often moved outside the region, taking their contact networks with them. The second was the fragmentation in the business sector, with many small businesses requiring extensive bespoke support to self-consciously decide to become innovative companies, whilst at the same time also being invisible to regional strategy makers.

4.5. Effectual & causal entrepreneurial discovery repertoires

4.5.1. Aveiro

In the case of Aveiro, it is possible to identify a very strong causal logic running through the development of the more recent regional innovation strategy, derived from its top-down nature between CIRA and the University. Although there were efforts made to involve a wider selection of participants than in the previous triple helix strategy, its bureaucratic logic identified a desire to create certainty around a set of potential future sectors, as well as creating an administrative structure to deliver that certainty. The four sectors chosen in the strategy became an end in themselves rather than necessarily a means of mobilizing actors to propose and develop innovative projects that might create regional spill-over effects. The desire to retain control over the process within the core entrepreneurial discovery team (CIRA and UA) reduced its flexibility to operate and created a rigidity in the process that did not allow it to meaningfully build upon what it inherited from the previous regional innovation strategy. It therefore appears to be associated with this regional innovation stasis.

At the same time, it is possible to identify elements of more effectual reasoning in the entrepreneurial discovery process of Aveiro. Interviewees confirmed that the first



strategy formulation process enhanced the overall capacities of diverse partners, in which they both learned how to work together but also learned about each other's operational capacity below the strategy level. One example of this was the emergence of a regional specialization area that genuinely reflected regional uniqueness. The lagoon area is a dominant physical feature of Aveiro and it is therefore unsurprising that a wide range of different partners had developed different kinds of knowledge and products related to its development.

There were also a number of activities proposed for support that sought to bring different networks together, for example around maritime engineering and ICT, to create new telemetry devices for the ocean. In linking between these two communities with their very different orientations but the shared regional embedding, the regional strategy was able to promote something that had the potential to be useful in terms of building up regional critical mass for innovation.

4.5.2. Twente

In Twente, the regional stakeholder partnership inherited a causal mind-set from the initial regional innovation activity, in which Twente Index had been created to facilitate the measurement of the progress towards the desirable future. In the context of a fragmented group of regional stakeholders, this measurability had persuaded regional partners of the need for coordinated action, but at the same time had strengthened a belief that all the valuable contributions were measurable. All activities oriented towards capacity building, particularly the capacity within innovative networks, were therefore only visible if they also included measures in the short-run to stimulate economic activity. Likewise, causal reasoning had been implemented in a far-reaching way in the selection process for new projects and activities, which involved a 3-step procedure through decision-makers at working tables, a financial board and finally the Twente Board itself, evaluating return on investment and strategic alignment. This selection process (what at the time of writing was not complete) was planned to drive activities towards that most obviously fit with long-term goals and away from those that focused on more plausible capacity creation. By trying to plan around possible obstacles and minimize risk, surprise factors and innovative, unexpected developments were eliminated from consideration, encouraging a continuation of initial activities rather than seeking to exploit embedded capacity.

There were also clearly effectual processes present, because regional partners were smart enough to appreciate that the strictly causal logic was missing something. On



some occasions, the three-step procedure deviated from what was intended to move away from selection towards construction, where changes to projects were proposed, or new ideas proposed, to exploit existing capacities and create novel combinations. One area where this was particularly important was around the significance of technological projects for Twente's rural hinterland; the initial emphasis on being a leading technological region was quickly realized as being irrelevant for these rural regions, and therefore efforts were made to articulate a wider range of regional strengths. A final effectual element can be seen in the plethora of boards and structures that typified Twente emerging out of a reluctance to omit any potential from strategic processes and to build in substantive redundancy to strategy processes. Calls to 'simplify the structure' can therefore be regarded as being underpinned by a causal element that overlooks the coupling between substantive networks that was regarded as important to stimulate economic development in a region with a strong understanding of its own shortcomings.

4.5.3. Lincolnshire

In Lincolnshire, a number of different causal lines of reasoning can be seen in the processes towards the creation of the GGLEP and its regional strategy. Firstly, the partnership was created in great haste and underpinned by a political need to create anything to replace the abolished regional development agency. In this process, what was necessary was to have a long-term vision and a first short-term plan to achieve it, in the context of partners with no underlying knowledge of the capacities embedded into regional networks. Instead of finding partners and creating networks around regional assets, the logic that prevailed in this interest was the need to fulfil functionalities that created the basis for cooperation.

Additionally, the clear role of the UoL in identifying core areas of the regional strategy, in line with its own preferences, hints toward causal logics, that support individual actors more than creating partnerships to stimulate knowledge sharing and spill-overs. More generally, the definition of emerging sectors within Lincolnshire was described by a number of interviewees as a primarily top-down process, with little capacity to embrace contingencies or leverage new opportunities.

At the same time, some aspects of effectual thinking can be identified, particular as far the processual arrangement of strategy making was concerned. A key element of this was the way in which the UoL seconded a number of staff to work at the county council. These secondees were working to identify common ground between partners and to build a wider, shared understanding in a way they believed could not be delivered



through orchestrated periodic meetings when attendees were representing their host institutions. Although the level of common purpose appeared not to be as great as that in Novel-T in Twente, this bilateral secondment created a sheltered space where a common interest could be built up as the basis for coordinated actions towards more representative regional outcomes. It is important not to exaggerate how extensive these effectual logics were (particularly given the speed with which regional partners found themselves having to develop the strategy). Nevertheless, even where top-down processes were used to identify priority sectors (a causal form of reasoning), there was a sense amongst partners that this was a temporary situation for the purpose of capacity-building and developing a better understanding of regional innovation access.

4.6. Reasoning approaches in entrepreneurial discovery processes

We now relate this to our overall conceptual framework, which has sought to distinguish the dynamics of causal and effectual reasoning evidence in entrepreneurial discovery processes creating regional innovation strategies.

4.6.1. Causal reasoning in entrepreneurial discovery processes

On the basis of our three case studies, we identify three causal reasoning repertoires recurring in these different cases, namely that strategic choices ‘freezing’ at the moment of publication, the complex project selection reflects those moments of ‘freezing’, and a tendency to select partners based on their parent organizations rather than their capacity to mobilize capacity for regional collective action. These three factors together tended to have the common effect that continually undermined progress and led to situations of strategies repeating themselves rather than adding up over time to represent a coherent programme of interventions that would contribute to knowledge-based regional development.

Firstly, it was clear that the defined strategies froze at the moment in time to which they were reacting, and before this point there was some flexibility to choose between different potential directions. However, once the direction of travel was chosen, that direction became internalized as a necessary condition rather than one possible desirable future. This in turn engendered an extremely low flexibility to react to future events; in effect, they had made it impossible for themselves to succeed because there was never a chance that exactly those futures would be delivered, but any deviation from that path was seen as being somehow undesirable.



This relates to the second element of causal reasoning within the process, which was the selection of projects to receive funding, and the way in which the derivation of selection criteria from the strategies reduced the flexibility to consolidate and build up projects in interesting and productive directions that were not specified ex ante. This had the effect of leading to all the chosen projects being constructed in an artificial way to be able to prove that they met the requirements of several years earlier, not what was then necessary, and certainly not reflecting the capacities that had been created in these projects that did not immediately and directly relate to what had previously been specified in the 'frozen' strategies. This clearly made it hard for them to build up into overall regional transformation.

The third area of causal reasoning was in the assembly of the individuals to be involved in strategic activities. In all three regions, partners were selected to participate in strategic activities because they held a representative position in one of the participating organizations rather than because they had the contacts, skills and resources to deliver effective projects. The issue here was that these representatives tended often moved on, and therefore those skills, contacts and resources were lost from the strategic team. This provided a third factor which in turn made it hard to build up and develop activities within a region – although there were examples of where individuals had moved between different roles within these partnerships and this had contributed to some progress and away from falling into black holes.

4.6.2. Effectual reasoning in entrepreneurial discovery processes

We have been able to recognize three repertoires of effectual reasoning present in the different cases, where strategies represented pathways, where attempts were made to create flexible organizations that could react to events, and changing participants based on their responses and not their representative function. Firstly, there was an evolution in all three regions away from setting a goal that was ambitious towards setting a goal to adopt a new way of working, thereby avoiding the risk of trying to achieve an unattainable goal. The best example of this was in Twente which abandoned the strategic desire to be a top high-tech region, and instead argued that it wanted to be a region in which technology played a fundamental role, thereby shifting the focus away from GDP levels towards the adoption of new kinds of techniques and practices by regional industry.

Secondly, there were examples of regions adopting techniques and organizational forms to avoid a kind of fossilization highlighted in the causal reasoning. This was most evident again in the case of Twente when there was a parallel discussion structure that reflected



on how the region was developing and what was necessary, and those discussions were fed back to create new projects. Even if that approach did not address the issue of static end goals, the ongoing reflection process brought a degree of updating to the ways partners understood those end goals.

Finally, in all three of the partnerships there was an evolution in participants that was at least partly driven by a desire to refresh partnerships with partners who had resources and assets that could potentially contribute to realizing useful projects. In the case of Twente, further education became involved as it was obvious that the college could contribute and benefit from some of the projects in association with the university of applied sciences around materials innovation and entrepreneurship. The best example of this was seen in Aveiro with the emergence of the Smart Coast Initiative; where a few regional partners realized the importance of connecting different sectors around the maritime topic, until it has become an important part of the strategic direction of the region.

4.7. Embedding effectual entrepreneurial activation in smart specialization processes

In this paper, we have asked the research question of whether effectual approaches to regional innovation strategy are a way to encourage the development of regional embeddedness. Our first observation is that it is indeed possible to distinguish in our empirics between causal and effectual kinds of reasoning in entrepreneurial discovery processes, and they also seem to correspond with what we expected, namely that causal reasoning would be static and restrictive, whilst effectual reasoning was associated with more iterative and progressive strategies. There are three more specific points emerging from our analysis that are salient to answer the question, namely that effectual reasoning is more selective, that particular kinds of processes appear necessary to enable effectual reasoning and that there is a key role for regional leadership (cf. Grillitisch & Sotarauta, 2018). At the same time, we acknowledge that this was a small, exploratory study seeking to understand the dynamics of reasoning in regional strategy processes, and we must remain modest here in our claims, in that they are more suggestive than definitive. Nevertheless, the issue of effectual reasoning appears to be a worthy avenue of study to help improve the embedding of regional innovation systems.

The first issue is that the causal reasoning processes produced regional strategies that were relatively easy for regional partners to support, in that they excluded almost nothing, but at the same time that meant they did not provide a useful selection guide for regional partners. The hard choices that were made were not about choosing between two



equally unlikely future technology sectors but identifying what might be considered as regional styles of innovation, such as Twente choosing to implement technology as its unique selling point or Aveiro's rediscovery of the contemporary potential of its longstanding strengths around marine and maritime technologies related to its lagoon. Although it is perhaps obvious, it is worth emphasizing that this approach, in selecting a few areas that are good enough, is at odds with the whole contemporary public policy approach of new public management (cf. Kickert, Klijn, & Koppenjan, 1997), in which potential choices are made on the basis of scoring, evaluating, comparing and dispassionately choosing. Therefore, this suggests that the effectual reasoning approach needs to be accompanied by a change to market-driven approaches to public policymaking.

Related to the first, our second point is that effectual reasoning emerged in processes that permitted effectual reasoning. In situations where these new public management repertoires dominate – evaluating and comparing competing options – there is almost no room for effectual reasoning to be used. We note that the whole entrepreneurial discovery process as constituted allows for the possibility that it will be causal (comparative) or effectual (constructive), and no guidance is given as to how to drive to one or the other. But we likewise note that the wider meta-narrative of regional innovation policy has been based on a causal logic, that regional innovation systems are knowable, that gaps can be identified and filled. The entrepreneurial discovery process appears to have been intended to change that mindset, but by building on the existing repertoires of regional innovation policy, that embed causal thinking, they undermine the opportunity to drive genuinely constructive innovation policy processes. Delivering Cooke's transversality requires the deployment of novel repertoires that permit and facilitate this flexible and constructive thinking (Asheim, Boschma, & Cooke, 2011)

Our final conclusion relates to the role of regional leadership and these reasoning processes (Beer & Clower, 2014). Representatives in regional leadership forums appear to have to have a primary concern with their individual institution's wellbeing and therefore seek to create strategies that appear to guarantee their institution will benefit from the policy. This drives towards precisely the 'freezing' of strategies that undermine their flexibility, but at the same time that is unavoidable because of their representative role. In all three examples we saw that the real flexibility and leadership was provided by institutional entrepreneurs below the level of the senior leaders, who were able to mobilize and extend their networks to construct promising projects that supported regional embeddedness. This study therefore backs up the argument of Benneworth,



Pinheiro, and Karlsen (2017) that more consideration in regional leadership studies needs to be given to emergent leadership. Most obviously, this highlights the opportunity that emergent leadership creates for effectual reasoning to support in developing embedded regional innovation systems.

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PUBLICATION II

5. The Role of Universities in Building Dense Triple Helix Ecosystems in Sparse Regional Environments

Abstract

University-industry-government relationships driving regional innovation are often discussed by using the shorthand of the ‘triple helix’, referring to any arena where these partners come together. This rapid expansion of the idea’s use risks it becoming a ‘policy concept’ whilst potential tensions of collaboration can be ignored. Instead of ‘happy family stories’ of well-functioning regional partnerships, we seek to explore how triple helix mechanisms may stimulate regional innovation systems in places that have traditionally not had a long history of collaboration. Whilst universities are often dominant drivers of innovation in these ‘sparse’ regional innovation ecosystems, they may not be fit to respond to the identified regional needs.

We address this by using empirics from five regions with relatively sparse triple helix environments and present evidence on the ways in which the universities have sought to play the role of *tertius gaudens*—honest broker—helping to address the stalemates that emerge between partners with very different goals, norms, values and intentions around regional innovation. We identified several processes through which universities can play this role and thereby contribute to densifying sparse innovation environments, increasing agglomeration and diversity whilst helping to address the tensions and problems that densification brings.

Keywords

Regional innovation systems, Peripheral regions, Entrepreneurial universities, University regional engagement, Innovation barriers, Institutional diversity

Reference

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5.1. Introduction

It has become increasingly common to talk about university-industry-government relationships stimulating innovation using the shorthand of the ‘triple helix’. In Europe, the terminology has been used to refer to any arena where these partners come together to stimulate better cooperations. But the rapid expansion of the idea’s use risks it becoming a ‘policy concept’ (Böhme & Gløersen, 2011), something that creates consensus by hiding disagreement. In effect, triple helix collaborations are agreed to be good despite different visions of what constitute good relationships and specifically obscuring tensions in arising collaborations between public, private and civil society partners. In the original triple helix model (THM) of Etzkowitz and Leydesdorff (2000), the underlying mechanism was the *tertius gaudens*, the honest third party, helping to address the stalemates that emerge between partners with very different goals, norms, values and intentions around regional innovation. In much of what is written about triple helix partnerships, there is a risk that these tensions are ignored and the mechanisms by which they are addressed shift into the background behind ‘happy family stories’ of well-functioning regional partnerships (Lagendijk & Oinas, 2005).

We bring these two trends together to explore how triple helix mechanisms build up in places lacking long histories of collaborative relationships between partners and therefore lack the experience in addressing these problems. We focus on places with ‘sparse’ regional innovation ecosystems, where a university may be a dominant innovation driver but without necessarily meeting regional partners’ expressed needs. Although all partners would benefit from denser interaction, these mismatches between partners’ capacities and goals inhibit building closer relationships and thereby addressing these mismatches, trapping the regions in a sparse triple helix vicious circle. We therefore ask the research question: “what roles do universities play in sparse environments in building up triple helix relationships stimulating regional innovation processes?”. We use empirics from five regions with relatively sparse triple helix environments where universities played leading roles in attempting to build up relationships between triple and quadruple helix partners.¹² Applying the empirical material to the conceptual framework derived, the chapter presents evidence from these five regions on the ways in which the universities have sought to play this *tertius gaudens* role, of the honest broker, to address the tensions that can arise, specifically using their global connections to help build better local interactions. The chapter identifies several

¹² The Quadruple Helix refers to the fact that civil society organisations can be considered as a distinct sector of regional innovation networks and therefore deserve their own separate inclusion.



processes through which universities can play this role and thereby contribute to densifying sparse innovation environments, increasing agglomeration and diversity whilst helping to address the tensions and problems that densification brings. This chapter therefore helps understand the ways in which universities can help build more fertile innovation and entrepreneurial ecosystems, thereby contributing to driving regional growth and wellbeing.

5.2. Literature Review

5.2.1. The Problem of Sparse Innovation Environments

Solving the innovation challenge in ways that produce socially equitable as well as economically efficient solutions requires understanding how innovation processes occur. This is particularly applicable to peripheral regions that face materially different challenges to those of the most successful regions from which examples are most frequently drawn (Eder, 2019). Whilst diverse sets of challenges for these groups of regions have been identified by various authors (for an overview see Nieth and Benneworth (2018)), Tödting and Trippel (2005) highlight that peripheral regions lack structural density, with insufficient actors to achieve critical mass; old industrial regions may become 'locked-in', incapable of creating new pathways or interactions, resulting in "ties that bind" (Grabher, 1993).

These challenges have been addressed in practice in weak(er) regional innovation ecosystems in diverse ways. One approach can be linking the peripheral region to urban areas on a national or even international scale (Eder, 2019; Isaksen & Karlsen, 2013). Firms and universities can become important regional actors using international contacts to facilitate knowledge exchange and learning. Isaksen and Karlsen (2013) even argue that 'less emphasis [should be placed] on the endogenous development capacity' of the region, with other geographic scales (national, international) potentially being equally important for innovation. These approaches nevertheless assume that a region has assets, actors and capacities that are sufficiently attractive to external partners to develop these wider linkages.

5.2.2. The Triple Helix Approach

The THM conceptualises the partnering of regional actors for boosting regional innovation capacity (Etzkowitz & Leydesdorff, 2000; Leydesdorff & Etzkowitz, 1998), focusing on the interactive innovation dynamics between three main cooperating actors: industry, government and university. Bilateral relationships concatenate and drive their



regional innovation environments forward, in a heuristic of a helical model of overlaid and reciprocal exchanges (sometimes depicted to resemble the DNA double helix). In its initial formulation, its triptych form was proposed in consideration of emerging tensions and contrasts stemming from dualistic collaborative arrangements. In the introduction of a third element, cooperative actor relationships could be better managed.

The THM was developed from a relatively limited set of paradigmatic cases (e.g. Silicon Valley), assuming a spontaneous emergence of these cooperative links and the development of functional regional partnerships (Lagendijk & Oinas, 2005). However, the original model saw that conflict was a potential driver of innovation: in the *tertius gaudens* mechanism, the ‘third who benefits’, this refers to a third party that can work to create balance and address emerging tensions when otherwise productive innovation relationships founder. This third party would act as an ‘honest broker’, moderating these different intentions, values, goals and norms between actors, mediating rigidities and compensating for any absences, enabling the potential of those innovation relationships otherwise held back by those tensions.

The THM of various stakeholders is part of a much wider family of Territorial Innovation Models (Moulaert & Sekia, 2003). The triple helix model is similar— although not identical—to concepts of ‘regional innovation coalitions’ (Benneworth, 2007), ‘regional innovation networks’ (Rodrigues & Teles, 2017) or ‘multi-level partnerships’ (Morgan & Nauwelaers, 2003), all-encompassing the idea of different stakeholders coming together and providing potential solutions to varied problems (Wilgaard Larsen, 2017). Whilst the idea of partnerships becoming regional ‘possibility-making machines’ (Åkerstrøm Andersen, 2008) is attractive, it obscures the fact that different partners have different aims, motivations, desires and goals. Harmonious and uncomplicated cooperation in ‘happy regions’ (Lagendijk & Oinas, 2005) cannot be seen as the status quo, as a variety of stakeholders ‘each with their own assumptions, ideas, goals and expectations’ (van Drooge & Spaapen, 2017, ‘7 Discussion & Conclusion’, para. 1) need to be aligned, whilst facing different tensions (Nieth, 2019).

In this chapter we combine these two literatures to ask whether these regional partnerships can drive densification processes in these sparse innovation environments, thereby addressing an important lacuna in the literature: moving beyond thinking of sparse innovation environments in terms of processes that operate in successful/dense innovation regions. We specifically address the role of different actors in triple helix partnerships and how they play different roles to address tensions and create new



innovation assets. We ask the research question: ‘what roles do universities play in sparse environments in building up triple helix relationships that stimulate regional innovation processes?’.

5.3. Methodology and Case Studies

5.3.1. Methods

To answer this research question, this study comparatively analyses five universities in sparse innovation environments across varying national and regional contexts: the five universities are all located in sparse innovation environments and all have actively sought to manage their contributions to regional development. The study draws on desk-based research and data from a total of 194 semi-structured interviews, split as following throughout the case studies: 35 interviews in Satakunta (FI), 36 in Lincolnshire (UK), 40 in Twente (NL), 38 in Aalborg (DN) and 45 in Aveiro (PT). These were conducted between 2017 and 2019 with academics, local authorities and other relevant stakeholders (e.g. businesses, intermediary and civil organisations) exploring how universities contributed to supporting regional innovation and entrepreneurial co-operative environments. Questions addressed engagement activities and collaborative projects of relevance undertaken with external stakeholders, emerging tensions and opportunities and the effective or foreseen impact these had on the region and the institutions involved. Interviews were recorded, transcribed and translated into English where applicable.

5.3.2. Cases

The University of Aveiro has played an active and relevant role in the entrepreneurial ecosystem of Aveiro (NUTS III) and Centro region (NUTS II), evidenced in previous studies (Fonseca, 2019; Rodrigues & Teles, 2017). Despite its location in a less developed region, it benefits from a unique lagoon setting in the Portuguese coast and its positioning between the major metropolitan areas—Lisbon and Porto—creating opportunities to develop its innovative assets in the areas of environment, agri-food, ICT and others related to the local industry. UA has boosted regional innovation by engaging in inter-institutional collaborations with both big, medium and small businesses but especially with its continued work with local (municipalities) and regional government (intermunicipal community of Aveiro and Centro region’s commission) in the support of development initiatives, like the incubator network, the science park and the technological platforms.



The University of Twente has been contributing to the regional innovation environment through diverse channels, such as teaching entrepreneurship courses, as well as contributing to regional strategy platforms and supporting a start-up/spinout system which encourages students and researchers to contribute to regional development (mainly in the high-tech sector). Established in 1961, it was created with the aim to revitalise the regions lagging industry and create a knowledge-based environment that would attract students, researchers and companies alike. It has been working with governmental actors such as the 14 municipalities of Twente, cities (especially Enschede and Hengelo) and the Twente region as well as with industrial partners and societal stakeholders (Nieth, 2019). The region and the university have been focusing on expanding as well as supporting high-tech related projects, activities and sectors.

Aalborg University, opened in 1974 after active lobbying of diverse regional interest groups, is situated in the most Northern part of Denmark and combines 11 municipalities. The city of Aalborg constitutes the centre of the region, with the university and much of the industry being located there. Since its creation the university has been an integral part of the regional innovation ecosystem through its active involvement in joint initiatives and platforms (especially internationally known clusters). At the same time, AAU has adopted the problem-based approach for teaching, learning and research, allowing active interaction of students (and to a lesser degree also academics) with the private and public regional stakeholders. The regional industry, which is heavily based on SMEs, used to be dominated by traditional and labour-intensive industries, counts on more growth-oriented knowledge industries today.

University Consortium of Pori, coordinated by the new Tampere University,¹³ is a network of three Finnish universities. Altogether, there are six university consortia scattered across the country in more peripheral regions otherwise lacking access to HE. UC-Pori is located in the Satakunta region in the Southwest of Finland, where the former Tampere University of Technology has offered degree studies in engineering since the late 1980s. It was officially established in 2003, and later on the position of the university consortia was legitimised in 2009 (Ministry of Education and Culture, 2009) to reinforce the societal role of higher education. Currently, the UC-Pori contributes to building a regional innovation ecosystem not only by increasing the local skill level with local access to higher education but also by engaging with regional authorities in policy design and evaluation processes and supporting local SMEs through ERDF funded activities

¹³ University of Tampere and Tampere University of Technology merged in January 2019.



(Salomaa & Charles, 2019). It is active in all regional priority sectors such as energy production, offshore process industry, ports and logistics.

University of Lincoln, located in the rural region of Lincolnshire in North East of England, has had a strong regional mission since its establishment in 1996. Since then, it has expanded rather quickly and become an important driver of regional development, especially through intensive collaboration with regional authorities (Salomaa, 2019). UoL has strived to support regional economic growth by focusing on large-scale, collaborative infrastructure initiatives such as the establishment of Lincoln Science and Innovation Park together with the Lincolnshire Co-Op to attract more large-scale companies to the area. It has also sought to serve the local job market by providing tailored degree education, e.g. in engineering but also increasingly in other local priority sectors, namely, in agri-food and food manufacturing, through National Centre for Food Manufacturing at the Holbeach campus and the Lincoln Institute for Agri-Food Technology at the Riseholme campus.

5.4. The Dynamics of University Collaboration Activities in Sparse Innovation Environments

In this chapter we focus on a set of concrete collaborative projects that fulfilled our criteria in that they involved actors from all three sectors, represented an increase in the density of the regional innovation environment, and actors played different roles in each of these sectors. Four of the cases represent efforts to create density by the development of new networks between different partners, the network for sustainable business development and Matchmaking Schemes in North Denmark, Aveiro's Network for Innovation and Collaboration and health sector and robotics collaboration in Pori. Four of the cases involved developing specific physical infrastructures for improved collaboration, the living lab for lighting in Aveiro, rural campuses and technology hubs in Lincolnshire and Enschede's smart city infrastructure in Twente. A final example was the University of Twente's Professional Doctorate of Engineering scheme, P.D. Eng., which contributed to raising high-level innovation skills in the region.

5.4.1. Network for Sustainable Business Development (North Denmark)

The Network for Sustainable Business Development (NSBD) is a collaboration between various municipalities of North Denmark, local business centres, Aalborg University, a local energy firm and several companies (Kommune, n.d.), aimed at managing different activities in the area of green and sustainable development. The municipality of Aalborg, which secured the network's initial developments, was already engaging actively within



the field of sustainability and has been ‘recognized as a pioneering municipality for crafting local authority commitment to sustainability initiatives’ (Normann, Johnsen, Knudsen, Vasström, & Johnsen, 2017). Today, the network is managed by two municipalities, Aalborg and Hjørring, with a secretariat involving actors from municipalities, university and different technological experts. It is primarily financed by municipalities but also received some EU Structural Funds, and—reflecting the national priority for green and sustainable development in Denmark—there have also been national funds. A NSBD researcher claimed that the idea to create the network emerged in 2008 as a result of an ongoing between researchers at Aalborg University and their municipal counterparts. A project participant noted that this initiative was a ‘a very collaborative effort between the three main partners’ (public, private and university) aiming to create tasks and benefits for everyone: the municipality drove the ‘environmental rationality aimed at monitoring and adjusting operational practices in polluting industries’; the university acted as knowledge specialists promoting technical advancements (Normann et al., 2017). A member argued the network was important for experience and knowledge transfer:

Building up the capabilities of the municipality, and teach the people how to transform from being regulators to being advisors or dialogue partners. We are upgrading both the industry but also the public organisations.

5.4.2. Matchmaking Scheme (North Denmark)

Aalborg University (AAU) and the North Denmark Region created a new cooperation infrastructure in 2007/2008 seeking to facilitate cooperation with the existing business infrastructure in the region, particularly in the region’s remoter rural areas and with SMEs. The original idea of this Matchmaking Scheme was creating new access points for university knowledge, one of the scheme’s initiators describing this as a ‘no wrong door policy’ (Nieth & Benneworth, 2019). The project was constructed to match regional needs, thereby ensuring funding from the regional Growth Forum, the body distributing European and national economic development funds. The new scheme involved two elements: the first was a matchmaking secretariat responsible for project management and organising matchmaking activities and the second were the ‘matchmakers’. There were three varieties of matchmaker created to stimulate knowledge exchange and build up new connections: internal matchmakers (academics and managers from different faculties), external matchmakers (employees of municipalities, business associations or similar institutions) and student matchers (individuals facilitating connections between students and regional businesses). These matchmakers were identified and connected



to each other, and as they were usually well connected, this extended many small networks into a large consolidated arrangement with more perspective of partners' different interests and needs. The secretariat also organised 'municipality tours', and project fairs were initiated, creating new ways for engagement between researchers, students and companies. More recently, new university management decided to refocus the programme as part of a rationalisation of all university knowledge exchange arrangements, partly reflecting national policy shifts in Denmark, shifting the focus to student-business connections.

5.4.3. Network for Innovation and Competitiveness (Aveiro)

The Network for Innovation and Competitiveness (Rede para a Inovação e Competitividade, RIC) was established in 2008 as a 1-year partnership between Águeda municipality (in Aveiro region), UA and its Águeda polytechnic school and firms and entrepreneurial associations. Funded by the EU's regional innovative actions programme, RIC's creation was a purposeful 'introduction of the triple helix model into the political discourse' in Aveiro region (Rodrigues & Melo, 2013, p. 1681), following a belief that this arrangement would help boost local competitive capacity and innovative dynamics. The proposal was driven by the Mayor of Águeda's generally recognised innovative mindset. In turn, UA regarded RIC as an opportunity to implement its regional engagement discourse. Entrepreneurs and firms were enticed by the prospect of accessing and developing innovation assets. More than 100 ideas were proposed (CMA, 2009) although most were rejected due to their impracticality or lack of innovativeness. Six developed into projects, of which the Lighting Living Lab (LLL) was the most notable (see below). Whilst RIC produced few tangible results, it represented the first step to connecting actors and legitimising the inclusion of academic resources in development efforts in Aveiro region. This was profited in future projects and experiments (see, e.g. Fonseca, 2019), including the RunUp network which sought to create more competence networks linking universities and local sectors (habitat, mobility, culture and tourism) in Águeda. National recognition for the RIC led to further similar projects including the Urban Network for Innovation and Competitiveness (RUCI) encompassing all 11 of Aveiro's municipalities.

5.4.4. Lighting Living Lab (Aveiro)

The Lighting Living Lab (LLL) emerged out of the RIC and demonstrates the way that the network drove substantive collaboration between different stakeholders in Águeda. The mayor of Águeda first initiated the notion of the LLL in 2006/2007 in articulating the desire of creating 'an association to create open innovation' in lighting, one of his



municipality's most important industries (70% of Portugal's lighting industry are located in Águeda). The concept of a living lab was then relatively innovative, and close cooperation between the public, private and research sector persuaded actors to undertake the experiment. From the outset, the municipality served as 'the main testing environment' for new lighting solutions, with citizens involved 'to explore the social and behaviour implications of the new technologies and co-design new solutions' (World Bank and ENoLL, 2015). The initiative sought to address regional problems of high energy consumption and local companies' competitive challenges such as intense local competition along with technological challenges incorporating digital electronic technology in diverse lighting products. The LLL's main activities involved organising conferences and workshops, technology development and demonstration, joint participation in exhibitions, joint development and implementation of projects and (research) studies. The university was an important partner as a knowledge provider but also serves as a neutral connector between the different, sometimes very conflicting stakeholders. More recently, challenges such as financing, severe competition between constituent companies and a failure of the university to develop industry-specific training have led to a significant slowdown in LLLs' activities.

5.4.5. UC-Pori's Collaboration with Healthcare Institutions (Pori)

The University Consortium of Pori (UC-Pori) launched several projects together with local healthcare institutions supported by the Satakunta Regional Council and European Regional Development Funds. The consortium was extensively funded by the city council, and researchers felt that that wanted to 'give something back to the community'. These initiatives were built on individual connections, as UC-Pori researchers were required to actively search for partners to find ways to contribute to regional priority sectors (e.g. Salomaa & Charles, 2019). One project sought to assist healthcare professionals using mobile robots with specific functions targeted to elderly people with memory illnesses. The researchers had contacted a local healthcare institution to explore how robotics could be applied in elderly care and the challenges they faced in their daily activities. One issue was that dementia patients easily get lost and need constantly assistance, for example, in navigating out of their room. A set of such repetitive tasks were identified with healthcare professionals and then partly automated, with engineers developing a mobile assistance robot to assist the demented patients. The researchers also invited local businesses to take part in the pilots and creating a new ecosystem through implementing open source software. A second project together with local hospitals aimed to assist surgery patients discharged from the hospital through gamification. In this case,



researchers developed a game that measured whether patients understood the instructions for treatment during home-based convalescence. Both these pilots, producing academic outputs as well as new healthcare innovations beyond regional boundaries, were also potential steppingstones towards larger, international research projects.

5.4.6. Rural Campuses Riseholme and Holbeach (Lincoln)

The University of Lincoln (UoL) aimed to support regional priority sectors, notably agri-food, by establishing satellite campuses located in more rural areas of Lincolnshire. The Holbeach campus, previously a satellite campus of an agricultural college, officially joined UoL in 2002 with a strong support from the local government. The campus subsequently grew rapidly increasing collaboration with local industries (Salomaa, 2019). Following the UoL takeover, the Holbeach campus provided ‘a higher level of technical science based skills that the industries didn’t have before’ an access point for agricultural industries to academic knowledge, alongside helping researchers with relevant expertise for the food sector, such as life and computer science, to better engage. Since 2008, the Holbeach campus hosted the National Centre for Food Manufacturing (NCFM) offering apprenticeships and short courses for food industry employers, as well as state-of-the-art R&D facilities used by both local and bigger international food producers, e.g. Nestlé and Heineken. Following the NCFM’s opening, UoL has been actively working with regional partners to develop the food sector (Salomaa, 2019). In 2016, the Lincoln Institute for Agri-Food Technology (LIAT), located at the Riseholme campus, was established to coordinate and enhance UoL’s contributions to food production and agriculture. Collaboration between LIAT, School of Science and NCFM secured large-scale projects from both national and European funding sources, notably in agri-robotics, where UoL’s management identified a possible strategic opportunity: ‘when you think about the alignment with the regional need and the agricultural sector, and our understanding of where the technological maturity is, we could see agro-robotics would become a bigger thing’.

5.4.7. Lincoln Technology Hubs (Lincoln)

Lincolnshire County Council (LCC) has used European Regional Development Funds (ERDF) to deliver business support programmes: one such initiative sought to encourage local SMEs to apply cutting edge technology by showcasing modern technology in ‘Digital Hubs’ located throughout Lincolnshire. These would demonstrate how modern technology, for example, motion capture cameras, could be applied in manufacturing processes, such as fault detection in production lines. As LCC lacked capacity to operate



the equipment and hubs; they were contracted to third parties, with one being located at the University of Lincoln. University personnel contacted LCC during LCC's search for partners, suggesting that UoL could host a hub: I think I submitted a proposal to them to say what kind of equipment we'd want and what kind of support we would offer companies in return for that equipment, in return for the council investing in us. There were originally five hubs across Lincolnshire, but a review saw this reduced to three as not all hubs were performing equally well: the UoL hub was perceived as running smoothly having engaged with more businesses than expected. One LCC interviewee noted: 'the university uses the hub in a more advanced way I would suggest, tending to use it in a more in-depth-way with businesses looking for technological support'. The problem for the university was in persuading academics to engage with the project as the funds only cover capital investment, the UoL interview noting: 'I have to work sometimes on some goodwill and I have to do quite a bit of persuading to help to get people engaged with this'. However, the collaboration through UoL Digital hub has been beneficial for all parties: it has generated PhD research projects and long-term knowledge transfer partnerships with regional partners.

5.4.8. Smart City (Twente)

In Twente, the municipality of Enschede has adopted the smart city concept in the hope of stimulating the creation of new knowledge resources, attracting funding and promoting international cooperation. Several initiatives have emerged, led both by the municipality and other major regional institutions. The Smart City Enschede project was started in 2017 by the municipality, involving companies, residents and knowledge institutions, proposing Enschede as 'a city where entrepreneurs can test and demonstrate their new concepts, products and services in an open field lab' (Novel-T, 2019). Simultaneously, the University of Twente (UT) launched its own Smart City Initiative, in close cooperation with Enschede's municipality and, later, with the province of Overijssel. Despite UT's initiative being predominantly focused on internally coordinating strategic interdepartmental research and education activities and funding attraction on smart city topics, these two initiatives intersected to generate projects involving both UT and the municipality. The UT's Smart Campus project sought to create a living lab for advanced technologies involving other institutes and local companies. There has also been a focus on involving civil society actors in these partnerships, with one project addressing flooding in a city district using citizens to self-measure and report local groundwater levels. These initiatives were relatively small and lacked longer-term, deeper impacts, in part because of financial pressures. One interviewee noted: 'Despite smart city being



very important, there is hardly capacity or money to really make it successful'. Therefore, albeit a strategic focus area of UT, smart city is not a priority area within the regional strategy, hindering its development and upscaling.

5.4.9. UT's PDEngs (Twente)

The University of Twente (UT) created a professional doctorate in engineering (PDEng) to raise local skill levels through a practically oriented training programme targeting the needs of industry partners, supported by the Cluster Smart Industry East Netherlands project partly funded through European Regional Development Funds (ERDF). There were lengthy discussions with local stakeholders on smart industries and manufacturing, with UT staff preparing an ERDF bid proposing to transfer scientific knowledge on smart industries to local SMES via 18 individual research projects. Another project motivation was identifying mechanisms to use a long-term ongoing training programme to bring together different regional actors more closely together, particularly business partners. The ERDF subsidy cover half the training costs paid by companies, although most PDEng candidates are university employees because that is most cost-effective for the companies. Because firms had no previous experience in accessing ERDF programmes or PDEngs, thus the whole process seemed rather daunting to firms, slowing their recruitment onto the programme, despite the university employing that recruitment to a third party. To facilitate this, regional funds paid for the university to employ PDEng candidates to work on projects of local relevance where there are no identified funding companies, thereby contributing to raising high-level skills in the field of smart industries and manufacturing.

5.5. Discussion

In this paper, we are asking the question of 'which roles do universities play in sparse environments in building up triple helix relationships that stimulate regional innovation processes?'. We are specifically interested in the ways in which universities become involved in projects that have wider benefits other than being purely bilateral knowledge transfer activities. Rather, the focus is on the sharing of knowledge assets that also help other companies to access innovation resources. Although universities are not necessarily interested in generating a profit from their activities, collaborative innovation must nevertheless make sense from their own perspective, and they must derive advantages from it. It is clear from these examples that in regions with sparse innovation environments, there are challenges for universities in participating in these collective activities. In the nine examples presented above, universities have had to play their



regional roles in rather different ways to address these issues and ensure that they can benefit from undertaking those activities.

5.5.1. Universities' Roles in Stimulating Triple Helix Collaboration in Sparse Innovation Environments

One of the main issues identified was that, where universities were interested in stimulating new industries and adoption of new technologies, there were not always regional partners capable of absorbing this knowledge to create new industries and improve competitiveness. What emerged in the examples was, in the case of a mismatch or tension between universities and firms, that the role for government was to help foster interaction by attuning interests and objectives for greater potential. This can be clearly observed in the case of the LLL initiative in Aveiro, where there were both knowledge assets in the university and a set of lighting firms. The intense competition between the companies and within their markets meant that there were no attractive propositions for the university to engage with individual companies, but the LLL initiative created a set of activities, often further subsidised, which helped the university and companies to build up their linkages. We here see one possible *tertius gaudens* mechanism, namely, purposeful mobilising actors' voices and aligning different stakeholders through networking activities to create links for further collaboration and even pilot projects.

A second issue that arises here is that universities in more peripheral areas sometimes face a rather marginal existence. Therefore, external collaboration and societal contributions are regarded internally as a form of existential risk: a badly loss-making collaboration could potentially threaten the continuity of the HEI activities. In the case of rural campuses, support and demand from government can help stimulate the university to prioritise—or value—engaging with regional industrial partners. In Pori's case, local authorities provide substantial financial aid to the UC-Pori campus, which partly steered researchers towards bilateral interaction between local industries and public sector actors. In these collaborations, UC-Pori sought to develop pragmatic solutions to other parties' problems, alongside seeking external funding to support those activities. In this case, it is the university that the government partners must cajole to undertake regional engagement, again with the same potential results of building up incidental relationships some of which then concatenate into more long-lived and sustainable regional innovation activities. In the case of Pori, we also denote the exercise of agency by researchers, rather than institutional leadership. This second *tertius gaudens* mechanism could be considered as government enrolling university capacities to persuade university leaders to embrace engagement more systematically.



A third issue arose in the lack of well-expressed regional demands from partners for knowledge resources, making it hard for government to steer those activities strategically. What we see in both the cases of the Matchmaking Scheme and the rural campuses of UoL is that the universities undertook efforts to make their offer clearer to firms. Part of this involved better coordinating their internal knowledge resources, such as linking allied sectors such as manufacturing and computer science to food technology—as in the UoL case. But this also involved creating linkages outwards, from the university to business contacts, to create pathways by which potentially interested business partners would be made aware—by matchmakers—of the existence of these concrete pathways into the university. In this case, the universities' agency helped resolve tensions between government and business, where there were no instruments that government could use to steer firms towards collective behaviours. In the Matchmaking Scheme, there was even the explicit involvement of matchmakers from the local municipalities to stimulate collective innovation activities. This third mechanism is the activity by the university to mobilise pathways to business users that then allowed government to steer policy to better aid businesses.

Another variety of this mechanism was evident where universities helped articulate the needs of sophisticated industrial sectors to government, encouraging government to use their strategic tools and resources to better support those sectors. Three examples showed universities and businesses working together to create a dynamic set of innovation activities, with these sectors then becoming adopted by regional governance partners as priority sectors. UoL's rural campuses helped identify a high-technology future for the agricultural sector by linking it to automation and company science technologies; UC-Pori used its links to local healthcare providers to mobilise an open-access cluster of robot developers which reinforce robotics' role as a strategic priority sector within the region. In the case of the LLL in Aveiro, the successful 'triple helix' collaboration—although initiated by the Mayor of Águeda—was able to win national recognition and become distinguished at the regional level. This also applies to the National Centre for Food Manufacturing located in the Holbeach campus (UoL), successfully bringing together university knowledge and local businesses through strategic collaborations, whilst mobilising national and international companies. The fourth mechanism is therefore that universities and firms work together to win external resources, in this case often European Structural Funds, that represent a recognition of those sectors' innovative potential and which then see them becoming stronger in regional strategic agendas.



A final mechanism is in the role that universities can play in providing a sense of continuity to partners and provide an ongoing search and matching facility for complementarities between partners. In a sparse environment where resources are difficult to access and develop, the potential to build the concentration of certain capacities by bringing actors together whose assets can complement the needs of the others is an important step to systematising, potentiating and making innovation processes more effective. This is evident in the Aveiro cases of RIC and LLL as well as the case of the NSBD, where knowledge from the university, administrative and financial resources from the municipality and needs, ideas, contacts and experiences from businesses and citizens combined to originate wider benefits. The third party, as can be the university or the municipality in these cases, creates a kind of system of deferred exchange, i.e. providing assets without expecting an immediate return on investment. Thus, whilst complementarities can imply a mutually beneficial transaction, particularly in the case of sparse environments, there seems to be a need to have a stakeholder that can envision long-term effects and generate the effort to fulfil that potential. Whilst creative turnover was relatively weak in the RIC case, possibly characteristic of the element of sparseness in such environments, the capacity to generate a degree of permanence of value is thus desired in the *tertius gaudens*.

5.5.2. Key Barriers to Constructive Triple Helix Relationships in Sparse Innovation Environments

The cases also provide some interesting insights into some of the issues that universities face in functioning constructively in triple helix partnerships in sparse innovation environments; we here identify four main issues. Firstly, universities are very complex actors and engage in these triple helix partnerships in various ways, as strategic leaders through to a kind of surreptitious individual interaction. Secondly, these elements do not interact in a straightforward way, in that researchers remain important in the delivery of the benefits, and strategic frameworks, on their own, are not enough to align universities towards delivering regional contributions. Thirdly, there is an issue of scale in these triple helix activities, in that it is possible to mobilise small activities, but it is much harder to then build those up into something that has a more general regional benefit. Finally, these change processes are extremely long-term, whilst the short-term benefits are not always evident or can even be costly, so there is the issue of who can persuade universities to engage for persistent regional good. It is not clear to us whether these problems are a function of the sparseness, for example, that the issue of the complexity of universities as actors is less material in denser innovation environments where there



are more actors in general. But nevertheless, they seem to serve to constrain the contributions the universities can make to these dynamic forward-moving partnerships.

The first issue regarding universities' organisational complexity cements that the activities that support the triple helix development do not necessarily always originate at the leadership level of the university, nor is it that the university leaders lead in solving tensions in triple helix relationships. These issues were observed in the case of UC-Pori, where the roles of the 'honest broker' were played by researchers and not the university as an institution. This means that universities lack a single set of interests and goals and, in turn, can undermine developing relationships with other actors through this process of attuning divergent interests. Diverse projects in North Denmark were dependent on the network of matchmakers. However, university (and student) matchmakers were restricted in their capacity to connect external partners to their own networks. What they could not always provide was an access to 'university networks' more generally, because they negotiated their participation based on their immediate contacts' interests—interests that were not necessarily those of other academics elsewhere in the university. Likewise, the PDEng programme was designed by a single individual within the UT, and although it could have potentially served to create engaged studentships across the university, its alignment to those particular university interests hindered its diffusion across the institution.

The second issue is that there are constructive relationships between different elements of universities allowing support to be demonstrated for regional activities, but these are not always available when regional partners demand them. With the case of UoL's technology hub, a highly committed individual can autonomously initiate projects with potential long-term effects, but it is not always possible for universities to align their strategic, infrastructure and academic interests in all potential opportunities. University managers may resist engagement—as an existential risk—or prioritise other areas, such as teaching or research quality, and unless engagement contributes to those, engagement cannot achieve an internal institutional traction. University managers are also far more exposed to the exigencies of other kinds of policy-making, so although the matchmakers in Aalborg were generally satisfied with the role of the scheme, a change at the national level meant that it was necessary to reconfigure the whole scheme internally.

This leads to the third problem, which is that it is not simple to upscale from the basis of individual successful projects in the university to a situation where the university



contributes more generally constructively to regional collaborative projects. The PDEng addressed one particular long-standing problem that firms and government had been unable to address: that of high-level skills for smart industries and manufacturing. But, despite creating a new accreditation structure, it was difficult to use that PDEng mechanism to create new pathways for all regional partners to access applied high-level skills within the university. One approach noted here is the creation of dedicated strategic spaces, such as Riseholme and Holbeach campuses, the LLL in Aveiro or the Lincolnshire Technology hub, in which universities are committed to invest in these sites that have a wider regional benefit. But this simply promotes a small activity to become strategically important by increasing the dependence of the university on that activity. It does not find ways to upscale and make more open-facing the universities' knowledge activities that could potentially create regional benefit.

The final issue relates to both the preceding issue of upscaling as well as the role universities may play in providing a long-term source of stability for complementarities in innovation actors and resources. Whilst small projects may have a very clear cost-benefit logic for universities at the individual level, universities, as much as other actors, may find it difficult to see a profitable way to stimulate engagement more strategically in the present, in order to produce longer-term regional benefits that will ultimately strengthen the university. Universities face urgent pressures on their resources and may therefore lack the freedom to systematically prioritise regional collaboration activities except in those conditions where they are organised as these stable, economically sustainable projects. This risks universities overlooking the informal interactions that their employees have with other triple helix actors and hinder concatenating them to achieve the upscaling.

5.6. Conclusion

This chapter has asked the question of 'what roles do universities play in sparse environments in building up triple helix relationships stimulating regional innovation processes?'. We have traced out a set of triple helix partnerships and relationships in five different sparse regional innovation environments and are able to identify the ways in which universities might constructively contribute to improving regional innovation environments. In all these different kinds of relationships, universities and local authorities increase collaboration with the private sector, but the changes emerge through a complex 'spiral' model where both internal and external dynamics of the parties influence one another (Rodrigues & Melo, 2013). In these cases—where there is not a



'natural' critical mass of interaction as a consequence of this sparseness of interaction—existing connections may slowly build sustainable mechanisms to improve the density of the innovation environment. However, nurturing these partnerships into regional success stories requires a lot of work from all parties (Wilgaard Larsen, 2017), as they tend to be fragile and dependent upon the present support environment (Åkerstrøm Andersen, 2008).

A challenge for universities is in linking informal, functional relationships to more formal, strategic relationships in ways that allow universities to maximise their stability and minimise their exposure to volatility. Regional partners can play different kinds of roles to encourage universities to undertake those internal integration activities that can help with the upscaling of triple helix activities to drive these longer-term processes of regional shift. Government can play a regional leadership role, encouraging university leaders to acknowledge their academics' research strength; regional firms can create collectivities to engage with academics to build up a critical mass of interaction activities. In some cases, where necessary, governmental partners may even directly subsidise university leaderships, so they permit their academics to take the risk and create regional contributions responding to business needs. Although universities may have complex internal dynamics, our paper suggests that the *tertius gaudens* principle may apply to these tensions within the university, with external partners helping university internal actors to resolve their tensions and to align strategic priorities with the activities being delivered by their knowledge workers.

We acknowledge that this is a relatively small study of five universities in sparse regions, using research that has been repurposed from other studies to provide a retrospective comparative dimension. This constraint demands a degree of modesty in the claims that we make, and we were unable to claim that the repertoires that we find universities playing are universally present or represent a best practice for universities seeking to maximise their triple helix contributions. Concomitantly, we note that the study provides a nuancing of the original model—that of universities playing a *tertius gaudens* role with respect to government and industry actors to facilitate developing collective regional innovation assets.

There is a range of different repertoires and barriers to be observed here. In some cases, the role of the university is as one of the partners who become trapped through tensions with another, and it is the third partner that plays the honest broker role. In other examples there is more of an orchestration, as solving one problem between partners



leads to a development and new tensions between different partners, with the necessary roles shifting as the innovation environment becomes denser. And it is this modified innovation model that is our contribution regarding the understanding of triple helix relationships in regional innovation contexts, as a diverse and dynamic process between actors with diverse internal and external interests. This issue of the role of internal diversity in shaping triple helix dynamics is not something currently addressed in the literature, and we contend that more reflection is needed to ensure that triple helix approaches retain their analytic salience and applicability to understanding contemporary regional innovation-based economic development processes.

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PUBLICATION III

6. Designing regional development? Exploring the University of Aveiro's role in the innovation policy process

Abstract

With growing pressure to contribute to their region's development, universities are increasingly called upon to engage dynamically in innovation policymaking and governance activities. Previous studies suggest in their collaboration with local and regional government that universities can emerge as animateurs, providing guidance, consolidating networks, and ultimately activating institutional and human agency. This is especially important in the context of less-developed regions, where the unlocking of innovative potential may rest on those factors. This paper provides an extended perspective on universities' engagement in innovation policy processes and, in a broader sense, on the collaboration between these higher education institutions and local and regional government. Through an analysis of the partnership between two Portuguese institutions, the University of Aveiro and the intermunicipal community of the region of Aveiro, this study explores the potential implications on regional innovation policy and the activation of institutional agency in a less-developed context. Policy documents, reports and interview data from 18 academics, top managers, policymakers and other stakeholders show that while institutional expectations differ, collaborative interplays have boosted the formation and growing effectiveness of regional innovation networks, crucial for the development of less-developed regions.

Keywords

Universities, regional development, innovation policy, capacity-building, engagement; policy process

Reference

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6.1. Introduction

Higher education institutions (HEIs) are considered key drivers of regional economic development (Chatterton & Goddard, 2000). With regions progressively dependent on knowledge intensive activities to compete globally (Arbo & Benneworth, 2007), universities can leverage development gaps as local ‘anchors’ of wider economic activity (Goddard, Coombes, Kempton, & Vallance, 2014). As a result, the third academic mission of regional engagement emerged as the institutionalization of this capability and (expected) responsibility of universities toward the socioeconomic development of their regions (Etzkowitz, 1990; Gunasekara, 2006a).

Accordingly, HEIs and scientific knowledge are commonly acknowledged by firms and government authorities as an advantage in the search for innovation, economic growth and social development (Arbo & Benneworth, 2007; Uyarra, 2010). However, while increasingly the case in more developed, high-tech regions (Rodrigues & Melo, 2013), this linkage between science and other institutional spheres is not straightforward in less-developed regions (LDRs). To activate innovation dynamics, they need to circumvent a circumstantially ‘weak’ and fragmented environment, of insufficient research and development (R&D) activity and lack of interaction between regional agents (Rodrigues, da Rosa Pires, & de Castro, 2001). The question is if in this they stand to gain from the knowledge resources provided by a university.

According to Drucker and Goldstein (2007), in the wake of a knowledge-based economy, strategies have been designed by state agencies to leverage the impact of universities in the region. Nonetheless, although such projects have advanced the translation of university knowledge resources into economically viable outputs (Pugh, Hamilton, Jack, & Gibbons, 2016), they may have failed to grasp the full potential of universities’ agency. Conceptualizations of regional development and innovation systems often contemplate the triptych of university, industry and state (e.g., the Triple Helix Model), or even these in combination with a growing number of spheres (e.g., Mode 3). However, university–industry collaboration and research commercialization are usually the focus in the study of these linkages, overshadowing potential benefits and widespread implications of universities’ engagement with local and regional government and their growing importance in policy design.

Albeit a less studied facet of their regional mission, universities’ engagement in governance activities has been increasingly embedded in policy agendas – at least on a supranational, discursive level. The current European Union (EU) Cohesion framework



of smart specialization (Foray, David, & Hall, 2009) considers universities as more than key players, guides in regional innovation strategies' formulation and implementation processes. On a conceptual level, universities' regional governance activities is under-researched. The few existent examples include Gunasekara (2006b), Aranguren, Larrea, and Wilson (2009), Rodrigues and Melo (2013) and Pugh et al. (2016). Though predominantly small-scale studies of short-lived events, these highlight the potential of a mutually beneficial relationship between universities and regional government, in building knowledge infrastructures, learning dynamics and institutional capacity. The above-mentioned authors defend the notion that universities can assume a leading role in this type of engagement, successfully promoting associative or networked governance and more rational and efficient decision-making and planning. It is important, therefore, to analyze latent qualities in this relationship, and to consider whether these initiatives have the capacity to mature and lead to more long-term institutional commitments.

This paper explores the nature of universities–regional government collaboration in the design of territorial development strategies in an LDR. It seeks to answer the following questions:

- Why and how do universities and regional government authorities start collaborating in matters of innovation and regional development policy design?
- What are the main challenges in this type of collaboration during the strategy-building process?
- In what way does the participation of the university shape innovation policy-making and institutional capacity in LDRs?

The paper is structured as follows. The literature review is structured inversely: it establishes the main challenges in unlocking innovation potential in an LDR, followed by an illustration of how universities' engagement in governance and policy design can help overcome them. The next section discusses how universities' incorporation in the policy process has been framed in both discourse and practice, and the main motivations and challenges in this linkage. A case study approach provides an in-depth perspective into the process and institutional dynamics involved, peering into the potential impact of a university in institutional capacity-building, regional governance and development. Consequently, the partnership formed between the University of Aveiro (UA) and the Intermunicipal Community of the Region of Aveiro (CIRA), two relevant institutions located in the LDR of Centro, in Portugal, is pertinent to explore this. It adds to previous literature (Aranguren et al., 2009; Gunasekara, 2006b; Rodrigues & Melo, 2013) by



providing an extended in-depth perspective of this link. Two policy periods are analyzed, approaching opportunities, challenges and the potential implications of institutional collaboration. Documents and thematic analysis of interviews with academics, policy-makers and other regional stakeholders are used. Findings suggest while institutional expectations conflict, collaboration has boosted the formation and growing effectiveness of regional innovation capacity, especially needed in the context of this LDR.

6.2. Activating Innovation in LDRs: Why Universities and Institutional Collaboration Matter

Universities' role in fomenting regional innovation has been widely emphasized (Arbo & Benneworth, 2007; Chatterton & Goddard, 2000). However, while more developed regions with strong innovation systems generally succeed in translating knowledge into the productive sector, LDRs struggle at establishing this connection (Bonaccorsi, 2016; Huggins & Johnston, 2009; Rodrigues et al., 2001). Typical shortcomings of LDRs in promoting innovation-based development include insufficient and inefficient locally based R&D activities, paired with a low demand for innovation from local firms; and institutional fragmentation with lack of interaction between economic and institutional agents (Huggins & Johnston, 2009; Rodrigues et al., 2001). Thus, to foster innovation, LDRs should not just build up infrastructural and fundamentally quantitative and economic factors, but equally consider the institutional, cultural and inherently social dimensions supporting it.

The latter may be the crucial factor to tackle in LDRs, as the skill to engage in collaborative action must be honed to deliver successful regional projects (Morgan & Henderson, 2002). This echoes Hirschman's (1958, p. 25) argument that the great problem in unbalanced development is a 'basic deficiency in organization' and a lack of energetic human agency. This suggests activating individual or shared leadership potentially improves institutional effectiveness (Beer & Clower, 2014; Rodríguez-Pose, 2013). Ultimately, difficulty implementing a coordinated and determined action amounts to not a lack of resources, but an inability in effectively gathering and using them – to deficient communication skills and a failure 'to explore joint solutions to common problems' (Morgan & Nauwelaers, 1999, p. 3). Therefore, successfully interconnecting and capturing institutional actors' willingness and capacity to exchange resources, of a scientific or practical base, should be considered for more viable development policies and regional innovation.



An important actor capable of activating these collaborative practices and innovation dynamics is the university. By supporting a knowledge infrastructure, regionally engaged universities particularly can stimulate regional networking and institutional capacity-building (Chatterton & Goddard, 2000; Pugh et al., 2016). Oft overlooked, their engagement in governance and policy design is an important mean to accomplish this. Universities are uniquely capable of providing resources, analysis, leadership and credibility in regional development strategies and trajectories. Moreover, guided, in principle, by the search of objective truth and a sense of civic responsibility, universities can contribute to rational and informed policy-making and regional governance.

It is believed universities' regional collaboration with policy-makers and engagement in governance activities can trigger effective and sustained learning processes (Aranguren et al., 2009; Gunasekara, 2006b). Furthermore, the general perception in stakeholder networks of universities as 'honest brokers' is an advantage in the power-governed policy sphere, promoting network and collaborative approaches based on mutual trust and enabling decentralized decision-making mechanisms (Gunasekara, 2006b, p. 729). Some studies on this developing link echo these findings, suggesting this collaboration can evolve towards co-generation of knowledge, enable more deliberative democratic processes and build institutional capacity (Rodrigues et al., 2001; Rodrigues & Melo, 2013; Rodrigues & Teles, 2017). Nevertheless, it is important to consider the policy sphere does not easily grant entry. And an encouraging milieu is needed to enable universities' expansion of their engagement initiatives into governance (Gunasekara, 2006b).

6.2.1. From discourse to practice

With the academic literature on economic geography, regional development and innovation increasingly emphasizing the advantage regionally engaged universities can have, interest has also grown on the part of policymakers. This is more evident on a discursive level, where development and political trends lead policymakers to underline the importance of R&D investment, scientific and technological resources and HEIs. Allusions to academic concepts persist, such as the Triple Helix Model of university–industry–state collaboration (Etzkowitz & Leydesdorff, 2000), and its four-helix extension with a public/consumer sphere (Carayannis & Campbell, 2009). There are examples of practical applications of these academic models (Rodrigues & Melo, 2013), but the instances in which these were implemented with academic guidance might be relatively fewer. Ultimately, it is a distinction between an academic guiding concept for public policy and academic guidance itself. The latter has greater probability of grounding a policy to



the local context activating endogenous resources, institutional and human agency, while bringing originality and inventiveness in doing so.

A current example that considers the strategic incorporation of universities in the policy process is the smart specialization concept (Foray et al., 2009). Intended as a tailored innovation policy to decrease regional disparities, its uniqueness relies on three aspects. First, it considers the collaborative character of innovation, delineating a process in which several regional stakeholders (e.g., universities, firms, entrepreneurs) discuss and progressively define areas of competence and growing trends for the region's development – the entrepreneurial process of discovery. Second, it highlights universities as central actors in strategy design, imbuing them with a heightened responsibility in planning and regional innovation. Finally, the European Commission (EC) defined it as an ex-ante conditionality for regions to access European Regional Development Funds (ERDF), implying its mandatory application. This meant a steep learning curve for most regions, but consequently interesting experiments of university–regional government collaboration have surfaced throughout Europe.

Nonetheless, it is evident that putting institutions with different expectations, organizational arrangements and culture working together is not a seamless process. Within universities, integrating the third mission into an institutional strategy and academic routine dictated by the first two is a convoluted process. Academic drivers are different for each mission, and engagement rarely factors into academic evaluation and career progression. This leads to research being detached from regional needs for international recognition (Bonaccorsi, 2016), and to only a limited few entrepreneurial, usually top-management staff externally collaborating (Chatterton & Goddard, 2000). A technological push has also shaped universities' engagement, often to the exclusion of more civic projects. Concomitantly, regional authorities' ability to integrate these complex 'loosely coupled' HEIs into the process has not fully developed. Locally, HEI knowledge may face a lack of absorptive capacity (Bonaccorsi, 2016; Chatterton & Goddard, 2000), and in itself, engagement with regional government can be challenging given administrative fragmentation, urban/rural divides and intra-regional competition. Ultimately, university and government authorities have their distinct missions and visions, accountability mechanisms and bureaucracy. To develop a partnership, traditions of engagement and institutional characteristics of the university system, along with the organization, autonomy, and multilevel obligations of the government authority, need to be considered. As per Aranguren et al. (2009), this highlights the importance of the local context, policy environment and academic culture in shaping collaboration.



Once the link has been made, establishing university–regional government collaboration means balancing the inherent power in policy environments (Aranguren et al., 2009; Nicholds, Gibney, Mabey, & Hart, 2017). This is needed to avoid participation and control asymmetries, which can degenerate into tokenism, i.e., a symbolic inclusion of actors in the process, and/or autocratic or technocratic modes, the latter meaning here more prevalence of university actors. Balance can be achieved by managing conflicted interests and expectations, enabling dialogue and fostering shared leadership (Nicholds et al., 2017). Nurturing interactive collaborative modes can thus benefit these links, and ensure commitment of players involved in procedures and outcomes (Aranguren et al., 2009). Spurring collaboration, implies moving beyond consultancy, where university participation is ‘customer’-oriented, framed as a product, and follows traditional forms of communicating research results, toward an ‘action research’ approach (Aranguren et al., 2009), i.e., frequent interaction, co-design, participatory workshops and shared stakes. While this closeness may hamper actors’ neutrality, trust between partners can thus emerge, contributing to more informed, democratic and impactful policy processes.

Universities have increasingly been studied by their potential to activate innovation dynamics in a region, but their capacity to do so through their engagement with local and regional government in policy-making and regional strategies is under-researched. This literature review’s purpose was to clarify universities’ potential in this area, particularly by stimulating regional networking and build institutional capacity. This is especially important in LDRs, where organizational and collaborative capabilities need to be nurtured more attentively. As universities are progressively invited to participate in regional innovation policy processes, the potential to help activate endogenous resources and institutional and human agency is there. Nevertheless, barriers and opportunities in universities’ collaboration with regional government authorities in policy design still need to be considered, so that such experiences have a greater chance of success. It is important to understand how these links can be forged, developed and strengthened, and why this matters in practice. This study thus explores this through UA–CIRA collaboration in the design of territorial development strategies in an LDR – the region of Aveiro, Portugal. It seeks to provide an in-depth perspective into the process and institutional dynamics involved, and the university’s potential impact in institutional capacity-building, regional governance and development. The guiding questions are:



- Why and how universities and regional governmental authorities start collaborating, namely in matters of innovation policy design and regional development?
- What are the main challenges in this type of collaboration during the strategy-building process?
- In what way does the participation of the university shape innovation policy-making and institutional capacity, namely in the context of an LDR?

The next section presents the case and methods used to examine the policies co-design processes.

6.3. Methodology

The methodological framework is qualitative and interpretative. It seeks to gain insight into the experiences of groups and individuals regarding innovation policy processes in which UA and CIRA partnered in. Specifically, two territorial development programmes, the first corresponding to the 2007–13 period (PTD) (Grande Área Metropolitana de Aveiro & UA, 2008) and the second to 2014–20 (EIDT) (CIRA, 2014). A case study method enables more in-depth exploration, triangulation of data and interpretation of results. While illustrating a particular set of conditions and relationships, there is potential for analytical generalization allowing one to extrapolate logically to theory and social processes in other contexts (Yin, 2009).

Data collection combines policy documents, reports and statements of both UA and CIRA. In addition, 18 in-depth semi-structured interviews were conducted with university academics and top managers, policymakers and other actors involved in the strategies. This allowed for an enlarged perspective of the process itself. Interviewees' selection considered whether they had participated in at least one of the strategy design processes, or whether they managed in some other form the UA–CIRA relationship. It included both top managers and technical staff. To acquire reliable information on the process, it was important to consider that the interests involved, especially from top managers, might skew the openness in delving upon certain topics. Moreover, routinely working on strategy-building and project management inevitably confers different perspectives on achievement. Therefore, consulting both technical and managerial-type staff was necessary for a broader perspective. Equally, interviewing other regional stakeholders, for example, business associations and intermediate offices, conferred other perspectives on the collaboration. Their selection was based on regional relevance and/or their role as intermediates in other projects with UA and CIRA. At the time of



writing, six interviews were conducted with policymakers and technical staff, seven with academics, two with intermediate offices, associated with municipalities or UA, and three with business associations.

Interviews were recorded with an average duration of one hour. Questions included how strategies' design process took place; in what consisted UA's participation and what were the expectations involved; and what benefits or tensions emerged from this collaboration. Collected data were transcribed and coded by identifying persistent and relevant themes. To address the research questions, analysis focused on motivational and contextual factors that enabled the partnership; emerging institutional, organizational and/or interpersonal tensions; and perspectives on UA's participation and its meaning for policy and regional development. Conclusions were drawn from these sources through content and thematic analysis, permitting detailed and contextual documental examination.

6.3.1. A case of innovation co-design

The UA was chosen given the particularities of the region in which it is situated (6), the context of its establishment and the discourse of regional embeddedness and innovation surrounding it. This was reinforced by previous accounts in the literature (Rodrigues et al., 2001; Rodrigues & Melo, 2013; Rodrigues & Teles, 2017; Rosa Pires, Pinho, & Cunha, 2012) reporting on punctual collaborative experiments carried out between the UA and local or regional government.

First, the Aveiro region refers to the agglomerate of 11 municipalities in the Portuguese Centro region's coast, and it is loosely equivalent to the NUTS-III level. It is classified as less developed according to the EC's Cohesion framework¹⁴. Mostly economically based on agriculture until the 1970s, and located between the metropolises of Porto and Lisbon, its peripherality in a highly bipolarized country contributes to this categorization. Nevertheless, its industrial development, aided by UA's creation in 1973, has granted Aveiro district the third highest performance in relative weight in gross domestic product (GDP) and exports (Rodrigues & Teles, 2017). Its industry is highly relevant in the areas of ceramics and materials, agro-food, forestry, information and communication technology (ICT), sea and environment, and metallurgy, with several national leading companies. It is predominantly built of low-tech small and medium-sized enterprises (SMEs), however, and it can be considered sectoral and geographically diffused,

¹⁴ For more information on this categorization, see http://ec.europa.eu/regional_policy/sources/what/future/img/eligibility20142020.pdf.



Figure *Error! Unknown switch argument.* - Portugal with the NUTS-II administrative divisions and the NUTS-III Aveiro region highlighted.



Source: Author's own elaboration.

with no distinctive urban area anchoring industry and with this being practiced concurrently with agriculture (Rosa Pires, 1986).

Second, the context of the UA's creation was one of growing international competition which required massification of higher education and economic regeneration in Portugal. With increasing government investment for new universities to circumvent the Lisbon, Coimbra and Porto triptych, there was a demand from the Aveiro region to have one established there. The UA started in the Innovation Centre of Portugal Telecommunications, with its curriculum first consisting of ICT, ceramics and environmental studies, aligned with the regional economy. Created to respond to local needs, this inevitably shaped its regional mission and association with innovation and technical areas. While this has materialized in a more technology-based knowledge transfer and entrepreneurial model of engagement, in recent years it is argued UA has been shifting to a more civic model with a wider regional focus (Rosa Pires et al., 2012).

Third, previous studies on regional government–university–industry interplays (Rodrigues et al., 2001; Rodrigues & Melo, 2013; Rodrigues & Teles, 2017; Rosa Pires et al., 2012) have been elucidating but punctual in nature. Earlier joint projects cemented the UA–region link, namely a collaboration with a municipal association in 1989, the Municipal Association of the Ria of Aveiro (AMRIA) in matters of environmental pollution. Cooperation between the UA and individual municipalities flourished in the early 2000s,



with punctual Triple Helix-based regional innovation experiments (Rodrigues & Melo, 2013). These paved the way for the more recent collaboration in strategy-making. This effort was encouraged by ERDF requirements, which the Regional Coordination Commission of the Centro Region (CCDRC) at the NUTS-II level could delegate to the intermunicipal (NUTS-III) level, providing a territorial development strategy was designed (Rosa Pires et al., 2012).

Given the characteristics described above, the case study here presented can be analyzed to answer the aims proposed. Namely, to understand what are the triggering factors for universities and regional government to start collaborating on innovation governance and policy design, how this engagement is managed, and why the nature of collaboration is given to a greater or a lesser proximity and continuity. Finally, what the implications of such an arrangement are for regional innovation and institutional capacity. The following section presents the findings, followed by an interpretation of their relevance in this context.

6.4. Results

The findings are presented to understand the partnership's establishment, the involved tensions and UA's role in innovation policy and institutional capacity-building in the Aveiro region. Through the analysis of strategy documents, the territorial development programme (PTD) (Grande Área Metropolitana de Aveiro & UA, 2008) and the integrated territorial development strategy (EIDT) (CIRA, 2014), both institutions' websites¹⁵, and interview data, relevant themes have been identified, granting this section the following structure: first, influencing factors for the establishment of the partnership will be stated, accompanied by the institutional response to the partnership, helping one to understand relevant triggers for the institutions' rapprochement; second, emerging challenges throughout the process are identified for a clearer comprehension of pitfalls; and finally, some outcomes and regional implications of the partnership are listed.

6.4.1. Forging the link between the university and local and regional government

6.4.1.1. *Context, motivations and efforts*

Imbued upon its creation with regional expectations especially regarding industrial regeneration, the UA has characteristically focused on industry cooperation with an entrepreneurial approach. It is pertinent to question then why UA and CIRA partnered in matters of public policy, and how this process developed. Three main motivators are

¹⁵ CIRA': <http://www.regiaodeaveiro.pt/>; UA': <http://www.ua.pt/>.



identified: the policy environment, a historical connection and appeal to a regional mission, and institutional and individual ambitions.

- *Policy environment.* Aveiro region has witnessed a few collaborative and associative experiments throughout the years. In 1989, 10 municipalities banded together under AMRIA to face a shared environmental problem of water pollution. It was also one of the first experiments of working with UA, particularly its environmental sciences department. Then, in 2007, the national and supranational level were promoting sub-regional associative experiments: EU guidelines based on the Lisbon Agenda promoted sub-regional intermunicipal partnerships and the adoption of new methodological approaches to governance and policy-making (Rosa Pires et al., 2012); and nationally, administrative policies encouraged municipal associations at the NUTS-III level, concomitantly granting them partial management of the ERDF. In this environment, 11 municipalities of the Aveiro region came together for a more permanent associative experiment – CIRA, the intermunicipal community of the region of Aveiro. Political and financial factors were thus prominent. Depending on the elaboration of a territorial development programme to access regional funds, CIRA decided to resort to the UA's expertise, concluding its knowledge and resources would represent an advantage.
- *History and regional mission.* UA's historical predisposition toward regional needs facilitated CIRA's first approach. The UA had previously collaborated with AMRIA in solving pollution problems, but it had also worked with single municipalities in a variety of issues (e.g., education, health, planning). While interviewees argued there was a potential lack of strategic and unified vision on UA's part, these small initiatives slowly built a more transformative and enduring relationship between the two institutions. The 'historical commitment towards the future of the region' is referred in the agreement signed between the two (UA & CIRA, 2012, p. 1), and is a part of both institutions discourses (websites, reports, policy documents).
- *Individual doers.* The third motivating factor for a UA–CIRA partnership is related to the role of key individuals. In both institutions, leading actors (not necessarily top management) interested in contributing to the region and advancing UA's role enabled the agreement to occur and developed it to the present fully fledged partnership. As an interviewee in an intermediate position explained, 'the engine is often in one person', mirroring other interviewees' emphasis on the importance of leadership for the process. Namely, as an academic mentioned, 'it was a good



coincidence, that at that time we had motivated people both from CIRA and UA that wanted to get this going, that wanted to make this work’.

Contextual conditions therefore made this partnership possible, but willed interventions by individuals were key. While intermunicipal cooperation was enacted in the whole country, and multilevel political obligations and financial opportunities propelled a strategy, collaboration with the university was enabled in Aveiro by a shared vision of innovation.

6.4.1.2. Institutional and organizational adaptation

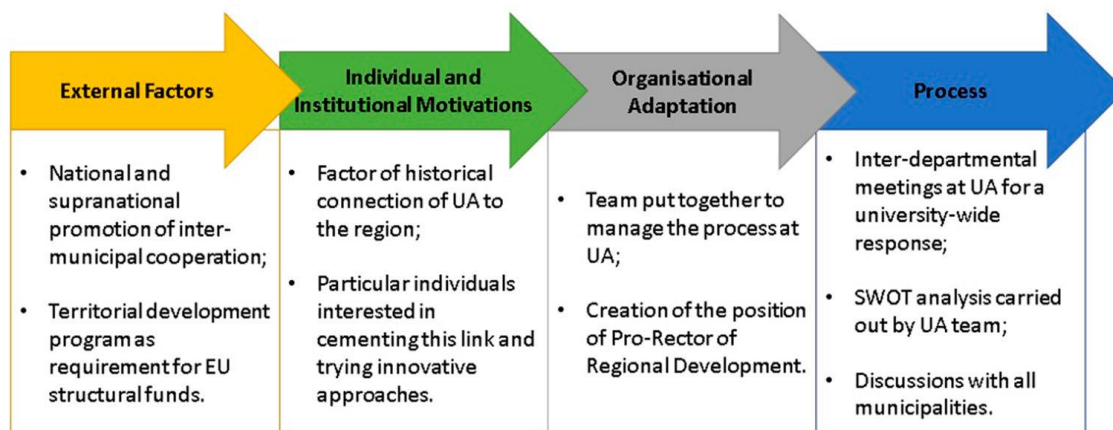
Regarding how both institutions started cooperating in regional strategy-making, a contrast is immediately identified between policymakers and academics. In interviews, the latter suggest UA wanted to get closer to the region and assumed a leading role in this partnership. Policymakers, on the other hand, point out it was their initiative to involve UA. As one CIRA employee humorously recalls asking at the time the agreement was proposed, ‘does UA want to dance with us?’. The proposal to have a (local) university involved in the process departed from CIRA, a decision uniquely divergent from that of other intermunicipal communities in Portugal at the time, who selected a consultancy firm for the strategies’ redaction. As a policymaker denoted, ‘we were eager to make something different, and something different is [...] to try a new agenda’, which existent consultancy firms were not providing. Specifically, a single consultancy firm was mentioned as doing other regions’ PTDs in 2007, and the policymaker emphasized CIRA’s will to reject ‘copy–paste’, ‘try something different’ and involve UA, ‘who has the responsibility’ to realize this. Nonetheless, UA proposed a closer partnership, with shared responsibility and costs, and this was accepted despite potential bureaucratic and administrative challenges in joint ownership.

Proposal agreed, the UA prepared a team of experts, both researchers and rectory staff, which would oversee the project. Interviewees referred to this step as crucial, emphasizing individuals’ roles, on both sides, in guiding and mediating and giving the process vision. One such case was the Pro-Rector of Cooperation and Regional Development, a position created expressly by the UA’s then rector to manage this process and act as point of contact between the UA and local and regional government. By creating these organizational facilitators, UA thus made efforts towards adapting to this new responsibility in regional engagement and policymaking.

UA was responsible for assessing the regional context through technical evaluations. While including other stakeholders in the process was a shared task among partners, UA’s team was the main facilitator. It attempted to involve all university departments in

brainstorming meetings, with 50–100 academics, to ascertain internal interest and tackle how collaboratively to respond to CIRA’s needs. Meetings in each of the 11 municipalities were also organized, where UA’s team provided assessed results and mediated between local stakeholders in deliberative forums (Figure 7).

Figure *Error! Unknown switch argument.* - Summary of the initial phase of the UA–CIRA partnership in the strategy process.



Source: Author’s own design.

6.4.2. Emerging challenges

6.4.2.1. *Scepticism and political interest*

While significant motivating factors were involved, inter-institutional collaboration was not straightforward. As mentioned, CIRA was the one approaching UA to engage collaboratively in strategy-making. However, the joint leadership suggested by UA led several mayors to consider it as dangerous to the (highly politicized) policy-making process (Rosa Pires et al., 2012). Several interviews with both policymakers and academics suggest hesitation related to a resistance to doing things differently, a certain mistrust in academics’ way of working and in evolving towards a joint ownership. According to a CIRA representative, for the first time, voting was not consensual, and the partnership close to not happening, with six municipalities in favour and five against. This led to tensions in the initial stages, concessions and the departure of certain academics from the project. Overcoming initial suspicion to move towards closer engagement modes was a concern for academics:

The very first big meetings, it was a struggle for us [...] to make them trust us, make them know that we might be useful in ways that they weren’t aware of. [...] Difficult initial phase, [...] not only because of the knowledge, or the lack of understanding, also because of the lack of communication.

As underlined by interviewees, ‘egos’ were hampering the process from both the UA and the municipalities’ side. Nevertheless, interviewees consistently regarded key individuals



as decisive in moving the process forward. Finally, joint leadership was maintained, with municipalities agreeing upon the value of this exchange, and with it enduring in following programming periods.

These initial fragilities relate to the tendency for concentrations of power in policy environments (Aranguren et al., 2009). By sharing the project and policy arena with the UA, municipalities in CIRA inevitably abdicated part of their political power and image. As is evident by this quotation from a policymaker: ‘Of course, the university read it as something fantastic for the university role. We said “ok, that’s our work, our vision that was analyzed”, but ok.’ Entering the field of politics was difficult for the UA to manage, with this statement by an academic exemplifying that even within CIRA relationships could be tense: ‘the major problem are the political relationships. This sometimes is what prevents things from going further. [...] The relationship between mayors. If they even have a relationship’.

6.4.2.2. Fragmented participation and managing expectations

While academics and policymakers alike emphasized the participative nature of discussions, with the involvement of both industries and third-sector organizations, statements from other interviewees suggest this was not as meaningful as expected. One from a business association expressed dismay in participating, asking: ‘Why should I work and try to work together if I’m just there to mark my presence?’ As most interviewees stated, the strategies being under the tutelage of two big institutions, CIRA and UA, limited other actors’ influence in the process. The inclusion of the Aveiro District Industrial Association (AIDA) in the period 2014–20 as the managing entity for the structural funds in the region did little to change opinions. It was also unclear whose role it was to incorporate other actors, with policymakers attributing that task to the UA, but with a consensus that ‘municipalities know what their people want’, implying little need to get too much input. As one academic stated, for UA ‘the major concern were the mayors. [...] The main actor that defined the main strategic dimensions of the regions were the mayors’.

Fragmentation could be accounted to university participation as well. When questioned about UA’s engagement in the project, one academic stated: ‘what we had was many people and departments interacting with regional entities, firms, municipalities and so on, but not very institutionalised [...] it was not the institution but professor X in the department Y acting like this’. Policy-makers had a matching perspective: ‘It’s not the university. [...] It’s who at the university [...]’. Furthermore, a policymaker considered UA’s input in the design process as uneven and insufficient, more pronounced in the



formulation phase than in the implementation and evaluation phases, where it is diluted and inconsistent. An academic also stated, 'In the design phase, there was a strong presence [from the university] and a great level of interaction. But then in the implementation phase [...],' suggesting an uncomfortable agreement with the policy-maker's statement.

6.4.3. Outcomes and implications

6.4.3.1. *In the projects*

Several resulting projects from the strategies in both periods included or were managed by UA. Two of the most frequently highlighted by interviewees are the Urban Network for Competitiveness and Innovation¹⁶ (RUCI) and the Business Incubator of the Region of Aveiro (IERA). Their relevance was stated as relating to the number of actors involved, the potential outreach and incorporation of different policy fields, funding attributed and the alignment with regional and national objectives.

- *RUCI*. A PTD project, in 2011 the RUCI of Aveiro region was developed seeking to contribute to the competitiveness and sustainable development agendas. It was framed under the national programming framework, and intermunicipal communities adopted it. In Aveiro region investment amounted to €9 million, €5.9 million of those in ERDF. In total, there were 11 partners in the project, which the UA co-led with CIRA. UA's participation led to the enlargement of typical innovation domains: aside from entrepreneurial promotion and economic growth, Aveiro's RUCI presented a new agenda for health and well-being, sustainability and culture, the latter combining arts and ICT for a 'Culture in Network' programme. UA thus enabled the incorporation of creative elements into the conception of regional development.
- *IERA*. Emerging from the EIDT in 2016, IERA is a network of 11 incubators throughout the CIRA municipalities, also co-funded by the ERDF. It is a strategic institution undertaken by the CIRA, UA and AIDA, with the objective of promoting entrepreneurship, social innovation and economic development in the region. UA's incubator is IERA's main hub and the nexus of contact. In principle, involved incubators should benefit from common resources, scientific knowledge and an integrated regional strategic vision. Practically, criticism of its organizational structure abounds, with little network dialogue occurring between incubators but rather centrally managed by UA. Nonetheless, IERA is considered to have boosted innovation performance in the region and remains one of the most

¹⁶ Translated from Rede Urbana para a Competitividade e Inovação, in Portuguese.



distinguishing projects of the UA–CIRA partnership. The project has now the opportunity to evolve with the recent opening of the science and innovation park, where IERA will be stationed.

6.4.3.2. *Institutional capacity-building*

UA's engagement in the process was consensually believed to have shaped the regional innovation setting. By providing guidance, mediation, mentoring and a new outlook into how innovation is thought about in the region, UA gave the strategies focus, and imbued them with knowledge and creativity. As one academic summarized, 'I think this was a major progress in terms of what they [municipalities] understood might be a collaboration between the University and the system [...].' Material outcomes were rarely mentioned in interviews, with respondents rather emphasizing the opportunity the partnership brought for a regional collaborative framework in innovation to be developed. This implies UA's engagement enlarged the realm of possibilities in innovation policy and practice in the region, perhaps creating new development pathways. It promoted new ideas and approaches, which nationally distinguished Aveiro region (Rosa Pires et al., 2012).

In the governance sphere, an academic interviewee emphasizes this capability of UA: 'We are in fact contributing to improve the capacity of policy-makers in the region. We are contributing to regional development through the provision of knowledge.' The knowledge of the multilevel policy environment and regional dynamics, as well as UA's pedagogical approach throughout the process, was considered as crucial to policymakers. One stated 'there is a clearer guidance' for territorial development since the partnership, with UA having the role 'to keep us working within the framework, because we have the tendency to get out of it and try [...] and work as we can'. UA's guidance implied an increase in the opportunity for municipalities to capture more resources from the regional and national authority, and promoted more informed policy-making.

Similarly, it suggests a capacity to stimulate learning dynamics and organize actors and resources for a common goal. As a policy-maker denoted, the UA's capable of assembling political actors and activating mechanisms in a way they had not been able to do before: 'There is a work that the university can do for us, which is mobilise us, that is, create conditions for us to operationalise, [...] materialise our objectives.' UA's ability to build institutional capacity in the region through this collaborative experiment is likewise described by an academic: '[what was most important] was in fact the effort made to put the university working together with municipalities, with other institutional settings, like the regional commission'. However, the same academic warns that priority



definition and implementation must be an equal priority, so that action is not relegated to the background, behind dialogue and image.

6.5. Discussion

The findings presented above, the result of a case study exploration of collaborative policy-making for regional development between UA and CIRA, have illustrated the motivators for university–regional government partnerships, the main barriers that can emerge in attempting such a collaboration, and the potential benefits in this linkage for the innovation imaginary of a region. This structure, mirroring that of the research questions, is continued below, linking the interpretation of the findings with the literature.

First, regarding how universities and regional government authorities start collaborating in an innovation policy process, it seems clear that the motivating factors found mirror Aranguren et al.'s (2009) emphasis on local context, policy environment, institutional culture (adapted to include individual ambitions) for the enabling of a collaborative initiative. An external impetus and shift in the policy environment, as well as particularities of the regional historical and institutional context of collaboration, were determinant in UA and CIRA coming together. Individuals with a specific vision, ambition and/or cultural predisposition for engaging then allowed them to stay together. UA's academic culture, with a discursive emphasis on a regional mission, facilitated active interest of key people in the process. Individual ambition was included here given academic engagement is not necessarily institutionally centred, but can rest on top managers and/or entrepreneurial individuals (Chatterton & Goddard, 2000).

Regarding these triggering factors, two takeaways should be considered in future studies. First, financial opportunities and a multilevel push from regional, national and supranational authorities were important to propel and structure the territorial programme, giving the partnership sense and shared objectives. Funds' accessibility, though materialistic in nature, is a common necessity for institutions, especially in LDRs, but the inclusion of an institutional partner like a university was not required, highlighting the existence of other preconditions to promote these partnerships. Consequently, and second, innovative thinking on the part of actors and institutions involved may provide the necessary step towards transforming governance arrangements and normalizing collaborative dynamics. As mentioned, CIRA sought new approaches for policy design and regional development, leading toward the collaboration; the UA was equally eager. A cultivation of entrepreneurialism, in the region but namely in these institutions, as well



as a relative openness in the milieu to new ideas, can foster the formation of these linkages.

Second, considering the challenges that can emerge in inter-institutional collaboration, interviews suggest this was convoluted. Academics left the team due to divergences in approach, and different expectations were highlighted as a factor. Policymakers were hesitant to share the project, with some showing caution regarding potential predominance of UA, in a certain level of technocracy or usurpation of political image. These initial fragilities in the partnership and strategy-making process can relate to the tendency for concentrations of power in policy environments (Aranguren et al., 2009).

Another challenge was found during the process itself. There was dismay in UA's lack of interest and support in the later stages, with a heavy input in the formulation phase with staff, research and guidance, but with little involvement in the implementation and monitoring phases. Results in regional development may therefore not have been maximized. Lack of UA's presence in these later stages also suggests a wider problem: the gap between policy and practice. Multilevel policies, as well as diverse actor inputs, add complexity to this, and for some disappointment, and outcomes fell short of initial aspirations.

Ultimately, emerging challenges can be summed up as a lack of effective communication on both sides, which can hamper the management of diverging expectations regarding the sharing of responsibilities and benefits. As a highly fragmented institution, the inclusion of the university was difficult. Entrance into the policy sphere, once granted, can also come with limitations in participation and adaptation to political programmes, requiring some negotiation ability. The increased bureaucracy in inter-institutional partnerships, along with a multilevel alignment involved in regional policymaking, can lead to hesitancy in collaboration and a fading interest throughout the process. This hinders implementation and requires continued adaptation of strategy and outcomes. Increasing awareness of these dilemmas might thus help improve actors' reflexivity and contribute towards a more effective process.

Third, concerning how universities' participation can shape innovation policy-making and institutional capacity, namely in an LDR, it is important to notice that notwithstanding disagreements in approach and initial mistrust, both institutions were able to build on this through a joint exploration of solutions to common problems (Morgan & Nauwelaers, 1999; Nicholds et al., 2017), building a more long-term commitment. This mirrors Aranguren et al.'s (2009) argument that an 'action research' approach gives way to more consistent interaction between actors. The UA gained a relevant role in the policy



process by using its knowledge, resources and capabilities for the mobilization of the wider institutional and innovation landscape. It helped support and manage a regional network by strengthening and mediating dialogue and used a pedagogical approach, thus stimulating learning dynamics and innovative thinking (Aranguren et al., 2009; Gunasekara, 2006b; Pugh et al., 2016).

While it is still too early to assess the strategies' effects on regional development and innovation, in institutional capacity-building the steps taken led the region in a good direction. The lack of interaction between institutional agents – a challenge in LDRs (Huggins & Johnston, 2009; Rodrigues et al., 2001) – has started to be tackled, and the university has played a major role. Effective management mechanisms and leadership were key in fostering collaboration in this LDR. More generally, this study proposes university–regional government's collaboration for innovation policy design to be of great value in various contexts. It is apparent that connecting institutional actors with regional development as a goal is, at least, a worthy pursuit. Findings suggest this enabled more comprehensive and long-term learning dynamics to occur and created opportunities for the uncloning of institutional and innovative capacity.

Albeit a set of circumstances have contributed to the current collaborative framework in Aveiro, this analysis can inform policy-makers and academics in other contexts about the potential benefits and opportunities in participating in a closer form of engagement in policy-making and governance activities (Figure 8). Its contribution to the previously mentioned literature through its more extensive, in-depth perspective has hopefully provoked a more active discussion on this oft-overlooked form of engagement, for a more thoughtful and reflexive approach.



Figure *Error! Unknown switch argument.* - Summary of the findings and discussion sections

	<i>In the case of the UA-CIRA partnership</i>	<i>Take-aways for policy and other contexts</i>
<i>Why and how universities and regional governmental authorities start collaborating, namely in matters of innovation policy-design and regional development?</i>	<ul style="list-style-type: none"> • Policy environment; • Historical tradition; • Individual ambitions and institutional culture. 	<ul style="list-style-type: none"> • Financial motivations seem effective in bringing actors together (at least punctually); • Multilevel policies (regional, national, supranational) that promote collaborative arrangements enable inter-institutional experiments; • Promotion of innovative and entrepreneurial thinking necessary for inventive solutions to collective problems.
<i>What are the main challenges in this type of collaboration during the strategy-building process?</i>	<ul style="list-style-type: none"> • Diverging institutional and individual expectations; • Lack of effective organisation; • Fragmentation of participation; • Dilution of interest in later stages. 	<ul style="list-style-type: none"> • Communication and negotiation abilities must be fostered to facilitate dialogue and adaptation throughout the process; • Lessened bureaucracy may promote and facilitate inter-institutional collaboration and joint partnerships and ownership of projects; • In strategy processes, attention should be given to include outside actors to avoid concentration of power.
<i>In what way does the participation of the university shape innovation policy-making and institutional capacity, namely in the context of an LDR?</i>	<ul style="list-style-type: none"> • Partnership formed with joint responsibilities and discussion; • Pedagogical approach by the university; • Stimulated actor networks and broader regional interaction. 	<ul style="list-style-type: none"> • Effective management mechanisms and leadership are necessary to ensure an efficient and effective strategy process and delivery of results; • Collaborative modes of interaction promote long-term commitment and stimulate actor network; • Shared goals facilitate actor linkage and stakeholder involvement.

Source: Author's own elaboration.

6.6. Conclusions

This paper has explored the nature of collaboration in matters of policy design between a university (UA) and a regional authority (CIRA) in the context of the design of territorial



development strategies in an LDR: the region of Aveiro, Portugal. The UA's role in the Aveiro region's strategy process was the result of a long worked-on collaborative link. CIRA amiably pressured the university to respond to its needs, and institutional mechanisms were created for this knowledge transfer to occur. While perhaps the partnership has not been fully profited upon, with further room existing for UA to engage more actively in the implementation and evaluation stages of the process, the UA–CIRA partnership has greatly furthered development goals in a less-favoured context, with the strategic plan strengthening institutional ties.

Several of the findings mirror the literature concerning influencing factors for engagement and collaboration, barriers and the potential of collaborative modes of interaction in stimulating stakeholder networks and learning dynamics. While universities' role in building institutional capacity has been acknowledged in the literature, the exploration of this role in the context of two strategy-design processes in which the university was a de facto partner of the regional authority is valuable to enrich the field. Some of the motivating factors identified, such as the policy environment and the access to funds, can carry potential implications for future programming periods. But while circumstances might normalize collaboration, only human agency and dialogue can channel effectiveness and learning. A communicative, pedagogical and adaptive approach to align stakeholders better over time seems key. This is what allowed the UA to guide and mediate the process and unlock regional institutional capacity and innovative thinking, presently shaping the region. And it is important when seeking to cultivate collaborative dynamics in an LDR.

This paper expands on the under-researched topic of universities' regional engagement in governance activities, and chiefly in innovation policy design, by providing an extensive, in-depth and long-term perspective on a partnership between a university and a regional authority in strategy design. By illustrating influencing factors and barriers for the effectiveness of the partnership, it approaches a relevant topic not just for academics but also for policymakers seeking to develop such collaborations. Its contribution to the fields of innovation, higher education and planning can be further expanded upon by analyzing more specific territorial dynamics and particularities of LDRs, as well as engagement limitations for universities and academics in this type of engagement.

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6.8. References

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PUBLICATION IV

7. The Role of Universities in Regional Development Strategies: A Comparison across Actors and Policy Stages

Abstract

The emergence of collaborative approaches in innovation policy and regional governance has increased expectations for universities to engage in strategy making and assume broader roles and responsibilities. Nonetheless, complexities inherent to the policy process, regional context and universities' own institutional and organisational capacity are often ignored or under-explained when framing universities' roles. Although these roles are frequently introduced, they have been superficially conceptualised in the literature. This study develops a deeper theoretical and empirical understanding of universities' contributions in the different stages of regional innovation strategy processes. Through a comparative case study of four European universities, it explores the variation of these roles by policy stage and university actors involved in the strategies. Findings suggest universities have expanded to perform new planning-related roles (e.g. consultation, mediation) and that diverse factors (e.g. the regional context, such as urban versus peripheral) determine their participation in regional strategies. However, strategic coordination within universities and with regional bodies is needed for the optimisation of their engagement in the regional governance process.

Keywords

Entrepreneurial university, regional development, smart specialisation, structural funds

Reference

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7.1. Introduction

While formerly universities were mostly responsible for knowledge dissemination and production through the academic missions of teaching and research, now they are progressively assuming a more engaged regional stance through a “third mission” of external, societal engagement (Etzkowitz and Leydesdorff, 2000; Gunasekara, 2006). This has translated into a growing number of bi-directional and network links with regional actors. University–industry collaboration has figured prominently in studies approaching universities regional engagement, resulting in a skewed perception of universities’ regional roles (Pugh et al., 2016). Indeed, with governance models and policy frameworks emphasising increased stakeholder participation and a knowledge-based approach to decision-making (Ansell and Gash, 2007), university–regional government collaboration has become salient and universities are increasingly important in the design of regional strategy processes. A recent and paradigmatic example is the EU’s Cohesion Policy Smart Specialisation framework and subsequent strategies (RIS3), which have formulated a mechanism for collective stakeholder engagement in the Entrepreneurial Discovery Process (EDP) and highlighted universities’ privileged position in those processes (Elena-Perez et al., 2017; Foray et al., 2012).

The increasing expectations placed upon universities, not only regarding knowledge dissemination, production and commercialisation, but also regional governance and strategy design, demonstrate a need for more comprehensive assessments and understanding of universities’ roles. Limiting universities’ regional roles to university–industry interactions and entrepreneurial or economic impact (Fonseca, 2019a; Pugh et al., 2016) works against the potential of universities to perform developmental roles and contribute knowledge as well as experience to regional development processes and strategies (Marques et al., 2019). There is still a lack of clarification on the exact roles universities are performing, and a tendency to conflate and homogenise these roles across institutions, contexts and timeframes (Flanagan et al., 2010; Uyarra, 2010), particularly in university–regional government relations. This is a complex dynamic and engagement arena, influenced by multiple aspects: the regional setting and administrative structure, political mandates, power asymmetries and, on the other hand, universities’ regional/international orientation, research and engagement interests and capabilities, and the general predisposition of their agents towards external/regional engagement (Aranguren and Magro, 2020; Brown, 2016; Goddard and Puukka, 2008; Thune et al., 2016). Since the policy cycle is also characteristically given to variations in



actor involvement, commitment and scope (Birkland, 2010), this topic demands further exploration in the literature.

This study will, thus, develop deeper theoretical and empirical understandings of universities' contributions and effective roles in the different stages of regional innovation strategy processes. Through a comparative case study of four European universities in different regional contexts – Aalborg University (AAU), University of Aveiro (UA), Autonomous University of Barcelona (UAB) and University of Twente (UT) – it explores what roles universities play in regional innovation strategies and to what extent these vary depending on policy stage and university actors involved. The background section approaches the literature on collaborative regional governance, emerging expectations of universities' roles, specifically in regional innovation strategies, and draws on this to provide a conceptual model of analysis. This is followed by the methodology section, and finally by our findings, discussion and conclusion. Findings suggest universities have expanded on mere knowledge transfer to perform more planning-related roles (e.g. consultation, mediation), with high dependence on regional context. In more peripheral regions the university tends to emerge as a predominant actor compensating for what can be an institutionally thin innovation system (Amin and Thrift, 1995; Fonseca et al., 2021), which can allow for closer engagement throughout the policy stream. There is, however, an increased necessity for strategic coordination and alignment within universities for an optimisation of their engagement with governmental institutions and potential new stakeholders in the regional governance process. By understanding the determinants influencing universities' capacity and predisposition, regional stakeholders can draw from universities' planning and governance potential, and thus clearly delineate their desired contributions to regional policy/strategy processes.

7.2. Background

There has been a tendency in the last decades to call upon a set of diverse stakeholders to participate in regional innovation and development strategies, and policies (Brandstetter et al., 2006; Dąbrowski et al., 2014; Purkarthofer, 2019). This aligns with the idea of bottom-up, collaborative regional governance, in which networks of state and non-state actors contribute to regional transformation processes (Ansell and Gash, 2007; Willi et al., 2018). Governance habitually comprises the definition and implementation of regional strategies that define a shared regional vision, and the activities that must be undertaken to get there (Valdaliso and Wilson, 2015). Within the idea of collaboratively creating regional futures, governance transcends the state's traditional spaces to rely on various other actors. This has been picked up in different areas, such as the innovation



policy literature. Kuhlmann (2001) argues that innovation policies are created in “multi-actor innovation policy arenas” in which different player networks negotiate the priorities of their innovation systems.

The expectation that a group of actors can define the drivers of regional innovation and collaboratively implement strategies towards new regional futures is increasingly found in diverse policies. A recent and prominent example of these collective, bottom-up governance processes and respective strategies (Aranguren et al., 2019) is the EU’s Smart Specialisation framework, as an ex-ante conditionality for accessing European Regional and Development Funds in all European regions. It has introduced EDPs, a collective prospecting process in which regional stakeholders progressively identify and define regional strengths, priorities and trends and collaborate towards strategic development.

7.2.1. Emerging expectations and variations in universities’ roles

Next to the state, the private sector and civil society, universities have become major stakeholders in these multi-partner governance processes (Benneworth, 2018; Edwards et al., 2014; Silva et al., 2016). Indeed, universities contribute to regional governance through different activities/processes (Table 16) and have increasingly been ascribed a more developmental – and less entrepreneurial and market-centred – role (Gunasekara, 2006). Growing evidence points to universities being a trigger for development (Fonseca, 2019a; Goddard et al., 2013), even in territorial disfavoured contexts. For instance, Goddard et al. (2013) found that universities are important players in three main areas of these regional strategies: (a) they participate in EDPs by generating knowledge and engaging with regional partners; (b) they give academic support to government officials in defining the strategies; and (c) they use their international connections and knowledge to connect the regional to the international scale.

Table 16 - Universities in multi-partner governance processes

Brokering, networking, triggering learning processes and shaping institutional capacity	Aranguren et al. (2012, 2019); Fonseca (2019a); Gunasekara (2006); Vallance et al. (2017)
Assisting in regional planning, new path development, strategy design, implementation and management	Fonseca (2019a); Pugh et al. (2016); Raagmaa and Keerberg (2017)
Having multi-level participation in governing and advisory boards and contributing with expertise for regional development	Goldstein and Glaser (2012); Porter (1998)
Providing leadership in regional development and governance processes	Bonaccorsi (2016); Fonseca et al. (2021); Gunasekara (2006); Marques et



	al. (2019); Pugh et al (2016); Raagmaa and Keerberg (2017)
Creating links between local and global academic and business networks	Goddard et al. (2013)

Source: Author's own elaboration.

Several underexplored dynamics of universities' roles – particularly governance-related roles – in regional contexts have thus been introduced or re-emphasised with the introduction of RIS3 (Vallance et al., 2017). However, universities' predisposition and activities in engagement and collaboration are influenced by various factors, with regional development expectations placed upon them perhaps greatly exaggerated (Bonaccorsi, 2016; Brown, 2016). In their study on universities' contribution to RIS3, Elena-Perez, Arregui Pabollet, and Marinelli (2017) found that universities' engagement largely depends on a diverse set of regional configurations and instruments that originate different dynamics. Similarly, internal institutional characteristics – such as universities' disciplinary focus, interface bodies, academic communities, individual agency and leadership potential (Fonseca et al., 2021; Nieth, 2019; Raagmaa and Keerberg, 2017; Thune et al., 2016) – can greatly influence the type of regional roles they assume. Therefore, different types of universities inserted in distinct regional contexts inevitably undertake heterogeneous roles and engagement activities in the regional strategy process.

Boucher et al. (2003) have considered both external and internal determinants in universities' roles, furthering this argument. Among those stipulated, the type of region, the characteristics of the higher education system, the number, scale and age of universities in the region, universities' strategic orientation and their embeddedness in a regional strategy significantly shape the type of engagement a university delves in and, consequently, the regional roles it undertakes. A single university located in a peripheral region, for example, will have a greater alignment with regional needs, and be better positioned to participate in networks and shape the institutional environment (Boucher et al., 2003).

7.2.2. Towards a more comprehensive analysis of universities' roles – Building a conceptual model

The literature on universities' roles has emphasised the combination and intersection of several models of engagement, which can give rise to “contradictions or conflicts of policy rationales and objectives” (Uyarra, 2010: 1229). With studies pending towards private sector links and the more economic aspect of universities' regional engagement, this may lead to a skewed perception in the identification and conceptualisation of university roles, limiting awareness of universities' regional impact (Marques et al., 2019).



Concomitantly, while universities are increasingly expected to participate in regional strategies, they are not homogenous institutions that can be predicted to contribute evenly. What regional roles universities are able to play depends heavily on their organisational priorities that, in turn, are determined by aspects such as funding mechanisms and other incentives (e.g. national/international rankings, research assessment exercises, excellence frameworks, etc.) (Bonaccorsi, 2016; Goddard and Puukka, 2008; Rose et al., 2013). The different roles may also not be prioritised nor adopted at the institutional level, but by individual actors or communities within the university (Perkmann et al., 2013; Thune et al., 2016).

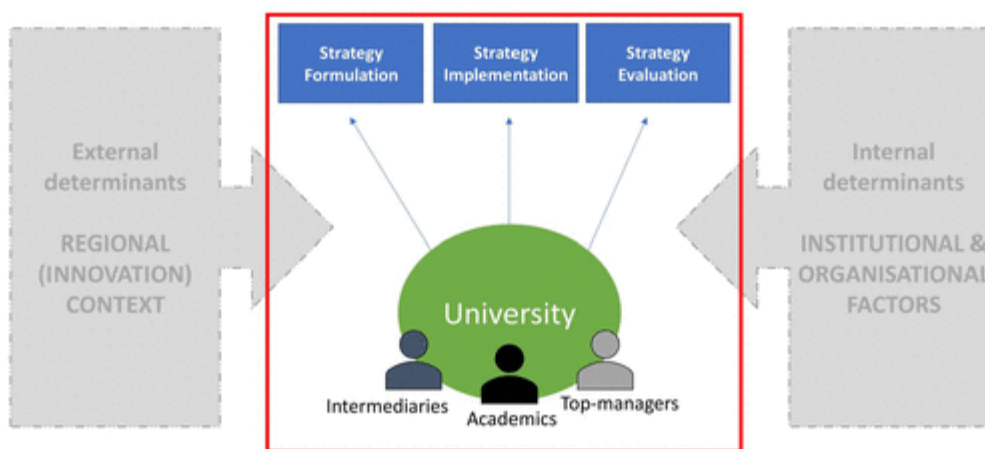
Universities are “loosely coupled” institutions with complex and fragmented internal structures (Goddard and Vallance, 2014). Even though managerial and administrative levels seek organisational alignment, directives often dissipate in their transmission to the lower levels of the institution (Fonseca et al., 2021). Benefitting from a high autonomy, faculties, departments, research units, interface offices, technical staff and individual researchers can diverge in their priorities and approaches to tasks (Thune et al., 2016). Without disregarding this institutional and organisational complexity, we will focus on three main levels within universities: (a) managerial (executive management); (b) intermediary (i.e. nexus offices administering knowledge transfer and collaborative activities); and that of (c) academics (individuals as well as research teams). This can provide a granular analysis of the overall activities and roles universities perform in their engagement in regional strategies.

Finally, despite expectations associated with the multiple university roles identified in the literature (e.g. service-provider, connector, animator), there is still a lack of definition of what exactly they entail in practice and a tendency to conflate and homogenise them across universities, contexts and timeframes (Flanagan et al., 2010; Uyarra, 2010). It is widely underemphasised in the literature that in different contexts, different areas of action (e.g. policy, industry or community engagement) and stages (project design versus implementation), universities perform differentiated roles. For instance, in the case of their participation in regional strategies, depending on the phases of the strategy process, that is, design, implementation and evaluation, universities can be called upon to contribute in specific forms, and themselves can assume varying levels of responsibility. There are inevitable variations in stakeholder engagement in the governance process (Birkland, 2010), determined by self-interest and different procedural necessities. We will therefore also utilise a policy stages analysis (see, e.g. Tantivess and Walt, 2008) for deepened understanding of universities’ varied

governance roles. For example, in the policy formulation stage, the exploration and assessment of options is prioritised, so actors with expert, solution-oriented knowledge tend to be recognised here. The implementation stage is given to more fragmentation and deficiencies, exacerbated by the fact that implementation actors are not often involved in the formulation stage. Finally, the evaluation stage is considered an important – often under-researched – part of the policy cycle, involving different stakeholders (Teirlinck et al., 2012). Sustaining a consistent level of interest, commitment and collaboration throughout these various stages is inherently a difficult task.

Innovation and regional development policy are characterised by complexities related to contextuality, and the granular character of multi-level governance of strategies (Blažek and Csank, 2015). Thus, the need to understand differences in universities' roles and explore under which circumstance certain roles are prioritised and by who needs to be made explicit. This paper aims to introduce more detail to this underexplored topic by applying the conceptual model outlined (Figure 9) and considering the dimensions of university actors and their role in different policy stages. The following research questions are posed.

Figure 9 - Universities' participation in the policy process.



Source: Authors' own design.

- a) Why and how do universities engage in regional strategy processes and how is this affected by regional and institutional contexts?
- b) What differentiated roles do universities play in each stage of the regional innovation policy process?
- c) To what extent are universities moving from traditional roles to more governance/planning-related roles?



7.3. Methodology

In seeking to understand the character of universities' participation in regional strategies, a social phenomenon, this study is inherently exploratory and qualitative in nature (Bryman, 2012). Through a comparative case-study approach, a better understanding of contextual and institutional factors is achieved. It enables theory-building by facilitating the drawing of patterns and conclusions across cases (Bryman, 2012: 73), therefore supporting replicability and contributing towards enhancing knowledge in the field. Case selection applied the following criteria.

a) Case studies should be universities who have engaged in regional strategy processes in the past 4 years.

b) Cases should be in different EU countries, possessing national, regional and institutional heterogeneity. Variety in economic development and innovation are welcomed to provide a counterpoint to the comparison.

This paper thus draws on four case studies of universities across different national and regional contexts: AAU (Denmark), UAB (Spain), UA (Portugal) and UT (The Netherlands). As per criterion (b), three are in peripheral regions in their national context, while one (UAB) was chosen to provide a counterpoint to the analysis, being located in a regional development nexus in Spain. In institutional terms, these are public universities that have been shaped by the economic and policy context of their region. Despite their varied backgrounds, these universities possess broadly comparable characteristics. All are relatively young and entrepreneurial universities created in the last 60 years, and are actively playing a leading role in their respective regions, namely in regional governance matters. This leading role is explored in other literatures, such as Fonseca et al. (2021). It presents itself as a wilful institutional positioning towards responding to regional needs and collaborating with regional partners. On a policy level, as per criterion (a), all four universities demonstrate an interest in extended engagement activities with their regions, particularly in regional development strategies and policymaking, and have adopted organisational models to enable this interaction.

The authors have considered pragmatism in the case selection as well, with two of the universities being their home institutions. The other two universities were chosen according to the criteria and investigated during research secondments of 3–4 months.

Data collection was undertaken as part of the two authors' PhD projects, and took the form of document analysis and semi-structured interviews. In total, these amounted to 120 interviews across the four case studies (Table 2). Initial access to a small group of



key individuals was given through project partners and stakeholders within and outside the university; subsequently, a snowball approach was applied to access additional interview partners. Closure was reached when no new interview partners were recommended, and/or topics were examined from all possible perspectives. The recorded interviews lasted between 60 and 90 minutes and were transcribed and translated into English (when necessary). Interviews in Aveiro and Twente were partly conducted jointly, while interviews in Aalborg and Catalonia were conducted by one of the two researchers. Interviews included actors who were involved in the strategy formulation, implementation and evaluation process that came from strategic/management levels as well as project/executive levels (Table 2). Qualitative analysis was conducted to draw relevant themes from the interviews, and quotes serve to highlight these and provide an actor-relevant perspective. In addition, regional strategies, action plans, cooperation agreements and university documents were analysed.

Table 17 - Interview Partners.

Entity	Level	Aalborg	Aveiro	Catalonia	Twente
University	Top-managers	7	1	3	6
	Academics	6	15	3	3
	Technical staff	3	5	3	5
Regional Authority & Municipalities	Policy-makers	1	8	-	3
	Technical staff	5	3	6	7
Other entities	Industrial associations	3	3	1	1
	Companies	1	2		1
	Others	4	2	3	6
TOTAL		30	39	19	32

7.4. Key aspects of the role of universities in regional development strategies

Table 18 provides an overview of each of the chosen universities by their strategic foci, formal organisational engagement support structure and their regional setting. The following section below outlines each universities' engagement history, the different institutional actors involved in regional strategies and the roles assumed in the different policy phases.



Table 18 - Comparison of case study universities and their respective regions

	Name	Aalborg Universitet (AAU)	Universidade de Aveiro (UA)	Universitat Autònoma de Barcelona (UAB)	Universiteit Twente (UT)
UNIVERSITY	Link	www.en.aau.dk	www.ua.pt	www.uab.cat	www.utwente.nl
	Creation	1974	1973	1968	1961
	Students	20 729 (2017)	13 675 (2018)	37 523 (2019)	10 400 (2018)
	Strategic foci	<ul style="list-style-type: none"> • Internationalisation • Inter-disciplinary • Innovation • Problem-based learning • Research excellence 	<ul style="list-style-type: none"> • Teaching, research and cooperation with society • Entrepreneurship • Innovation • Regional development 	<ul style="list-style-type: none"> • Innovation • Internationalisation • Social responsibility • Knowledge transfer 	<ul style="list-style-type: none"> • Entrepreneurship • Social impact • “High Tech, Human Touch” • Internationalisation
	Engagement support structure	<ul style="list-style-type: none"> • AAU Innovation incl. <ul style="list-style-type: none"> ◦ Matchmaking ◦ Entrepreneurship & cluster support • Career Centre NOVI Science Park 	<ul style="list-style-type: none"> • Pro-Rector for Regional Development • Vice-Rector for University-Society Relations • Technology Transfer Office (UATEC) • University-Business Office (GUE) • Research Park • Business Incubator (IERA) 	<ul style="list-style-type: none"> • Research park; • Vice-manager’s office for Research; • Hub B30 	<ul style="list-style-type: none"> • Department for Strategy & Policy • Strategic Business Development Office • Design Lab • Novel-T (incl. tech transfer, science shop, etc.) • Science Park ‘Kennispark’
	Further relevant education institutions	<ul style="list-style-type: none"> • UCN University College of Northern Denmark • EUC Nordvest, Centre for Education and Business 	<ul style="list-style-type: none"> • 4 other Polytechnic Schools that are a part of UA (Design, Health, Management, Accountancy). 	<ul style="list-style-type: none"> • 11 other higher education institutions (detailed list at Generalitat de Catalunya, 2016) 	<ul style="list-style-type: none"> • Saxion University of Applied Sciences • Art institute ArtEZ • 2 further education colleges (ROC Twente / AOC Twente)
REGION	Region	Nordjylland Region	Intermunicipal Community of the Region of Aveiro (CIRA)	Catalonia Region	Twente Region
	Link	https://rn.dk/	www.regiaodeaveiro.pt	http://web.gencat.cat/ca/inici	www.regiotwente.nl
	Admin. Divisions	11 municipalities	11 municipalities	4 provinces	14 municipalities
	Capital	Aalborg	Aveiro	Barcelona	Enschede
	Population	587 335 (2018)	363 424 (2017)	7 441 000 (2017)	627 592 (2018)
	Area	7 883 km ²	1 692,9 km ²	32 198 km ²	1 503 km ²
	Typology	<ul style="list-style-type: none"> • Peripheral region with some areas defined by particular demographic and industrial challenges • Below national average in terms of economic performance 	<ul style="list-style-type: none"> • Less developed • Peripheral region in a bipolarised in the major metropolitan areas of Lisbon and Porto 	<ul style="list-style-type: none"> • Developed and highly industrial region with the highest GDP in Spain • Moderate + innovator • Economic hub between Mediterranean territories and continental Europe 	<ul style="list-style-type: none"> • Peripheral, especially in national comparison • Economic growth for 2017 by 3.0% (national economic growth 2.9%).
Industrial structure	<ul style="list-style-type: none"> • Heavily based on SMEs • Used to be dominated by traditional labour-intensive manufacturing 	<ul style="list-style-type: none"> • Heavily based on low-tech SMEs • Highly industrial area, geographically and sectorally diffused, with a focus on ceramics, 	<ul style="list-style-type: none"> • Mix of innovative industrial SMEs and large multinationals, mostly in biomedical, agro-food, automobile and ICT, though 	<ul style="list-style-type: none"> • Heavily based on SMEs • Current focus on high-tech industry adapted by the majority of stakeholders 	



	<p>industries & primary industries</p> <ul style="list-style-type: none"> • Today growth-oriented knowledge industries are also represented, but still need for catching up in terms of innovation performance 	<p>metallurgy, chemicals and agro-food</p> <ul style="list-style-type: none"> • Since the 1970s, increasingly important in ICT and biosciences 	<p>predominantly concentrated in Barcelona's metropolitan area</p> <ul style="list-style-type: none"> • Long tradition of scientific research and innovation 	<p>(industry, education, government)</p> <ul style="list-style-type: none"> • High number of start-ups and spinoffs (often coming out of UT) • Main sectors: manufacturing (metal, electrical engineering, chemicals), trade and health care
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7.4.1. Aalborg University

AAU was established to stimulate regional development and has since been working very closely with regional partners, such as the public sector and industry, becoming an important driving force in industrial renewal. Collaboration and a strong link to regional partners has been facilitated through a support structure – AAU Innovation – that manages clusters, knowledge exchange activities, networking, etc. Regarding AAU's participation in regional strategies,¹⁷ it assumes a relevant role in the regional Vækstforum,¹⁸ a body created with regional development objectives combining representatives from government, industry and educational institutes. The regional strategy is formulated by the region with input from the Vækstforum members. Subsequently, these members evaluate, recommend and decide on the distribution of funding according to priorities defined in the strategy. In addition, the AAU Innovation Director participates in the Vækstforum's preparation committee and therein also evaluates and decides on funded projects. A university leader described AAU in the Vækstforum as the actor that introduces research-based ideas and a “broader, less political and trustworthy perspective”, thereby nominating it a counterbalance to the “political” municipalities.

Aside from formal engagement through AAU top-managers, academics were consulted in strategy formulation. This only happened when relevant connections between individuals (in the region and the university) were pre-existing. In those cases, the region relied on AAU's knowledge in focal areas, such as energy and sustainability. A project manager involved in the strategy formulation highlighted: “I think we need each other. But at least [the region] needs [AAU] a lot, because we need them to address regional questions and [. . .] take the responsibility of being the biggest knowledge provider”. AAU

¹⁷ Significant changes in the regional development support system will be implemented as of 2019 with those responsibilities being transferred to the national level. The analysis of this paper does not include the changes that are still being implemented.

¹⁸ Danish for “Growth Forum”.



plays an important role in the strategy's implementation as it is a major beneficiary of funding and materialises different projects.

7.4.2. University of Aveiro

Since its foundation, UA has formed a close connection with regional industry and public bodies at the local, sub-regional and regional levels, being considered a privileged partner and stakeholder. Despite being located in a less-developed peripheral region, UA has managed to leverage collaboration with businesses as well as local and regional government, and is often considered as Aveiro region's "twelfth municipality". At the institutional level, this engagement rhetoric has been enacted by different institutions, such as the technology transfer office UATEC and other interface structures (e.g. Creative Science Park), as well as through several appointed management positions, such as the Rector for University-Society Relations and the Pro-rector for Regional Development. It is through the two latter top-managers, in conjunction with UA's Rector, that formal partnerships occur, namely in matters of regional innovation strategy. In turn, project management is conducted by UATEC, research units and academics. Multi-level policy engagement is emphasised, from local (municipalities), to sub-regional (intermunicipal community) to regional (Centro region, RIS3 level).

The Intermunicipal Community of Aveiro Region (CIRA), tasked with designing territorial development strategies, invited UA as a partner. Interviewees considered UA's engagement as prominent in the formulation phases. The Pro-Rector for Regional Development position was expressly created, and a team – composed of technical staff and academics – was assigned to conduct regional analyses, participative forums and support collaboration with CIRA's municipalities. Policymakers and other external stakeholders appreciated UA's coordination and pedagogic approach, seeing it as providing "clearer guidance" on policy requirements, and keeping the involved stakeholders "working within the framework".

Nonetheless, interviewees highlighted UA's diluted engagement and leadership in the implementation stages, where UATEC and academics' project management was more periodic. A lack of internal coordination and strategic engagement was referred to, as "each department just [tried] to deal and [do] its own work", independent of (un)existent overarching orientations. Interviewees agreed on the need to align institutional discourse with operational involvement, often dependent on efficiently managing incentives for academics.



7.4.3. Autonomous University of Barcelona

UAB was created in a time when pro-democratic demonstrations and political turmoil, and massification of higher education, required the development of flexibility and autonomy in higher education institutions (HEIs) to respond to emerging societal challenges (Manrique and Nguyen, 2017). UAB's location outside the city did not hinder linkages with Barcelona but benefitted the relationship with its surrounding region. Given Catalonia's innovative character, UAB has developed an entrepreneurial approach and regional societal engagement support structure (UAB, 2019), namely through its Research Park and various research and innovation (R&I) organisations. It has created a territorial network of influence, coordinated by its top management, of which the main "third mission" support nexus is the Vice-management for Research.

In the policy sphere, this vice-management is UAB's most direct channel of engagement, while the Catalan Association of Public Universities (ACUP) is an indirect one. Its participation within the smart specialisation strategy of Catalonia (RIS3CAT) was done through these channels, although it was highly variable across the policy process. According to an interviewee, while "there was a lot of interest by the government to have universities join the project", the complexity of Catalonia's innovation system led the regional authority (Generalitat) to limit stakeholder participation in the formulation stages. Instead, the Generalitat opted for a survey-based public consultation and an expert council. Interviewees considered joint sessions as more informative than consultative, and widely agreed that "universities weren't given much voice in the beginning of the process".

Universities were more active only through RIS3CAT implementation instruments. These include the RIS3CAT Communities, designed to facilitate collaboration across sectorial stakeholders, and Projects for Territorial Specialisation and Competitiveness, promoting territorially based collaboration and managed by local government. According to interviewees, UAB's involvement was not just motivated by access to European Regional Development Funds, but a visible attempt to "generate spaces of collaboration"¹⁹ and develop local innovative assets. Interviewees also saw UAB as providing both scientific and operational knowledge, by managing fund requirements and mapping "future actions".

Evaluation-wise, there was no institutional-level engagement – although an individual UAB academic co-generated assessments with the Generalitat. University

¹⁹ For more information on such initiatives, please refer to Fonseca (2019b).



representatives emphasised that the RIS3CAT process lacked transparency and progress communication, providing few opportunities for UAB's consistent engagement.

7.4.4. University of Twente

UT is one of three HEIs situated in the peripheral region of Twente. It was established with the aim of renewing the region's industrial landscape. Today, UT is involved in many regional projects and an important partner in networks. With a peripheral regional ecosystem lacking big economic players and company leadership, UT has been described as a coordinator and moderator. A high-level university manager claimed that "it's the university that sets the [regional] agenda and the industry that follows", explaining that UT takes on a "heavy responsibility" for the region's future. Different engagement activities are assumed at various institutional levels. The department for Strategy and Policy, under the Executive Board, has responsibilities in the preparation of strategic meetings with regional authorities. The intermediary organisation Novel-T often serves as a knowledge and technology transfer office.

In practice, UT is involved in the design and implementation of the regional strategy, with no responsibilities in its evaluation. The president of UT's executive board represents the university's interests in the Twente Board (TB), a strategic economic board consisting of members of industry, public governance (province and region) and different education institutes. The TB consults on the design of the regional innovation strategy, influencing policy design and selection of prioritisation areas. University actors and regional stakeholders described UT's role in this process as vital, giving direction in potential regional economic opportunities, connecting with international partners and becoming a "source of inventions". Aside from the formal role of the president of the executive board in the TB, academics are involved in so-called "innovation tables" that discuss specific prioritisation areas and can orient municipalities and industry. A project manager from the regional governance body explained that these academics are very relevant in the process, as they "disseminate their research efforts into practice" through the projects.

7.5. Understanding university engagement in the regional development policy process

Consistencies and variances were identified in relation to universities' tasks and responsibilities in the several stages of their respective strategy processes. This section comparatively highlights the roles universities assumed, in function of the analytical model (Figure 9).



7.5.1. Universities in strategy design

All strategies analysed included universities' participation but, comparatively, their involvement in the design phase was heterogeneous. In the cases of AAU, UT and UA, the universities' participation was done mostly through key top-management figures. In the first two, these acted as institutional representatives in the regional bodies developing the strategies, conveying their university's strategic orientation. UA was specifically invited as a partner in the territorial development strategy process, which enabled it to have a stronger involvement at several levels, with top managers leading initial contact and major discussions, and academics and technicians leading trend assessment and coordinating participative forums.

These three universities were emphasised as crucial actors in their region's strategy processes, particularly in the formulation stage, where they distinguished themselves among other actors by their proactive stance and knowledge of regional potential (often in direct relation to university strengths). The most prominent university roles identified in the cases of AAU, UT and UA were those of "leader", providing direction and guidance in an often complex and bureaucratic process; "facilitator", leveraging its networking capacity and facilitating (knowledge) exchange between partners; "moderator", attracting and engaging stakeholders to the strategy process; and "mobiliser", creating or providing the conditions to effectively materialise collective regional objectives. All three universities influenced and provided guidance on regional priority-setting and performed not just as knowledge providers but also pedagogical and steering roles that enabled learning dynamics and institutional-building – especially in UA's case – and promoted the universities as regional leaders.

Interestingly, the cases in which universities had a stronger participation in strategy design were in regions where these universities were either the sole university (UA) or the most prominent (AAU and UT). All were peripheral regions, with Aveiro also being categorised as less-developed. Given these universities' heightened role in the design processes, and in the definition and impact on regional development trajectories overall, it is relevant to emphasise that these contexts partly enabled the strengthening of a productive relationship. Nonetheless, higher expectations are also placed upon universities in these regions for institutional and operational steering. This can either pose the risk of straining university capacity or exaggerating their governance performance in relative terms.

In the case of UAB, its context of creation was more political than territorially based, meaning that such direct interaction with local, county and regional government was



difficult to establish. The abundance of regional actors, namely the presence of several universities, inevitably generated competitive dynamics and limited more consistent university–regional government interaction during RIS3CAT’s design phase and overall policy process. This has been changing in recent years with UAB’s greater approximation to the more local and county levels, where while still not the only university, it benefits from proximity and institutional ties. Nonetheless, in RIS3CAT’s design phase, while universities were considered relevant, their indirect representation through ACUP has made it impossible to identify any role aside from “consultative”.

7.5.2. Universities in strategy implementation

Universities’ roles in strategy implementation were found to be complex and multi-faceted in our cases, albeit lacking a strategic approach. The complexity is partly due to the variety of university stakeholders involved in different capacities. University leadership was often involved in strategy implementation through their engagement in policy platforms, such as the TB (UT) and the Growth Forum (AAU). In these platforms, top management was part of a group of regional stakeholders that acted as project/funding evaluators, recommending projects to be implemented and funded according to strategic priorities. In Aveiro and Twente, a similar role was taken on by academics who participated in roundtables along specific thematic lines, providing research-based and internationally linked knowledge that other regional stakeholders did not possess. This perspective distinguished the university as a knowledgeable and relatively neutral evaluator.

Concomitantly, individual academics and research groups were identified as fund recipients and project partners (sometimes even leaders) in the implementation of instruments/projects, together with other regional stakeholders. Overall, these roles were very much dependent on individual motivation, the need for funding of individual researchers or departments and the availability of potential (regional and international) contacts and project collaborators. Additional actors, such as UATEC or UAB’s and UT’s Science Park, were periodically involved at this stage by participating in – and, to a certain degree, coordinating – projects. Observably, further effort seems required to align the two levels of leadership and operational involvement. While researchers became involved in strategy projects and provided scientific and operational knowledge as well as connections, no strategic approach to project participation – aligned with the regional strategy – can be identified.



7.5.3. Universities in strategy monitoring/evaluation

There has been little to no sign of processes of evaluation of the strategies and their results, which might be due to the fact that most of the strategies are still ongoing processes. However, in Twente and Aveiro, where analysis focused on two strategies, no official or comprehensible evaluation was done between the two. Only RIS3CAT includes evaluation/monitoring mechanisms for furthering the strategy's impact. As in other phases, the Generalitat has chosen to develop its monitoring more closely with a selected expert – a UAB academic. This has been emphasised as an individual, not an institutional participation.

Given the emphasis of universities' knowledge provision role in other stages, their input to evaluation could be valuable for improved effectiveness. Their lack of participation is, therefore, surprising. Nonetheless, this could relate more generally to monitoring being a lesser preoccupation for government authorities, with them more inclined to use the start of a new period and the design phase as a form of evaluation (where the universities do play a role). This is also in line with the findings from Teirlinck et al. (2012: 374) in that “the planning of evaluation in the policy cycle remains ad hoc or exceptional, and the take-up of evaluation results is sub-optimal”. Government authorities could favour the strategy's sustainability by cementing evidence-based assessments in monitoring and evaluation.

7.5.4. Actors involved in engagement and strategy processes

Having discussed the various university roles at different strategy stages, we identify profound disparities between the distinct institutional actors that engage in the strategy process. On the one hand, university top management is often tied to regional partners through engagement contracts or specific roles in regional platforms. Accordingly, universities play a formal – even representative – role, in which top management shows commitment to the region and creates consensus among stakeholders. Often, this commitment is not broken down internally. While top management engages in these platforms, involvement in the strategy process does not easily trickle down to the faculty level or individual academics (see also Goddard et al., 2016). Only at UA have top managers officially included professors and technicians to become part of the strategy design process, while at the AAU, UAB and UT, top management coordinated first contact points between academics or heads of research units and external partners involved in strategy implementation.

Conversely, academics mainly participated in the strategy process autonomously, with most activities conducted independently from top-management direction. Applying for



projects within the regional strategy or giving feedback on strategic lines, for example, are dependent on intrinsic motivation primarily related to funding attainment, the wish for knowledge application, long-standing commitment to external stakeholders or the desire to build new connections. Most cases analysed show that, overall, individual engagement was unrelated to top-management behaviour or top-down stimulus.

Intermediary bodies, liaisons between external stakeholders and university staff, participated in crucial stages of the strategy processes. ACUP in Catalonia represented UAB and other universities in the region in the RIS3CAT design stage. In other instances, technology transfer offices like UATEC (UA), innovation and entrepreneurship organisations like AAU Innovation and Novel-T (UT) as well as research parks like PRUAB (UAB) provided a more specialised perspective on regional innovation and some even coordinated academics for an effective involvement in the implementation stages. Nonetheless, they appear underutilised, as they could serve as a missing bridge between strategic orientation and operationalisation, or between external actors and the expertise of the academic community. These intermediary bodies could be involved more strongly in strategic design and in incorporating different actors in the strategies, instead of mostly remaining as fund recipients. Their involvement, highly defined by top management and restricted by organisational resources, could thus be further optimised.

7.6. Discussion and conclusions

This paper explored the roles universities have assumed in regional governance processes, particularly how different circumstances have impacted on how universities participated in the design, implementation and evaluation of regional innovation strategies. When considering the circumstances under which universities participate in these strategies, the types of regions and the context of creation of the universities influenced their degree of involvement and the roles they assumed. Similarly, the nature of their regional orientation and their predominance as universities in the region shaped the opportunities and extent of their governance roles. While this reproduces some findings of the previous literature (Boucher et al., 2003; Elena-Perez et al., 2017; Gunasekara, 2006), its significance is herein emphasised as it considers the particular context of university–regional government relationships, and the more granular multi-level and stage-sensitive linking of this collaboration.

Why do universities engage in regional strategy processes and how is this affected by regional and institutional contexts?



Universities' engagement was prompted by a set of diverse factors: institutional and individual volition, expectations by regional authorities and certain regional and institutional orientations and path-dependencies. Those universities located in more peripheral areas (AAU, UA, UT) – often one of very few universities in those regions – tended to engage more directly with regional authorities and partners. In this analysis, this can also relate to the context of the universities' creation, strongly linked to regional needs and expectations, and the consequent development of their institutional strategy in close dialectic with the region, and regional government. UAB stands out here as the only non-peripheral university whose institutional orientation towards social innovation and network governance seems to have influenced its engagement in regional strategies more than the geographical context per se.

What differentiated roles do universities play in each stage of the regional innovation policy process?

Through a more granular analysis, the variation of university roles throughout the policy process was confirmed, as well as the fact that diverse university layers/agents interact at different times, scales and levels within the regional governance system. In line with Goldstein and Glaser (2012), top management was most often involved in strategy design in a formal representation of universities' interests in regional boards/platforms. This involvement thus improved steering and governance capacity (Goldstein and Glaser, 2012) and cemented the universities' leadership in the region. On the other hand, academics were asked to design/implement projects and thereby translate the strategic priorities into reality while applying their expert knowledge. Since the implementation phase is characteristically more fragmented and less constant in regional government engagement, it enables individual agency and autonomy in these academics, not always aligned with top-management directives or government authority expectations. This presents an interesting dichotomy between formal and informal modes of interaction. While agreements and other more formal, representative, periodical and political types of interactions are managed between the top tiers of regional institutions, at lower organisational levels there is a tendency for more informal contacts to be established by individual agents. These informal connections between engaged agents then give rise to more continuous forms of interaction that were considered crucial in ensuring the unlocking of impasses during the strategy process and resulted in wider and often unexpected benefits (e.g., institutional capacity-building, network expansion, consensus building and pedagogy). Besides the implications regarding universities' governance roles, this reflects two other points in the literature: the importance of interpersonal skills



and commitment of involved actors to enable, sustain and favour the governance process (independent of the stage of involvement) (Goldstein and Glaser, 2012); and the exercise of agency and leadership through key actors or “champions” at multiple levels (Gunasekara, 2006).

Despite variation in the cases analysed, the identification of the universities as “honest brokers” by the government authorities and other stakeholders was a constant at the various policy stages. Most universities analysed have been successful in building their legitimacy in this type of engagement from a proven regional orientation and internal capacity-building, and from consistently being awarded/managing regional funds (Pugh et al., 2016). This manifested in their incorporation - or not - in various capacities depending on the needs of the policy stage:

Formulation: knowledge provision, stakeholder mobilisation, network coordination and facilitation, forum moderation, priority-setting and assessment, institutional leadership, guidance in planning and strategy design.

Implementation: stakeholder mobilisation, network coordination, facilitation and institutional leadership, proposal writing and evaluation, project management and planning.

Evaluation: non-existent institutional-level engagement.

Nonetheless, one must acknowledge that although considered a relatively neutral stakeholder, in their involvement in shaping regional strategies and subsequent funding priorities, universities carry their own interests associated with funding attainment and promotion of research assets. In regions where they emerge as key partners in the process, they are in a unique position to exert policy capture (Brown, 2016). However, their contribution to evidence-based policy and their mobilising role may justify their active inclusion in the strategy process.

To what extent are universities moving from traditional roles to more governance/planning-related roles?

The university roles highlighted above point to an expansion of university engagement roles from a more entrepreneurially-focused knowledge transfer with industry to one encompassing more developmental (Gunasekara, 2006) and supportive roles to wider regional governance. Most of the universities herein analysed have performed several roles in the strategy design process previously thought of as the jurisdiction of government authorities (e.g., network mobilisation, forum moderation, strategy design



and priority-setting). Particularly those prominent regional universities in peripheral regions (UA, AAU, UT) have sought to meet the high expectations placed upon them by the regional government. This aligns with the findings of Aranguren et al. (2019) in that “regionally influential universities and higher education institutions [can] fill the void of regional government capabilities” (p. 8). It also appears as a compensation for a characteristically institutionally thin regional innovation system (Tödting and Tripl, 2005). It is thus suggested that these universities, in these types of contexts, could thus have a greater tendency towards playing planning-related roles, and seem to be cementing this (e.g., UA with its Pro-Rector for Regional Development, and UT with its office for Strategy & Policy).

Universities’ governance potential is therefore present, if not already widely materialised in these cases. However, it is not perfected. While these institutions shape regional governance capacity through their engagement, this is still inconsistent, dependent on actor commitment and, arguably, an indirect consequence of their knowledge provision role. It is also important to posit if universities’ encroachment in governance is, indeed, desirable. As highlighted by Aranguren and Magro (2020), there are challenges, such as the policy implementation gap and tension related to the lack of consensus about policy goals, which might complicate the contribution to regional policies and question whether universities should take on these new roles. Their involvement, and especially their predominance in the process in peripheral and less-developed regions, can exert policy capture (Brown, 2016). Moreover, they are compensating for certain government deficiencies that, consequently, may never fully be developed. Recognising the benefits of their engagement should therefore be accompanied by a critical reflection of the region’s overall dependence upon them.

Although the findings presented are limited to four case studies, they point towards an increased necessity for coordinated engagement and alignment between universities and governmental institutions, as well as wider stakeholders in the regional governance process. The entrepreneurial character of the universities studied herein, and the overall context of their creation, assumes their openness towards regional engagement. Nonetheless, their engagement in strategies and regional governance was not only a more recent extension of their activities, but one that lacked exploration. Each university dealt differently with this engagement, which suggests a need for more granularity in the analysis of these roles and practices.

In terms of policy recommendations, different aspects must be considered. Firstly, regional partners need to know how to work together – without being restrained by their



institutional differences (Nieth, 2019) – so that the regional strategy processes are effectively about regional development and not (just) about different stakeholders learning to cooperate while “[breaking] down silos between various administrative bodies and improve multi-level governance” (European Commission, 2017: 5). Finally, expectations towards the contribution of universities to regional governance processes are often not aligned with universities’ capabilities. In some of the cases, they have been expected to take up a heavy mantle in the governance process. While some may embrace this, generalisations should not be made of universities’ capacities to engage in this arena. Uyarra (2010) highlights that more attention must be given to universities’ complexity and diversity, and that we cannot assume these are highly flexible or integrated actors. This also applies to the regional strategy and policy process, especially considering that universities have become important stakeholders therein.

The regional setting, as well as the different stages of the strategy process, pose varied challenges, constitute opportunities and call for varied approaches to stakeholder engagement. In their work on territorial strategies, Valdaliso and Wilson (2015) point out that the rapid emergence of territorial strategies in the last decades has accelerated their creation and implementation before a conceptual and empirical understanding about them was established. Our findings confirm this, as it seems universities’ roles have been developed “on the go” – with apparent flexibility, but also vagueness regarding their contribution. Nevertheless, universities’ involvement was, regardless of variance, viewed as a vital guidance to these strategy processes, providing crucial knowledge and resources throughout. The strategies’ success would be in question without, at least, their partial input in any of the policy stages. Their undertaking of more strategic and influential roles imparts beneficial outcomes. Given the temporal limitation of focusing on particular policy framework periods, future research can explore effective socio-political and economic impacts of universities’ engagement in the strategy processes. We believe that through our case-study analysis, we offer policymakers an insight into how universities can take on strategic roles and how these can be explored depending on regional contexts, and thereby contribute to the conceptual and empirical understanding of universities’ roles in regional innovation and development strategies.

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PUBLICATION V

8. Entrepreneurial Universities and Regional Innovation: Matching Smart Specialisation Strategies to Regional Needs?

Abstract

Universities are expected to play a leading role in the smart specialisation strategy process. However, a gap between discourse and practice is marking the RIS3-related regional development programmes, which can be extended to the involvement of universities in the process. A mismatch can be speculated between the expectations towards universities' roles in RIS3 implementation and actual practice, and its repercussions on a regional innovation ecosystem. This chapter addresses the extent to which the role played by universities in a region's innovation and entrepreneurial practice aligns with the smart specialisation strategic outline. As an in-depth case-study of the University of Aveiro (Portugal), it draws on both quantitative and qualitative data, with an analysis of RIS3 approved projects in the Portuguese NUTS II Centro region, and interviews with key actors within the university and the regional administration. Through this, it weighs the contribution of entrepreneurial universities to the RIS3 goals, drawing lessons for public policy and discussing the future of RIS3.

Keywords

Entrepreneurial university, regional development, smart specialisation, structural funds

Reference

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8.1. Introduction

Universities are expected to contribute to the development of their regions, not just through their teaching and research missions, but increasingly through a “third mission” of dynamic engagement with external, and mainly regional partners (Charles, Kitagawa, & Uyarra, 2014; Chatterton & Goddard, 2000). In turn, the promotion of interaction between the university and other regional institutional actors through diverse engagement mechanisms is believed to stimulate innovation processes (Uyarra, 2010). Adapting to the strain of these growing expectations, and in search of alternative funding sources, universities have assumed a more entrepreneurial approach in their regional engagement. This is exemplified by their involvement in the development of incubators and science parks, and by their increasing pursuit of contract research, consultancy services and partnerships (Jongbloed, Enders, & Salerno, 2008). The importance of these relationships has been progressively underlined and encouraged in the political discourse, more evidently within EU's most recent Cohesion Policy, which in its incorporation of the smart specialisation concept has linked structural funds (SF) and ERDF particularly to research and innovation initiatives (Goddard, Kempton, & Vallance, 2013).

Universities are also considered crucial institutions in the regional development dynamics associated with smart specialisation, and particularly the research and innovation smart specialisation strategies (RIS3). The basic underlying argument is that development potential inherent to the knowledge generation, diffusion and dissemination capacity of academia is instrumental in a regional development policy context inspired by the smart specialisation concept (Begg, 2016). In other words, universities are expected to play a leading role in strategy implementation, relying on what is unique in a given region, namely the R&D and innovation domains in which that region can hope to excel (Foray, David, & Hall, 2009).

There is, however, evidence that a gap between discourse and practice is marking the RIS3-related regional development programmes (e.g. Iacobucci, 2012; Kroll, 2017), particularly evident in less developed regions (LDRs), and which can be extended to the involvement of universities in the process. Universities themselves manage different forms of incorporation of the RIS3 processes, which are very much dependent on territorial context, historical legacy (Breznitz & Feldman, 2012) and overall entrepreneurial architecture (Salomaa, 2019). As can often be the case of universities in peripheral regions, even entrepreneurial ones, if there is a divergence between the universities' activities and the needs of the surrounding local innovation ecosystem



(Charles, 2016), it is likely entrepreneurial spillovers will remain minimal (Brown, 2016) and RIS3 processes fail to further them. Accordingly, one can speculate about a mismatch between the expectations towards the role of universities in RIS3 implementation and actual practice, and its repercussions on a regional innovation ecosystem.

This chapter reflects on an entrepreneurial university's potential to contribute towards regional development through its involvement in the RIS3 process and resulting projects funded through SF. Empirically, it presents an in-depth case study of a university – the University of Aveiro – in a particular regional context – the less-developed Centro NUTS II region of Portugal –, aiming to address the relation between the regional government authority, the RIS3 process and the university in responding to regional needs and in fomenting the innovation and entrepreneurial ecosystem. The study strives to contribute to the debate on the implementation issues of regional policies driven by smart specialisation, focusing particularly on the role of academia.

8.2. Background

8.2.1. Knowledge-Based Innovation Policy: RIS3 and Universities' Role in Creating an Entrepreneurial Ecosystem

Scholars from the fields of regional studies and economics have widely acknowledged innovation, in the form of creative technological discovery, as a key factor in unlocking territorial development and competitiveness (Freeman, 2002; Gibson & Naquin, 2011; Krammer, 2017; Rosenberg, 2004). As conceptualisations evolved, innovation processes transformed from more linear, chain-like technical models to more systemic frameworks that considered their spatial, organisational and institutional dimensions (Cooke, Gomez Uranga, & Etxebarria, 1997; Etzkowitz & Leydesdorff, 2000; Landabaso, 1997; Lundvall, 2010). In the latter, innovation was finally perceived as an inherently complex, interactive, territorial and combinatorial process between markets, policy, science, technology and, ultimately, knowledge and learning (Edquist, 1997; Santos & Caseiro, 2015). Territorial competitiveness, in this sense, is progressively dependent upon the generation of knowledge and the promotion of collective learning mechanisms (Morgan, 1997; Santos & Caseiro, 2015). This has been approached paradigmatically in the literature on innovation systems and the 'learning region', which brought the role of knowledge and institutions to the centrefold of these dynamic and creative innovation processes (Gunasekara, 2006; Lundvall, 2010; Morgan, 1997).



Institutional and social dimensions are thus assumed by some authors (Morgan & Henderson, 2002; Morgan & Nauwelaers, 2003; Santos & Caseiro, 2015) as equally, if not more important than infrastructural and fundamentally quantitative and economic factors in fostering territorial competitiveness and innovation, particularly in less-developed and peripheral regions. For example, regional actors should not just be able to access knowledge but also have the capacity to learn and adapt, something facilitated by relational processes (Godin, 2006; Morgan, 1997). As such, regional and innovation policies seeking to address the issue of territorial competitiveness and 'bridge the gap' between more and less-developed regions have started emphasising institutional capabilities and endogenous potential by fostering interaction among regional actors to spur collective learning.

In the European context, the recent cohesion policy framework of smart specialisation emphasises this approach (Foray et al., 2009; Fröhlich & Hassink, 2018). As the basis for interventions in research and innovation through the European Regional Development Fund (ERDF), the smart specialisation concept and resulting strategies (Smart Specialisation Strategies – S3 – or Research and Innovation Strategies for Smart Specialisation – RIS3) are now an integral part of any EU region's economic development efforts, and an ex-ante condition to access regional funds. The guiding principles of smart specialisation consider the collaborative character of innovation within a participatory process designated as the entrepreneurial discovery process. Within it a diverse set of regional stakeholders and institutions (e.g. local and regional government, industry, universities and research institutions, third sector organisations, entrepreneurs) come together to discuss and develop regional futures, progressively identifying and supporting areas of strategic potential that can generate competitive regional advantage (Foray & Goenaga, 2013). By setting R&D and investment priorities based on regional uniqueness, S3 not only inherently emphasises endogenous potential and place-based (rather than 'one-size fit all') innovation strategies (Barca, McCann, & Rodríguez-Pose, 2012), but also increases the focus on knowledge-based and collaborative innovation as a way to boost regional competitiveness and development (Santos & Caseiro, 2015). Thus, universities have been brought to the forefront of regional innovation policies, with RIS3 highlighting them as key institutions in guiding the strategy process and the identification of regional advantages and trends (Foray et al., 2009). By helping leverage existing knowledge stock to create new regional trajectories through the diversification and upgrading of the R&D system, entrepreneurial and regionally-engaged universities, in particular, have become a critical asset for the design and implementation of RIS3 strategies to better connect with regional context and needs (Santos & Caseiro, 2015).



8.2.2. Entrepreneurial and Regionally Engaged Universities

Universities' roles have shifted throughout the years in the face of both external demands and endogenous processes that required their engagement with society (Clark, 1998; Etzkowitz et al., 2008). Whereas in the past their mission was that of predominantly disseminating knowledge through teaching, the concept of research-based teaching presented in the 19th century by Wilhelm von Humboldt added to universities the function of knowledge producer. More recently, expectations regarding universities' ability to drive economic development and innovation dynamics (Etzkowitz & Leydesdorff, 2000; European Commission, 2011), to anchor and combine global knowledge assets with local processes, and to create a potential for regeneration and development, particularly at the regional level (Charles, 2016), have influenced the incorporation of a "third mission" of external and regional engagement within these institutions. This typically refers to activities of social, entrepreneurial and collaborative character undertaken by universities with external partners (Etzkowitz & Leydesdorff, 2000; Zomer & Benneworth, 2011), potentiated by proximity and territorially specific processes, and therefore more emphasised at the local and regional level (Morgan, 1997). These shifts in the academic ethos reflect a clear trend in institutional adaptation, a transition from knowledge for its own sake to knowledge valued by its applicable potential, and even beyond with more network-based knowledge generation/creation activities (Etzkowitz & Leydesdorff, 2000; Gibbons et al., 1994).

With society now relying primarily on (scientific and technological) knowledge to be able to compete in an increasingly globalised economy, a greater emphasis has thus been placed on a university that can contribute towards the development and competitiveness of its surroundings (Brown, 2016; Etzkowitz & Leydesdorff, 2000; Gunasekara, 2006). State agencies have increasingly sought to support "third mission" activities, to interlink knowledge producers and users, and to maximise the impact of universities in the region (Brown, 2016; Drucker & Goldstein, 2007; Etzkowitz & Leydesdorff, 2000). This is particularly the case of regional innovation policies like S3, which by considering universities' potential in building-up regional economic, technologic and institutional capacity, progressively brought them to the centrefold of regional innovation and entrepreneurial ecosystems (Audretsch, 2014; Brown, 2016; Charles et al., 2014; Cooke et al., 1997).

Universities' incorporation of the "third mission" and their more pronounced role in economic development inevitably materialised in a more entrepreneurial turn (Etzkowitz & Leydesdorff, 2000), with the emergence of new functions and bodies that could



facilitate the connection between knowledge and the territory. Specialised infrastructures were created for this effect, namely technology transfer offices, incubators, science parks and other intermediate facilities that could promote and manage this relationship with external entities (Brown, 2016; Jongbloed et al., 2008). This could thus stimulate the innovation system in which the university was integrated, accruing alternative funding sources and outside recognition in the process. In seeking to play a more prominent role in knowledge-based innovation processes alongside other relevant institutions in the region, like industry and the state, the university has become more entrepreneurial, more active in its interactions with other actors and in the combined performance of its main missions (teaching, research and engagement) (Etzkowitz & Leydesdorff, 2000). As Santos & Caseiro (2015, p. 541) state, this requires universities to be imbued with a sense of discovery and risk, to approach knowledge as “an asset which can be created, developed, transmitted and valued,” and to take on a more anticipative, active and strategic role in the promotion of its transfer to society (Etzkowitz & Leydesdorff, 2000).

8.2.3. Contribution of the Entrepreneurial University to Regional Innovation

An entrepreneurial university is thus believed to have the potential to foster interactivity and collective initiatives in a regional context (Clark, 1998; Etzkowitz & Leydesdorff, 2000), adapting its organisational architecture in the face of external demands and according to its institutional objectives (Clark, 1998; Etzkowitz et al., 2008). The regional and institutional context, such as funding availability and financial constraints, local employment opportunities, and other socio-historic factors will therefore be highly influential in defining the entrepreneurial universities' regional role (Breznitz & Feldman, 2012; Salomaa, 2019). If the university's entrepreneurial endeavours are disconnected or disassociated from the regional socio-economic landscape, knowledge spillovers and effective learning dynamics are less likely to occur. This is particularly the case in LDRs, where the knowledge being produced and transferred is often unable to be absorbed by the local economic and entrepreneurial ecosystem (Bonaccorsi, 2016; Brown, 2016). Despite such restrictions, universities are widely acknowledged as sources of knowledge that can stimulate the regional economy. They present and stimulate generative, absorptive, collaborative, and leadership capacities (Goddard et al., 2013) that can play a key role for innovation policy initiatives to build new niches of knowledge and have impactful and positive outcomes.

According to Santos & Caseiro (2015), the concept of the entrepreneurial university and the smart specialisation framework are mutually reinforcing and amplified. A university that pursues an entrepreneurial approach, promoting an adjusted institutional



architecture and culture (Salomaa, 2019) and facilitating collaboration with regional partners, can be easily linked with the more relational and networked vision of innovation present in S3. Furthermore, by encouraging an entrepreneurial mindset and ultimately a society that stimulates a culture of “risk, search and discovery” (Santos & Caseiro, 2015, p. 541), entrepreneurial universities can more easily identify, exploit and carve out unexplored economic opportunities – a central tenet within the S3’s entrepreneurial discovery process. In turn, S3 aims to support regional innovation capabilities on par with entrepreneurial universities by fostering actor networks and interaction and enhancing collective learning processes capable of producing strategic knowledge.

Ultimately, universities’ roles in the RIS3 as relevant stakeholders and social connectors, partner institutions, policy actors and knowledge producers can be of great importance to strategy implementation, and enable the construction of a sustainable entrepreneurial ecosystem (Santos & Caseiro, 2015). It is nevertheless important to recognise that the promotion of an entrepreneurial culture or of the “third mission” more generally within universities is not straightforward and far from reaching effective institutionalisation and operationalisation (Fonseca, 2018). The integration of entrepreneurial activities with more traditional academic functions is still incongruent and disordered, lacking clear strategic institutional alignment capable of directing such activities and with little incentives in place to support academic engagement. Despite entrepreneurialism in academia being partly driven by the need for alternative funding sources, monetary incentives seem insufficient (D’Este & Perkmann, 2011), with these activities not being prioritised and rarely playing a role in academics’ career evaluation.

8.2.4. Can the Entrepreneurial University Help Match RIS3 to Regional Needs?

RIS3 can be summarised as an attempt to create a regional and dynamic entrepreneurial ecosystem conducive to territorial collective learning and innovation (Santos & Caseiro, 2015). In practice, while smart specialisation has gained momentum as a policy concept and instrument (Foray, David, & Hall, 2011), it has been faced with several implementation difficulties, particularly in the case of LDRs (Krammer, 2017). More developed regions with stronger innovation and entrepreneurial ecosystems generally succeed in supporting innovation endeavours, namely in translating knowledge into the productive sector.

However, LDRs can face certain shortcomings that hamper this: insufficient and/or inefficient locally-based R&D activities; a lack of absorptive capacity for R&D by local firms; and a weak or fragmented entrepreneurial ecosystem, with a lack of interaction between economic and institutional agents (Bonaccorsi, 2016; Huggins & Johnston,



2009; Krammer, 2017). More generally, RIS3 are still believed to have a weak conceptual basis, hindering the effective leverage of collective processes. Kroll (2017) highlights that current regional stakeholder participation and consultation in RIS3 cannot be rightfully called entrepreneurial discovery processes, as the bartering of individual interests still overshadows larger community-oriented visions and practice. Iacobucci (2012) warns RIS3 can tend toward ambiguity by diluting the focus on R&D-based innovation and specialisation, and that regions with weak research infrastructure may need a balanced mix of research and innovation policy to help correct infrastructural problems and simultaneously stimulate the innovation system.

In this, the presence of an entrepreneurially-veered university in a region can substantiate the current smart specialisation framework by providing the RIS3 process with key incremental organisational support, promoting an entrepreneurial culture within the region and among regional actors that can strengthen regional competitiveness and development. While this potential is present, universities' role in effectively linking the RIS3 with the regional fabric, and in developing collective learning and absorptive capabilities, is still unexplored (Santos & Caseiro, 2015). Without disregarding other actors' contribution to RIS3 and in the building of the entrepreneurial ecosystem (Santos & Caseiro, 2015), or the role of policy in creating the conditions for such a system to emerge (Huggins & Johnston, 2009), this chapter considers relevant to explore the role of entrepreneurial universities as key actors in driving RIS3 policy and in linking it with regional needs, analysing their agency in the process, in particular in the formulation and implementation stages.

8.3. The Case of the University of Aveiro: Research and Innovation Policy and Regional Priorities

This section focuses on the participation of an entrepreneurial university in the RIS3 strategy process. It considers the engagement in both the formulation and the implementation stages of the process to provide a more comprehensive view of a university's influence on the policy's orientation, its own adaptation to the strategy and, its contribution to its application. While it discusses the issue of universities' contribution towards matching a RIS3 to regional needs in a specific institutional and geographic context, the intent is to draw theoretical reflections and policy lessons that will allow for broader consideration.

A single case-study approach was deemed fitting by the authors given its potential for more in-depth exploration (Flyvbjerg, 2006). The University of Aveiro (UA), in Portugal,



was chosen for three main reasons. First, it is a relatively young university that has assumed a strong connection to its region since its creation in the 1970s, embodying an entrepreneurial discourse and approach in regional engagement. Second, its location in the peripheral and less-developed regions of Centro (NUTS II) and Aveiro (NUTS III) provides a useful context to explore the matching of entrepreneurial and innovative activities with regional needs in an LDR, where there may be shortcomings in infrastructural, institutional and connective capabilities. Third, UA has been increasingly active and involved in regional innovation policy and SF projects at regional, sub-regional and local level, engaging often as a relevant partner to government authorities and other relevant institutional stakeholders. More prominently, and as will be discussed in this chapter, UA has participated in the RIS3 of Centro region for the period 2014 to 2020, and has partnered with the sub-regional authority of Aveiro region – the Intermunicipal Community of the Region of Aveiro (CIRA) – in the design and management of SF for two territorial development strategies in the periods of 2007-2013 and 2014-2020.

Concretely, this chapter draws on data from the Centro regional authority (CCDRC) concerning projects financed by the Portugal 2020 programme (supported by the ERDF, and therefore S3) from 2015 to 2019. The available data (CENTRO 2020, 2019), last updated on March 31st, 2019, provides information on the set of supported innovation projects, namely their geographical and sectoral distribution, the partners involved and the volume of allocated funding. It thus permits investigating the extent to which the projects match the specialisation domains of the RIS3, as well as the nature and focus of universities' involvement. Complementing this is a qualitative analysis of 31 semi-structured, in-depth interviews with key actors within the university and the regional (CCDRC) and sub-regional (CIRA) administrations, conducted by the authors in Spring and Autumn of 2018. Discussions centred on the extent and nature of UA's engagement within these strategies, particularly the RIS3; UA's institutional and organisational adaptation in the face of its engagement in regional innovation policies; and, finally, the dynamics of UA's participation in RIS3 Centro-funded ERDF projects. The interviews cover 21 projects funded from the scheme, 10 of them small-scale grants for intellectual/industrial property projects, mainly covering patent costs for promising research outcomes. These were centrally applied and managed by UATEC, UA's technology transfer office. The other UA-led projects vary from largescale initiatives within regional "platforms", to small and medium size projects with a stronger regional focus. Two of these projects strive to reinforce internationalisation by encouraging researchers to bid for grants from Horizon 2020, whereas the others have stronger links with external stakeholders such as local businesses and government authorities.

8.3.1. Brief Picture of the Regional Context

The Centro region (Figure 10) is located in the central-most area of continental Portugal, benefitting from a strategic positioning between the country's major metropolitan centres – Lisbon, the capital, and Porto. Centro is one of seven Portuguese administrative regions, corresponding to the NUTS II European statistical subdivision, and encompasses approximately 30% of the country's total area, with a population of over 2 million inhabitants (European Commission, 2019). This population is unevenly spread out throughout the region, with a greater density in the more urbanised coastal areas (like Coimbra, the region's capital, and Aveiro), and a characteristic 'desertification' of the more rural interior, except for some urban centres (e.g., Viseu, Castelo Branco).

Figure 10 - Map of Portugal displaying NUTS II statistical divisions and the NUTS III Aveiro Region.



Source: Authors' own elaboration.

In economic terms, its GDP corresponds to roughly 19% of the national one, but its purchasing power is still below both national and European averages (European Commission, 2019). It is considered an LDR in a country that is, nevertheless, a



moderate innovator, according to the EU's Regional Innovation of 2018. Given that the region encompasses a great territorial area, Centro benefits from a rich variety of (natural) resources that have contributed to its economy becoming relatively diversified. It is both competitive in low technological industrial sectors – like ceramics, agro-food and forest industries – and increasingly in medium to high-tech sectors – namely ICT, biotechnology and health, renewable energies – which are bringing new applications to more traditional industries (Rodrigues & Teles, 2017).

Centro is the third highest ranked region in Portugal in gross expenditure on R&D with growing investment over time (European Commission, 2019). In this, its economy and innovation-related endeavours, Centro owes a lot to its higher education institutions, which include three universities – the University of Coimbra (UC), University of Beira Interior (UBI) and University of Aveiro (UA) – five public polytechnics and many other private education and research institutes. Nearly half of the R&D expenditure in the region results from activities implemented by higher education institutions, with businesses following suit and lastly government and other private institutions (European Commission, 2019).

Not following a regionalised tradition, Portugal's central government is the one responsible for regional development and, in the most part, for the definition of research and innovation policies. Regional commissions, such as the CCDR of Centro, possess administrative and financial autonomy but are merely decentralised bodies of the central government. Their competencies include, nonetheless, regional and urban planning and development, environment, inter-regional and transnational cooperation, and the management of financial instruments and EU programmes based on funds allocated to Portugal (European Commission, 2019). The RIS3 Centro is one such instance. By designing a RIS3, the region can access ERDF, and aim to enhance its overall performance in GDP and R&D in the national context and reinforce internal territorial cohesion and resilience (European Commission, 2019). To achieve this, and together with regional stakeholders, eight strategic priorities have been defined in RIS3 Centro, linked to the above-mentioned main regional industrial sectors but also including sea-related economic activities and tourism. Combination of these areas has been promoted through three main transversal scopes: i) sustainable industrial productivity; ii) energy efficiency; and iii) rural innovation (CCDRC, 2014b). The 2014-2020 RIS3 was implemented within the overarching CENTRO 2020 strategy, which had around €1.8 billion of European Regional Development Funds (ERDF) and €404 million European



Social Funds (ESF) to work with (European Commission, 2019). Within this (CCDRC, 2014a), ten priority axes were defined to orient investment, namely:

1. Research, development and innovation (IDEIAS);
2. Competitiveness and internationalisation of the regional economy (COMPETIR);
3. Develop human potential (APRENDER);
4. Promote and stimulate employability (EMPREGAR and CONVERGIR);
5. Strengthen social and territorial cohesion (APROXIMAR and CONVERGIR);
6. Affirm the sustainability of resources (SUSTENTAR);
7. Affirm the sustainability of territories (CONSERVAR);
8. Reinforce institutional capacity of regional entities (CAPACITAR);
9. Reinforce the urban network (CIDADES);
10. Technical assistance.

According to the available data set of CENTRO 2020's funded projects (CENTRO 2020, 2019), from 2014 until March 2019 an open call process yielded the approval of 5166 projects to a total funding of €1.303.231.907,03. While the majority of these were granted to the private sector (Figure 11 and 12), other regional bodies, like scientific and knowledge institutes and sub-regional and local government authorities, were able to become main beneficiaries in these projects. Intermunicipal communities, in particular, having been allowed since 2008 the partial management of regional funds provided their elaboration of a territorial development plan, emerged in this 2014-2020 period as major actors in RIS3 project management and fund implementation, granting local government nearly 20% of the allocated funding (Figure 11).

While territorial cohesion was one of the main goals in the elaboration of the RIS3, the data still demonstrates the existence of an asymmetry in fund allocation (Figure 13), a result of coast-interior economic disparities. Sub-regions like Aveiro, Coimbra and Leiria, benefitted from more developed industrial and service sectors, as well as institutions – such as UA and UC – capable of providing greater support to innovative initiatives. At the exception of the sub-region of Beiras e Serra da Estrela, where the UBI has made efforts in stimulating the surrounding economy, the other more rural and peripheral regions were inevitably at a disadvantage in the attraction of investment.

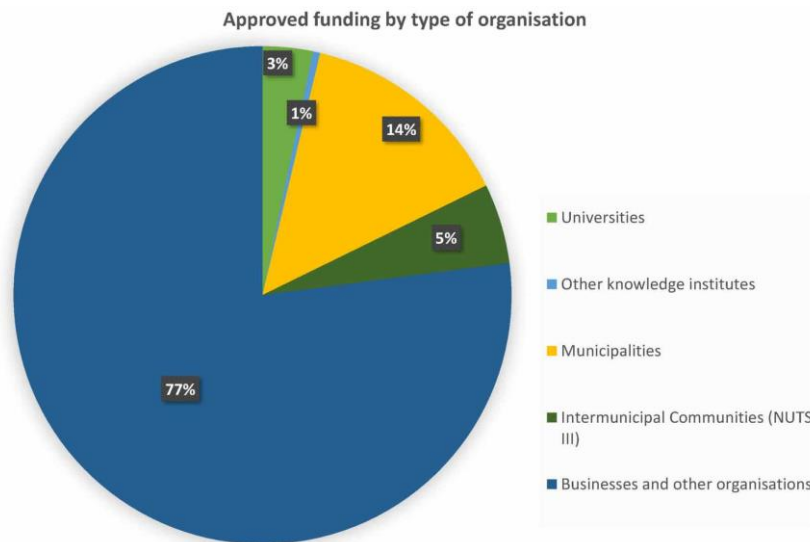


Figure 11 - Centro 2020 distribution of approved funding by organisation type. Source: Author's own elaboration from Centro 2020 data.

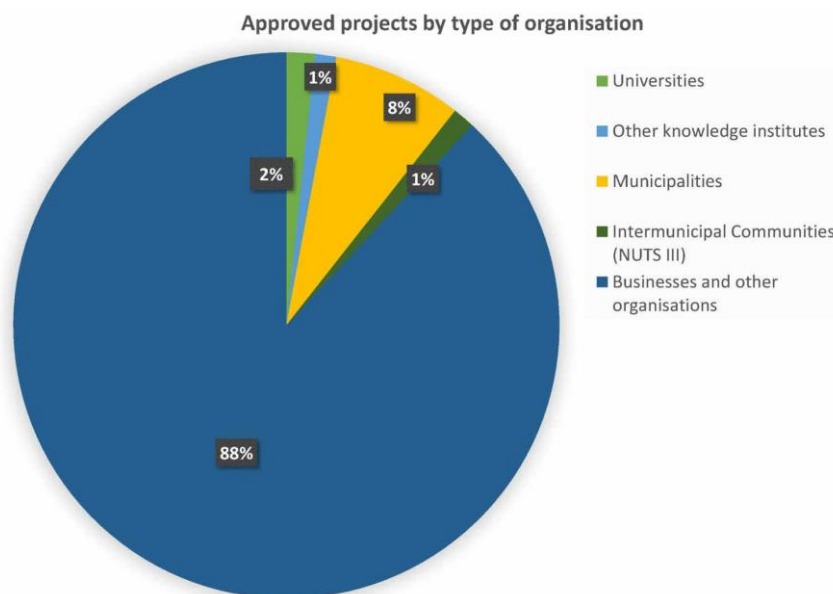


Figure 12 - CENTRO 2020 distribution of approved projects by organisation type. Source: Author's own elaboration from Centro 2020 data.

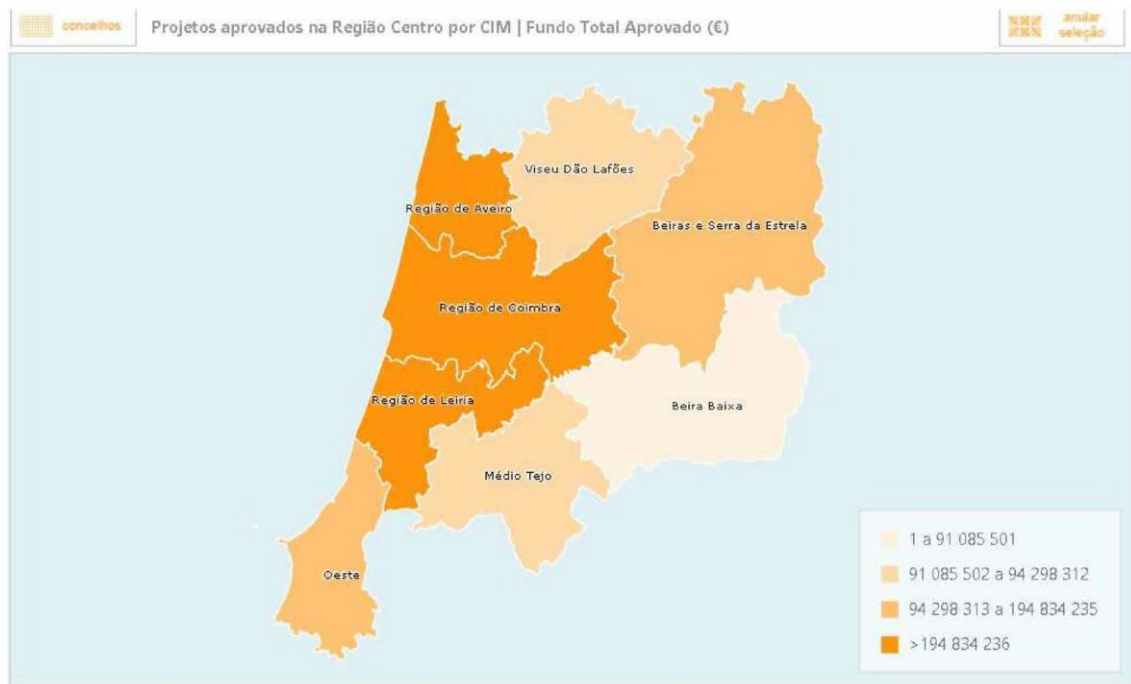


Figure 13 - Distribution of approved funding (€) in the Centro region by NUTS III. Source: Centro 2020 (2019)

8.3.2. Universities in the RIS3: UA's Engagement, Alignment and Entrepreneurial Practice

Considering knowledge institutions and, particularly, universities as central actors in the S3 and overall regional innovation policy process (Foray et al., 2009), it is curious to observe that in the Centro region, these bodies were only the main beneficiaries in 3% of the projects and 4% of the allocated funding. Their role in the process, nevertheless, cannot be solely perceived by this factor. Their engagement in the strategy's formulation and involvement in projects where they were not necessarily the leading actor, should be explored as well, and that is how the authors approach the case of UA. First, dissecting the capture of RIS3 projects and funding of each of the three Centro region's universities, there is a clearer competition between UA and UC: while UA was able to attain the approval of more projects (47 projects in total), with less projects the UC was granted more funding (Figures 14 and 15). The UBI has, so far, accrued the less projects and funding. This dynamic can be partly explained by historical, contextual and institutional aspects.

Of the three universities located in the Centro region, only the UC is over 50 years old. It was created in the late 13th century and is one of the oldest universities in Europe. Unsurprisingly, it is a pivot in the Portuguese higher education (and political) system and has been associated with a more traditional academic orientation. On the other hand, UA and UBI are two young entrepreneurial universities created in the 1970s, a time of

massification and restructuring of higher education in Portugal, and as a result of a need for innovative alternatives in a period of industrial decline. This beginning led UA and UBI to structure their organisations to respond to new academic and societal challenges, and thus become more entrepreneurial. In the case of UBI this was nevertheless more difficult to accomplish, as its surrounding region faces characteristic problems of the Portuguese interior: ageing population and insufficient infrastructure and communication links that hinder the formation and stimulation of an innovation system.

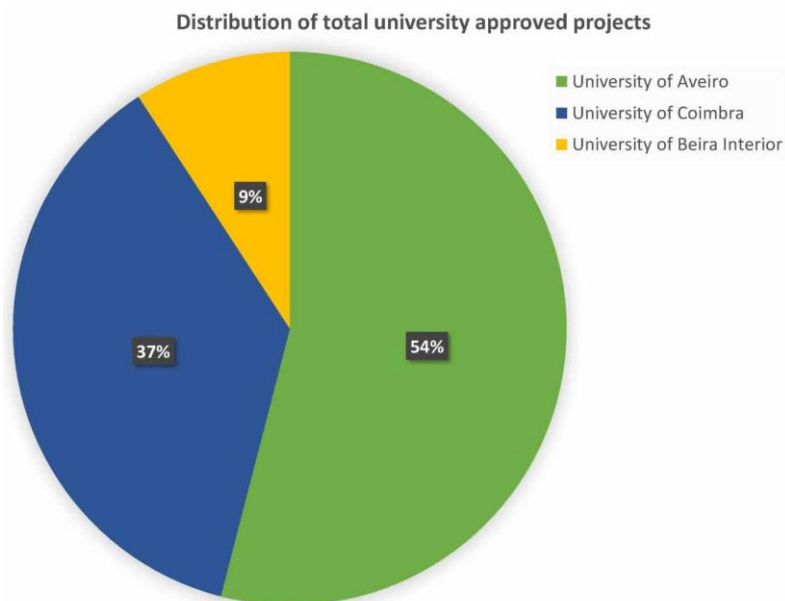


Figure 14 - Centro 2020 distribution of university-led projects by institution. Source: Author's own elaboration from Centro 2020 data.

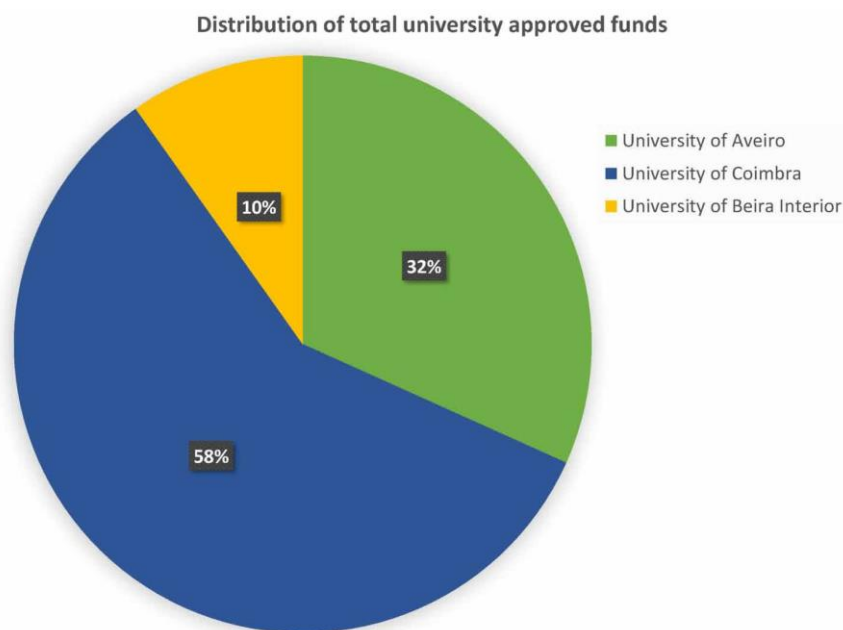


Figure 15 - Centro 2020 distribution of university-led project funding per institution. Source: Author's own elaboration from Centro 2020 data.



Focusing on UA, as an interviewee confessed, “we can say that university of Aveiro from the beginning, from its origin was much more outward looking to its regional ecosystem, let’s say, than the others.” Its creation was the result of local lobbying for a knowledge institution that could revitalise and support the increasingly stagnant industry. But it was nevertheless an already highly industrialised coastal region with good links to the main economic and knowledge hubs: Porto, Coimbra and Lisbon. Its implantation was also accompanied, in the same decade, by the opening of the Innovation Centre of Portugal Telecom in the city of Aveiro, in whose facilities the university started its activities. UA’s initial regional orientation inevitably became strongly defined by regional needs and industry demands, with a focus on characteristic regional sectors (e.g. ceramics and materials, agro-food), and new areas of scientific and technological potential (e.g. ICT, sea and environment, tourism, biosciences and pedagogy) (Rodrigues & Teles, 2017). To support this, UA has created several interface units to build its academic strengths and stimulate entrepreneurial endeavours. Namely, the Office for University-Business relations, that has created a portfolio of university resources and contacts available for firms; UATEC, a more proactive structure that has sought to strengthen internal coordination and external network collaboration; key management positions and boundary spanners, like the Vice-Rector for University-Society relations and the Pro-Rector for Regional Development, the latter specifically responsible for managing cooperation with government authorities; and other bodies like the incubator and the new science park that are helping to promote technology transfer and business creation.

Besides the more common university-business relationship within the entrepreneurial framework, UA has also been consistently and increasingly engaged with the local and regional government. This is more evident in its consultancy work with surrounding municipalities and in its partnership agreements with CIRA, which sought UA’s collaboration in developing two territorial development plans for the periods of 2007-2013 and 2014-2020 (Fonseca, 2019; Rodrigues & Melo, 2013; Rodrigues & Teles, 2017). The university was thus well-positioned to significantly contribute to the RIS3 policy process and engage more extensively with its immediate region to maximise the outcomes. UA was involved in the regional and sub-regional policy formulation stages. In the RIS3 process, it was present as a stakeholder at the table to assess opportunities in the territory and guide the discourse. Namely, UA participated in several thematic and working groups that advanced the discussion on the priority sectors and transversal areas of RIS3, specifically leading the working group and RIS3 platform on Sustainable Industrial Solutions. Interviewees unanimously considered UA as one of the most active and participating stakeholders, designating representatives to all working tables. One



interviewee from CCDRC presented some reasons as to why UA's role in the RIS3 might have been so relevant:

Aveiro had a strong role, not just as a university, but... a lot of the companies and some of the autarchs were connected to Aveiro. For example, to discuss ICT, I know that a lot of people from Aveiro participated, both from the university and the pole that is physically situated in Aveiro. (...) Aveiro is also a region that has a strong component of science and technology. It has some of the competitiveness poles that were invited to participate in RIS3. So, it had already people that were perhaps more aware of the RIS3 discussion dynamics.

The existing entrepreneurial fabric within the Aveiro region, and the heightened connectivity between it and the university, therefore created the opportunity and the entry points for the university to be more engaged within the policy process and shape the emerging discourse. As another interviewee stated, “[The University of] Aveiro benefits from being more integrated in the regional ecosystem”. They go on to give the example of UA's commitment to the region in the form of its close partnership with CIRA, considering it as a “meaningful” demonstration of the university's active support and effort in aligning the regional policy at multiple levels.

UA's organisational structure was also highlighted as a facilitating factor for more strategic and unified dialogue between the institution and the regional authority. Specifically, UA has no faculties. Instead, it is endowed with a ‘matrix structure’, in which above the departments there is only the rectorate. This allows, according to an interviewee, for a clearer direction and alignment between the management level and the rest of the university, as “messages flow much more smoothly to the departments and it's easier to engage.” Internally, UA has chosen to adapt to the S3 framework by creating eight so-called “technological platforms”, cluster-like networks for regional engagement and project stimulation, focused on the themes defined within the RIS3 Centro and its own disciplinary strengths (e.g. sustainable habitat, agro-food, sea, smart communities, moulds and plastics). While the CCDRC has still not integrated these platforms within its overall plan of action, their creation was associated with regional priorities, and it was an adaptation where UA remains at the vanguard of other Centro universities.

Therefore, it appears that in the early stages of the process UA played a relevant role by not only seeking to participate in the dialogue between stakeholders organised by the CCDRC for the RIS3 – i.e. the entrepreneurial discovery processes – but also in creating and promoting this interchange and connectivity in its immediate surroundings, namely by its cooperation with CIRA and the creation of organisational structures to support



knowledge transfer and network collaboration (e.g. technological platforms). For interviewees from the CCDRC, this interaction, paired with the transmission of expert knowledge and the promotion of learning dynamics, was the most important contribution of universities in the RIS3, and their main aim with the process. It was also a big advantage in the project proposals that included universities. According to an interviewee, “[universities] understood better than others how they should present their projects, and that to align themselves with RIS3 they needed to state how what they were proposing could have an impact. We are not experts in those small, these specific scientific fields.” Ultimately, UA was the main beneficiary in 47 RIS3 projects, mainly within the priority axes of IDEIAS, COMPETIR, and APRENDER, the three most related with research, education and competitiveness, emphasising their role in stimulating regional knowledge-based innovation. With these projects UA accrued € 13 488 934,37. Nevertheless, through their partnership with local municipalities and CIRA, they became involved in cultural and natural heritage and digitalisation projects relating to the axes CONSERVAR and CAPACITAR, which on their own granted funding of over € 4 million. In this sense, the degree of UA’s regional engagement through the RIS3 Centro appears much more diversified.

8.3.3. Implications in Implementation

Historically, SF instruments have been an important source of funding for universities in the Centro region and, particularly, for UA. As one interviewee remarks, they have enabled significant investments for capacitation and the upgrading of infrastructure and resources: Many things were constructed, like the incubator, many labs in all the universities of the region, Aveiro, Coimbra... research centres that are associations of universities and companies, all funded by FEDER in the last 30 years.

Nevertheless, while this same investment has improved UA’s entrepreneurial capacity to connect to its region, there has been a shift not only in the availability of funding, but also in the way this funding and projects is viewed within the academic institution. Although there is currently more emphasis regarding research and development projects over capital/infrastructure projects, SF from CENTRO 2020 are being resorted to more as a question of ‘survival’ of the academic institution rather than as a means of reinforcing institutional engagement with regional development activities. This has made the latter somewhat unimportant on both an institutional and individual level. Interviewees suggested that the reinforcement of entrepreneurialism has translated into an almost forceful pursuit of funding for academics to maintain their position: “you have to fund yourself and that’s it.” That same ‘survival’ through SF funds was echoed throughout the



institution, where “the orders are that the university should go for anything we can” or otherwise “many things would stop. Because there is no budget for research.”

There is an evident, stronger push from the university to apply for external funds, and CENTRO 2020 was considered one of the most accessible funding sources. ERDF funding was seen by academic interviewees as a valuable tool to interact with local SMEs. However, a number of challenges associated to its utilisation by UA still remain, from academics lacking the skills to collaborate with businesses (“to change your paradigm as a scientist, to think about the productive sector, it is a huge challenge”), to UA not viewing collaboration as valuable as researchers would hope (“...the ultimate mission of knowledge institutions, which is to bring to the productive sector the knowledge generated in the university, I think that this is not valued”). Academics’ motivation to engage with local stakeholders and respond to regional needs thus greatly varied. Whereas some researchers sought to engage with regional development projects to give back to the community, serve local companies and transfer academic results, others did not distinguish between regional, national or even international project activities. As one interviewee admitted, “the origin of the money does not matter much”. They also pointed out that “what really counts is the possibility to establish networks”, which suggests the establishment of collaborative partnerships with other actors is seen as relevant for increasing the success of project bids, the quality of research and, somewhat, for the continuation of innovative endeavours.

The unimportance of regional engagement activities was also explained by a lack of strategic management, accompanied by cultural issues and its insignificance in universities’ national evaluation framework. However, in many cases personal commitment and the ability to understand regional needs, to “speak the language of the people in the region – and translate the position of the university to the municipalities,” was considered a key feature in establishing projects and collaboration with stronger regional focus. According to interviewees, building a strong relationship with local authorities required individual engagement and commitment, and a lot of effort on UA’s part. Today, these links are more established.

Even though UA has been one of the key players in the RIS3, interviewees found that the regional strategy was not well communicated from the top-level. While UA’s matrix structure could have allowed for a broader informed interest, integration and coordination regarding the policy’s progress, due to a lack of strategic planning and effective management many academics are not considering S3 relevant or they are unaware of what it entails. Nonetheless, researchers involved with SF projects have articulated the



potential regional impact of their research activities in the bidding phase. This was considered a good exercise for increasing academics' mindfulness of societal needs as well as a way to establish a closer connection with the community.

Frequently highlighted regional benefits of SF projects' activities included promoting research, providing information for policy-making processes, developing links with businesses and job creation, especially in regional priority sectors like ceramics and ICT. Part of the UA-led CENTRO-FEDER projects have propelled grassroots endeavours and multidisciplinary collaboration around these themes, both within UA and with external partners. SmartWalk²⁰ is a positive example of a student-led initiative growing into a bigger project in the health sector:

*We are in the health department; we work with them (public sector).
UA chose to intensify this cooperation with hospital and primary care.
I think it's important, maybe because it's my area, to also intensify the
social care. Because they really need technologic solutions.*

Such projects were considered beneficial for the region, but typically their continuation after the pilot phase – and more importantly, the end of the project funding – depends on local agents' commitment. Ultimately, while SF funding opportunities can make “universities keener to cooperate with regions and regional agents,” in practice, the regionally-funded SF projects were not perceived as very aligned with RIS3 objectives. The latter also have a minimal role in the projects' design; only larger scale institutional initiatives had a somewhat strategic approach to regional development, whereas smaller SF projects were designed more opportunistically by individual researchers. One of these large-scale institutional initiatives designed at the rector level – CENTeR – focuses on communities' role in innovation processes. It was described as a successful example of an entrepreneurial discovery process to scale up a regionally relevant substance area. This contrasts with smaller, more specialised SF projects focusing on fundamental research. As one of the interviewed UA researchers stated, “there's always, always a box that we need to fill in, trying to mention and justify why this research is aligned with the RIS3... I really don't believe that it has an impact.”

In some CENTRO 2020 calls, there are limitations about the amount of applications per institution, which can create internal competition, but also lead to more collaboration. As one researcher admits, “if it wasn't for this funding opportunity, we would not be working together (internally) as intensively as we are now doing.” On the other hand, it can also force universities to manage project portfolios more strategically in the future. Some of

²⁰ A Smart Cities project for active seniors.



the interviewees believed that this strong relationship with government authorities has had an impact on the amount of granted project funding:

There is a really good relation between the university and CIRA, and the city [of Aveiro], a very good one. And that type of interaction helps us to get structural funds. Because we understand the reality and they understand the HEIs' role. And perhaps it's one of the reasons that we have so many SF projects funded.

Interviewees agreed that the knowledge UA has provided to both regional and sub-regional entities has played an important role in improving collective learning, particularly considering that more scientific and technical language of innovation is not these authorities' central domain. Nevertheless, they suggest there is still a lot of work to be done in optimising communication. Ultimately, the steering impact of regional funding instruments was repeatedly emphasised and considered positive as SF programmes are promoting new ways of collaborating and pushing academics to work more closely with their regions. As a UA professor remarked, "the most effective way of putting universities to work according to the direction of S3 is through funding. It's the only way, I think."

8.4. Challenging Entrepreneurial Universities' Regional Impact

The role of entrepreneurial universities in stimulating regional innovation has been widely emphasised in the literature, particularly for their capability in valuing knowledge and translating it into a useful asset for society. This chapter sought to understand if, in a context of smart specialisation in which regional priorities, knowledge-based innovation and collective learning mechanisms are being prioritised, the entrepreneurial university emerges as a key actor in the process. Particularly, if the regional potential of an entrepreneurial university is furthered or realised in this policy framework, namely through its effective collaboration in the RIS3 policy formulation process and in the implementation of the resulting projects.

Within the RIS3 Centro process analysed, knowledge institutions, but especially universities, were considered key actors, and they were integrated as much as possible in the entrepreneurial discovery process being carried out. Some universities had the capacity or the will to do so more than others, and UA was seen by interviewees as standing out in this aspect. These opportunities for universities and other stakeholders to interact within this entrepreneurial discovery process organised by CCDRC allowed for the establishment and/or the strengthening of networks, observed by interviewees within the regional authority as later leading to projects.



In the implementation stages, UA can also be considered as possessing the organisational structure and institutional partnerships needed to maximise its gains in SF and manage its involvement with other regional actors. Aside from the bodies and infrastructure already in place within the university that had been supporting its entrepreneurial activities throughout the years – e.g. UATEC, the incubator, the University-Business office and the Pro-Rector for Regional Development – others were created specifically to answer the challenge being posed by the S3 framework and the regional authority – namely UA's Technological Platforms, and more recently, the science park, which aims to be a connecting point between regional stakeholders.

Regarding projects in which UA was involved in, it is possible to draw some lessons about the impacts of these innovation endeavours in regional development:

1. UA was able to leverage its own internal resources and regional capabilities to influence the RIS3 entrepreneurial discovery processes and increase the probability of getting projects funded. This was enabled by its established regional ties and the dedication of key boundary spanners within UA and partner organisations.
2. SF projects were found to promote (even basic) research, job creation and university-business links in regional priority sectors, and encourage evidence-based policy. Nonetheless, fundamental research projects were found to be forcefully and opportunistically 'shoved' into the RIS3 box, questioning researchers' projections of regional impact.
3. Funding often enabled grassroots projects to scale up (e.g. SmartWalk), and garner multidisciplinary collaboration. This can be a way of promoting regional engagement in the broader academic community. However, while considered regionally beneficial, such projects often end after the pilot phase, with their sustainability dependent on local partners' commitment.
4. Larger scale projects were more strategically aligned to RIS3 and purposefully designed for sustained regional impact (e.g. CENTeR). Smaller projects tended to be more individualistic (focused on one researcher, unit or field, rather than multidisciplinary) and opportunistic ('stretching' the project's alignment with RIS3 goals to get funding). Collaboration may thus result in more effective planning and accountability.

Ultimately, UA was the main beneficiary in 47 CENTRO-FEDER projects, but it was its multiple partnerships and agreements with other regional actors, particularly with CIRA



and local government, that enabled it to be a partner in a few other projects throughout the region. Through them, UA contributed not only to projects within the more common academic scope of education, research and innovation, but also to those within the areas of sustainability, environment, culture and public services. Its connection to the region, and its interaction with multiple local actors, allowed it then to upgrade regional R&D and knowledge assets and to diversify its natural range of action to respond to regional needs in a more comprehensive manner. This follows Brown's (2016) and Santos and Caseiro's (2015) argument that entrepreneurial universities should expand their activities to realms beyond those typically associated with commercialisation and technology transfer. Instead, and especially in LDRs and peripheral regions, the involvement of universities in institutional capacity-building can be fundamental for more directly matching regional priorities and funding with regional needs (Fonseca, 2019).

There are, nonetheless, hindering factors in UA's contribution to the implementation phase of RIS3 that can potentially be expanded to universities in other contexts. While SF, and the projects thus supported, have been historically important for UA and other universities in the region, enabling investments in the capacitation and upgrading of infrastructure and resources, there are insufficient institutional mechanisms and culture that can enable their linkages with a regional mission. There is a push at the institutional level for academics to apply for such project funding, but this is viewed as opportunistic and necessary for the survival of their research, and in no way related to a pursuit for a strategic orientation to regional priorities. Ultimately, communicated strategic planning regarding regional engagement is lacking from the institutional level, leaving academics' engagement endeavours feeling 'scattered' and lacking concrete long-term impact.

There is, nonetheless, potential for the 'combination' of entrepreneurial universities and RIS3. Interviewees believed that the required consideration of impact in the SF bidding process was a much-needed prompt for academics to reflect societal needs and outreach. It was also widely agreed that SF projects helped promote research, developed links with businesses, and provided crucial information and knowledge for policy processes. Even though all UA-led SF projects might not have been intentionally directly aligned with RIS3 objectives, despite such expectations in the strategies and funding guidelines, especially when the university itself has engaged in the policy-design process, the wide-range of benefits can sustain the argument that they served to substantiate UA's regional engagement and even the current S3 framework. The lingering interactivity present in UA's surrounding region was enhanced as a result of this policy intention set with the RIS3, that provided a clearer direction to regional needs. In turn, UA provided



the key organisational support and played a role in building the needed institutional capacity to implement RIS3, echoing Fonseca (2019) and Fröhlich & Hassink (2018) conclusions. UA's efforts to support the entrepreneurial ecosystem and stimulate collective learning, and the positive impact of its projects, suggest the university provided RIS3 with more much needed tools for what is the first specialisation period.

8.5. From Policy Discourse to Integrated Collective Learning

The strategy processes initiated with RIS3 are still in the beginning stages of what is an experiment of spurring collective vision-definition for a region. One of the interviewees stated that it was unclear for anyone involved “how that definition was going to relate with the design and implementation of the funds”, leading regional authorities to often seek to “maintain the maximum space possible to accommodate what was their manoeuvrability for the implementation of the community framework programmes.” Therefore, it is pressing to understand if the rhetoric of valuing endogenous resources, of defining and identifying regional opportunities through the pursuit of collective network processes for knowledge-based innovation, is being translated into practice. As a key actor in stimulating these processes, the entrepreneurial university (namely UA) was chosen for this analysis, as through its multidisciplinary and varied engagement mechanisms it had the greatest potential in bridging this dichotomy between discourse and practice. While the data suggests this, there is a need for further work to attain this:

1. Enhancement of communication, so it is more frequent and effective about regional strategy/objectives. Most academics were unaware of the smart specialisation framework and its particularities in the Centro region. In Centro, regional actors were uninformed about achievement of RIS3 goals and the overall development of the process. The clarification of what the regional authority expects of each actor could boost participation and accountability. Enhancing communication both within the university and between it and all stakeholders and regional actors on RIS3 objectives and the development of the policy process could allow for better actor integration throughout the process and permit more effective and strategic coordination. It is a task of not only the regional government authority, but also of each institution involved. Universities, given their loosely-coupled character, would find in this a worthy challenge that could define an oriented regional mission and promote internal interactivity.
2. Foster the involvement of often-excluded actors in order to avoid individual interests and ‘monopolies’ to overshadow community-oriented visions and



practice. In the case of this chapter, an excluded actor could refer to the UBI, a university in a peripheral and less-favoured setting that faded in its involvement relative to the other universities. It could also extend third sector organisations or other actors that do not benefit from being a part of a dynamic entrepreneurial network and region, but that can nevertheless bring something to the table.

3. Emphasise the collective and immaterial benefits that can emerge from the strategy process, namely the fostering of collective learning dynamics, of which territorial competitiveness is often dependent on. Promote stakeholder linkages that go beyond economic outcomes and that present a pedagogical and innovative approach to their interactions and projects, in order to build wider institutional capacity. For universities, the main key lesson to consider is the need for a strategic orientation for regional engagement from the institutional level (i.e. top-managers). While UA entertained a regional connection from its creation, this discourse often clashes with the more strategically defined and goal-oriented teaching and research missions. If regional engagement was given institution-wide objectives (e.g. 30% of overall projects including regional collaboration and/or regional impact) and incentivised (e.g. providing schedule flexibility for academics more oriented towards engagement to be able to focus on such projects) (Fonseca, 2018), academic projects might consider effective regional impact and go beyond mere questions of “survival” and “opportunism”. Benefits from regional engagement also need to be stressed, namely the opportunity for networking and sustained collaborative activities and for the creation and improvement of the innovation and entrepreneurial ecosystem.

8.6. Further Research Directions

Further study to complement this assessment could comparatively explore each actor’s role within the RIS3 process to evaluate their impact in promoting dialogue and the strategy’s implementation. Similarly, a more granular, in-depth analysis of each funded project led by the university has the potential to identify further organisational constraints and provide a detailed evaluation on the effective impact of these projects on regional development. Lastly, an analysis of other universities in other contexts where RIS3 is taking place would enrich the debate and strengthen reliability of the findings.

8.7. Conclusion

The results obtained from this analysis allow for an overall assessment of the level of involvement of an entrepreneurial university in the RIS3 process, and how this played a



part in matching the S3 domains with regional needs. They also weigh on the contribution of entrepreneurial universities to the general and fundamental goals of the RIS3 approach, drawing lessons for public policy and opening the discussion on the future of RIS3 in EU regional policy. As such, the chapter addresses the extent to which the role played by universities in a region's innovation and entrepreneurial practice matches smart specialisation strategies to regional needs.

The case of the University of Aveiro, located in the Portuguese Centro region, enabled the furthering of this debate as it provided a perspective of an entrepreneurial university within the context of an LDR that nevertheless strives to actively engage in the regional policy process. Observed difficulties include the promotion of an effective link between regional domains defined within the regional policy to the academic community, as university's institutional strategic and engagement mission is not always communicated and operationalised successfully. It is possible to discern the inefficiency of certain institutional mechanisms that may be hindering regional engagement, particularly in the framework of entrepreneurial universities. Nevertheless, the S3 framework and the funding therein provided seems to have contributed to more directly link UA's research to regional needs, going beyond this chapter's initial propositions. In turn, the university's strong local partnerships enabled it to more effectively leverage the received funding, and advanced and diversified its action throughout the region, ensuring the promotion of a more dynamic entrepreneurial ecosystem and collective learning.

There are, therefore, clear and broad benefits to be had in entrepreneurial universities' more active involvement in the RIS3 process. While UA benefitted from an early connection to the region, it sought to build upon this by linking its infrastructure and organisational bodies to regional priority areas. This has permitted it to distinguish itself from other universities in the region, in the country, and to be a renowned institution in those same key areas (e.g. ceramics, ICT, sea and environment). Other universities that might lack either the infrastructure or a strong regional network may benefit from this example by defining a regional strategy that can allow them to prioritise on a few key strengths and contacts. This network can then be developed with the proper commitment. But it is nevertheless important to emphasise the role of effective institutional mechanisms, culture and of the diverse set of actors that complement this work.



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8.10. Key Terms and Definitions

Entrepreneurial Architecture: The routines, norms, structures and channels that influence the behaviour of individuals within a certain strategic mould and enable the flow of knowledge and innovation from the university to society. Vorley and Nelles (2009) have proposed a framework to illustrate the internal mechanisms involved in how entrepreneurial activities are embedded into the core institutional missions of the university. Salomaa (2019) has expanded this conceptualisation of entrepreneurial architecture to include contextual influences.

Entrepreneurial Ecosystem: The socio-economic environment shaping and fostering local and regional entrepreneurship as an economic development strategy. Within this framework, actors orient their focus to regional development and value-creation. The entrepreneurial ecosystem encompasses key players that are adopting an entrepreneurial mindset (risk and discovery) and developing related activities. It is considered by Santos and Caseiro (2015) as a required element for the implementation of a collective strategy and learning approach based on innovative assets and opportunities, and the result of dynamics between entrepreneurial universities and smart specialisation strategies.

Entrepreneurial Discovery Process: A bottom-up learning process which frames the interaction and inclusion of varied regional actors (policy, business, academia, social sector) who provide their knowledge and expertise. This helps in the analysis of regional strengths and in the identification and exploration of emerging trends and opportunities to define and shape the regional strategy for heightened competitiveness and development.

Entrepreneurial University: Universities that contribute to the development of the wider entrepreneurial and innovative environment, on a regional, national and international level. These higher education institutions consider knowledge as an asset that should be approached dynamically – to be created, transmitted and developed. Seeking to seize new opportunities in this, entrepreneurial universities often take on a more pro-active and strategic role in society and the market.

Less-Developed Regions: An economic categorisation of the European Union's cohesion framework. In the period 2014-2020, less-developed regions were considered



those that had a GDP less than 75% of the EU average. They would thus be eligible to receive more funding.

Smart Specialisation: An academic concept that entered the forum of EU policy. It is characterised by a place-based, tailored approach, contrasting the previously criticised “one-size fits all” policies. Smart specialisation also seeks to encompass a broader view of innovation, beyond technology-oriented approaches. It aims toward the identification of regional strengths and strategic areas of intervention. These are identified and defined through a knowledge-based analysis and a regional stakeholder involvement in an entrepreneurial discovery process, supported by monitorisation and constant adaptation as challenges and opportunities emerge.

Smart Specialisation Strategies (S3) or Research and Innovation Strategies for Smart Specialisation (RIS3): A strategic approach defined by the EU and implemented in the 2014-2020 framework. It targets support for research and innovation, aiming to supplement previous industrial policies to include more educational and innovation policy approaches. Specifically aimed at the regional level for a more granular, place-based approach to EU cohesion, it is a process of identification, definition and development of regional strengths for enhanced competitiveness. While S3 engenders the involvement of varied regional stakeholders in the strategy process, it highlights the role of higher education institutions as guides in what is ultimately a knowledge-based innovation strategy.

Third Academic Mission or “Third Mission”: Term asserting the additional responsibilities of universities in engaging with society and responding to market demands and developmental needs. Besides the other two core functions of teaching and research, universities are now imbued with a “third mission” of external, and often, regional engagement, through which they aim to create strategic links with other societal agents.



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PUBLICATION VI

9. The Organizational Adaptation of Universities to Smart Specialization: the emergence of strategic network interface units

Abstract

Universities are increasingly expected to engage in regional innovation policy. This has reinforced the need for organizational adaptation of university structures to respond to these new challenges. Recently, a variation in the typical knowledge transfer structures has emerged: strategic network interface units. These units are multidisciplinary and cluster-like formal networks led by universities in collaboration with businesses, government authorities and other organizations.

This paper compares the organizational adaptation of two universities – the University of Aveiro and the Autonomous University of Barcelona – as they assume increased responsibilities in regional innovation dynamics. Through interview-based analysis, findings suggest these interface units were created to support the alignment of the universities with smart specialization strategies and EU priority areas for accessing funding. However, while the original aims of these units are very similar, their institutional and operational configuration has led to different cooperative arrangements. Transversal communication based on trust and capacity-building was an important supporting factor in the innovation impact of these units.

Keywords

Universities, smart specialisation, organisational adaptation, regional cooperation, interface units

Reference

Fonseca, L., Rodrigues, C., & Capelleras, J.-L. (2020) The Organizational Adaptation of Universities to Smart Specialization: the emergence of strategic network interface units, *European Planning Studies*, vol. 29 (8), pages 1514-1537. DOI: [10.1080/09654313.2020.1854188](https://doi.org/10.1080/09654313.2020.1854188)



9.1. Introduction

The contribution of universities to regional innovation is widely recognized. Their collaboration with multiple actors is considered to have a transformative role in activating regional knowledge dynamics, highlighting their role in the territory alongside industry and the state (Etzkowitz and Leydesdorff 2000; Gunasekara 2006). This is emphasized in academic concepts like Regional Innovation Systems and the Triple Helix model, and in new policy paradigms like smart specialization where universities are attributed a central role in regional innovation dynamics (Elena-Perez, Arregui Pabollet, and Marinelli 2017; Foray et al. 2012; Goddard, Kempton, and Vallance 2013; Kempton 2019). Universities are considered key agents in smart specialization strategies (RIS3) capable of guiding entrepreneurial discovery processes (EDP), matching industrial and research resources, and developing regional capabilities (Foray et al. 2012). However, expectations of the transformative role of smart specialization and universities are often exaggerated (Brown 2016; Hassink and Gong 2019; Kempton 2019; Sotarauta 2018).

Given increasing expectations, universities are adjusting by creating closer inter-institutional ties and strategically framing their regional action. Viewed as the institutionalization of the «third mission» of regional engagement, complementing the traditional academic missions of teaching and research (Etzkowitz and Leydesdorff 2000; Zomer and Benneworth 2011), offices responsible for managing knowledge transfer and other collaborative activities have been created across universities to strengthen these outreach functions (Arbo and Benneworth 2007; Etzkowitz 2002). Recently, a new university organizational structure has emerged. Strategic network interface units have been created as multidisciplinary cluster-like networks between academics, businesses, government authorities and other organizations to align with regional policy priority areas. These structures remain relatively understudied as there are only a few European cases, although with others potentially emerging in adaptation to the current policy framework. This paper explores the organizational adaptation of two universities as they assume increased responsibilities in regional innovation dynamics, posing the questions: (a) what were the determinants that drove the creation and development of the new organizational structures; (b) how are these units linked to the universities' regional engagement strategy; and (c) what are the implications of these interinstitutional dynamics on the regional innovation (policy) landscape?

In accordance with the explorative character of the research, the grounded theory methodology of Gioia, Corley, and Hamilton (2013) is utilized through a comparative



case-study analysis of the technological platforms (TPs) of the University of Aveiro, Portugal, and the strategic research communities (COREs) of the Autonomous University of Barcelona, Catalonia. The first section of this article reviews literature on universities' regional engagement and inter-institutional cooperation, smart specialization, and organizational adaptation, followed by the methodology, data utilized, and analysis of each case. A comparative reflection is provided in the discussion section, and theoretical contributions, policy implications and limitations are presented in the conclusion. Findings suggest universities are furthering regional innovation objectives through interinstitutional collaboration carried out in alignment with smart specialization, although the motivation is largely opportunistic.

9.2. Literature review

9.2.1. Universities and regional innovation

9.2.1.1. *Academic ethos and regional engagement*

The academic 'ethos' has changed significantly over time, shifting from knowledge dissemination (teaching) to knowledge production (research) in the first academic revolution in the nineteenth century (Etzkowitz 1990). With the second academic revolution, a third mission of external (regional) engagement has emerged (Etzkowitz 1990). Universities are increasingly recognized by firms and government authorities as assets in innovation processes, resulting in their undertaking of further responsibilities towards society (Arbo and Benneworth 2007; Uyerra 2010). Accompanied by a need to acquire funding (Geuna and Muscio 2009), universities have thus assumed a heightened regional role through heterogeneous forms of engagement and organization.

Uyerra (2010) has conceptualized some of these forms, emphasizing, among other variables, the type of university and organizational unit that conducts the engagement, the main partners and the configuration of the dynamic. These engagement models range from a unidirectional knowledge transfer to more responsive and multilateral forms. The latter includes the entrepreneurial university model (Etzkowitz 1990; Etzkowitz et al. 2000) which focuses on universities' more generative role in economic development through knowledge commercialization (Gunasekara 2006; Uyerra 2010). In turn, the systemic university model refers to universities' 'boundary-spanning role' (Uyerra 2010, 1230) in networks, clusters and/or systems, particularly at a regional level. Lastly, the engaged university model is more developmental, with the university responding to regional stakeholders' needs and assuming broader governance responsibilities (Gunasekara 2006; Uyerra 2010).



All these models imply suitable organizational structures to manage the various facets of engagement. The entrepreneurial university model relies on organizational intermediaries like technology transfer offices or incubators. Likewise in the systemic university mode, although organizational linkages can also be formed through clusters and other similar bodies. The engaged university model relies on these and other structures including strategic and regional development offices (Fonseca 2019) and structures supporting staff regional outreach, regional decision-making and network brokering (Gunasekara 2006). Such engagement structures have spread across universities incorporating the «third mission», albeit with institutional and regional variation (Arbo and Benneworth 2007).

9.2.1.2. Inter-institutional collaboration for innovation

The previous arrangements were adaptive measures by universities to both internal and external pressures, aimed at facilitating the governance of knowledge transfer (Geuna and Muscio 2009), and thus universities' regional economic and innovation impacts (Alexander et al. 2018; Etzkowitz 2002). Closely associated, inter-institutional interaction and collaboration fosters capacity-building and learning dynamics linked with innovation outcomes (Guile and Fosstenlökken 2018; Morgan 1997). Pinto, Fernández-Esquinas, and Uyarra (2013, 3) have argued that SMEs interacting with external partners through knowledge mediators can overcome typical shortcomings in absorptive capacity, introducing 'innovations, invest[ing] in R&D and cooperat[ing] with the wider technological infrastructure'. Given that informal collaborative arrangements are the most common form of engagement with universities (Pinto, Fernández-Esquinas, and Uyarra 2013), more dynamic and open engagement strategies could thus enhance these outcomes.

Inter-institutional collaboration through network-like arrangements has become a growing theme in the academic and political discourse (Fjeldstad et al. 2012). Conceptualizations of innovation dynamics through interactive models include the Regional Innovation System (Cooke 1992) and the Triple Helix Model (Etzkowitz and Leydesdorff 2000). Networked inter-institutional collaboration has also been favourably argued in the context of innovation networks (Dhanaraj and Parkhe 2006), collaborative communities (Kolbjørnsrud 2017), ecosystems (Jacobides, Cennamo, and Gawer 2018) and technological platforms (Proskuryakova, Meissner, and Rudnik 2017). Inter-institutional collaboration can foster innovation by linking complementary actors and knowledge, thus creating a more effective learning and invention process (Dhanaraj and Parkhe 2006; Pinto, Fernández-Esquinas, and Uyarra 2013). Similarly, collaborative



networks or communities can cultivate shared visions and commitment through ‘trust, adaptability, innovation, knowledge creation and opportunity identification’ (Kolbjørnsrud 2017, 141), crucial factors in the promotion of place-based leadership (Beer and Clower 2014).

However, potential challenges in network formation and stability include actor isolation, issues of leadership and autonomy, and network monopolization (Dhanaraj and Parkhe 2006; Kolbjørnsrud 2017). Therefore, when researching these arrangements, it is important to examine elements of governance, organizational structure, and stakeholder interaction. These are key in determining the network’s effectiveness and potential, namely its mobilization, development, channelling and sustainability (Dhanaraj and Parkhe 2006; Kolbjørnsrud 2017; Nieminen 2005). While contextual changes, events and experimentation by the different parties involved can shape the emergence and development of these processes (Jacobides, Cennamo, and Gawer 2018), their success often relies on a ‘triggering entity’ (Dhanaraj and Parkhe 2006). As the main regional knowledge institutions, universities generally assume or are expected to play this orchestrating role. This is the case in the smart specialization framework, which emphasizes collaborative methodologies and views universities as key actors in regional innovation dynamics (Foray et al. 2012).

9.2.2. Universities in the context of smart specialization: policy pressure for adaptation?

The 2014 EU’s Cohesion policy framework incorporated the concept of Smart Specialization, developed in 2008 by the expert group ‘Knowledge for Growth’ (Foray, David, and Hall 2009). The framework arguably ‘revolutionised’ innovation policy (Capello and Kroll 2016; Hassink and Gong 2019), through its place-based and strategic investment approach, in the suggested interconnection between related but varied domains (Richardson, Healey, and Morgan 2014), and in the promotion of collaborative and bottom-up methodologies through the EDP (Foray, David, and Hall 2011). It also required EU-wide adoption of the framework as an ‘ex-ante’ conditional access to European Regional Development Funds (ERDF), and emphasized universities’ regional economic governance role (Elena-Perez, Arregui Pabollet, and Marinelli 2017; Fonseca and Salomaa 2020; Goddard, Kempton, and Vallance 2013). Universities are recognized within Smart Specialization as regional stakeholders especially capable of: (1) identifying and activating regional knowledge assets and priority investment areas; (2) building institutional and networking capability among regional stakeholders; (3) guiding and brokering governance processes (Fonseca 2019; Gunasekara 2006); (4) and matching



industry, research and other regional assets to boost competitiveness and development (Fonseca and Salomaa 2020; Foray et al. 2012). However, smart specialization and the contributory role of universities should be viewed sceptically. The policy framework is confusing, argued by some instead as 'smart diversification', as it intends for regions to identify priority areas through relatedness, branching and variety (Hassink and Gong 2019). The 'fuzzy' concept can thus make implementation difficult, especially for regional governments in peripheral and lagging regions that may lack the required capabilities (Capello and Kroll 2016; Hassink and Gong 2019; Pugh 2018). Moreover, there are other potential 'traps' in the integration of collaborative methodologies within smart specialization, including powerful actors monopolizing EDPs (e.g. universities or large businesses) and inter-institutional conflicts (Capello and Kroll 2016; Sotarauta 2018). This may lead to biases in priority identification, and to hindrances in implementation. Uncertainties exist, therefore, in how 'success' through RIS3 can be achieved as, despite hopes of smart specialization's transformative effect on regional innovation dynamics, it can still lead to lock-ins (Hassink and Gong 2019).

Similarly, universities may have an exaggerated relevance to regional innovation (Bonaccorsi 2016; Brown 2016; Kempton 2019). Just as their regional and institutional settings vary, so do their willingness and capacity to assume regional roles (Kempton 2019). Accompanying unrealistic expectations are risks of overdominance and overdependence on universities in these processes, as nexus in the innovation system (Brown 2016). Similarly, when university engagement is opportunistic, it can be withdrawn once assets (e.g. funding) are secured (Kempton 2019), jeopardizing sustainable commitment and policy alignment. Lastly, universities' role in regional economic governance is still relatively unexplored, with only a few isolated studies (Aranguren, Larrea, and Wilson 2012; Fonseca 2019; Fonseca and Salomaa 2020; Pugh et al. 2016; Rodrigues and Melo 2013). The institutional and organizational adaptation of universities to policy and regional expectations must be further explored.

9.2.3. Emerging organizational structures in universities' regional engagement: considerations of organizational adaptation

Organizational and institutionalism theories provide hypotheses regarding how and when universities adapt their organizational structure. Path dependence theory argues that institutions take shape over time through self-reinforcing mechanisms (Prado and Trebilcock 2009). Deviating from these arrangements carries a cost, and alternatives are only explored when benefits outweigh this cost. Organizational change is therefore not easily encouraged. In neo-institutionalism, the environment and the institution's rules,



norms and path-dependence constrain the willingness and capacity to adapt (Hladchenko, Dobbins, and Jungblut 2018). Windows of opportunity for fundamental changes can nonetheless be created (Hladchenko, Dobbins, and Jungblut 2018) through the intervention of governments and politics mediating universities' responsibilities toward society, together with funding, regulations and legitimacy (Trow 2007). Thus, a change in the regional policy framework can lead to a rethinking of the institution in its environmental context and to organizational adaptation. While Smart Specialization is reminiscent of cluster policy (Hassink and Gong 2019), its entrenchment and dissemination through the EU policy framework may have driven this opportunity window.

As the world shapes, limits and enables institutions' actions through rewards, pressure for conformity or shared values (D'Andrade 1984), sociological institutionalism posits endogenous processes can prompt organizational change. Scott (2013) argues change can ensue given the influence of regulative, normative, or cultural-cognitive systems within the institution. Therefore, the effective rules and directives of the institution, and the subconscious and socially-mediated routines of its actors, may shift the institutional mission, create new organizational structures or, at least, change the existing scheme's purpose.

Recently, organizational structures with a strategic regional focus and based on collaborative networked arrangements mirroring Smart Specialization precepts have been created in certain universities. These are formal multidisciplinary networks between academics, businesses, government authorities and other organizations, which adopt more dynamic, knowledge-based and complimentary configurations reminiscent of Uyarra's (2010) systemic model. Such organizations seek an alignment between research and engagement activities and regional priority areas, potentially enabling the attraction of ERDF funding and boosting regional stakeholder capabilities. These structures differ from clusters as they are not led by businesses nor have industry at their core (Rosenfeld 2002). Unlike traditional technological platforms, these interface units are not a policy instrument nor government directive (Proskuryakova, Meissner, and Rudnik 2017), although they follow a similar objective, i.e. the structuring of research in response to large scale challenges (European Commission 2004). Instead, they are university-led, with the university as the orchestrating entity or hub (Dhanaraj and Parkhe 2006; Jacobides, Cennamo, and Gawer 2018), providing a strategic orientation to multidisciplinary university research and engagement activities and organizing regional innovative dynamics through a networked arrangement between the university and other actors. Therefore, they are herein designated 'strategic network interface units'.



These units may result from internal processes or external pressures, but little is known about them. Concurrently, evidence of universities' institutional and organizational alignment to smart specialization is scarce (Fonseca and Salomaa 2020). As organizational structures potentially emerging from RIS3 alignment, an exploration of the regional dynamics they can generate, and their internal organizational and institutional implications is needed. This paper's conceptual framework employs an institutionalist logic to analyse these units. The aim is to understand the emergence of these structures and their embeddedness in the strategic framework of universities and their region, namely through the identification of path-dependencies in universities' organizational structure, windows of opportunity for change and other internal and external determinants. The following research questions are explored: (a) what were the determinants that drove the creation and development of these new organizational structures; (b) how are these units linked to the universities' regional engagement strategies; and (c) what are the implications of these inter-institutional dynamics on the regional innovation (policy) landscape?

9.3. Methodology

Considering its explorative and interpretative character, this paper follows an inductive qualitative research approach. A case-study methodology provides an intensive examination of the selected setting, and is recommended towards answering causal research questions (Yin 2009). The comparative analysis of two cases (namely universities) in different regional and national settings seeks to identify similarities and differences between them, drawing out implications and patterns with the potential for generalization to theory (Yin 2009). This is particularly useful given this can be an expanding form of organization. Case-study selection applied the following criteria:

- (a) Case studies should be universities that have created interface units with a multidisciplinary strategic cluster-like approach in the past 10 years;
- (b) These units should have as primary territorial scale the engagement with the surrounding region, and in particular with diverse spheres of society (industry, government, civic organizations);
- (c) Cases should be heterogeneous regarding their regional and institutional setting.

Thus, we focus on two universities – the University of Aveiro (Portugal) and the Autonomous University of Barcelona (Spain) – where strategic network interface units were established to structure academic research and engagement endeavours with the



region (see Appendix 1 for university profiles, or cf. Fonseca (2019); Fonseca and Salomaa (2020); Manrique and Nguyen (2017)). The University of Aveiro (UA) has established technological platforms under the direction of its technology transfer office UATEC since 2015. The Autonomous University of Barcelona's (UAB) Vice-Rector for Research started the CORE – strategic research communities – in 2013. Up until the design of this study, they were the only universities known to the authors to have created and developed this type of organizational structure.²¹ In accordance with both criterion (a) and (b), these are recent endeavours aimed at coordinating a strategic approach to regional issues. UA's eight TPs focus on regionally relevant themes (Sea, Moulds & Plastics, Agro-Food, High-Pressure Multidisciplinary, Connected Communities/Smart Communities, Bicycle and Soft Mobility, Forest, and Habitat@UA); similarly, UAB's four CORE concentrate on EU themes (Smart Cities, Mental Health, Cultural Heritage and Education & Occupation) with a focused action in UAB's surrounding region. All interface units have partners from at least industry and regional government. As per criterion (c), the case-studies are in geographically and economically heterogeneous regions. UA is in the less-developed sub-region of Aveiro, in Portugal's coastal area and between the major cities of Lisbon and Porto. Its economy is mostly reliant on SMEs, and agriculture is still predominant. UAB benefits from the more developed, highly innovative, and densely populated metropolitan area of Barcelona. Surrounding it are major transport links and one of the most industrially relevant areas in the country. This heterogeneity provides a fertile comparative ground.

This paper draws on 21 (11 for UA and 10 for UAB) semi-structured interviews conducted between Spring 2017 and January 2019 (see interview overview in Appendix 2). Interviewees included academics, support staff and external partners connected to these platforms (companies, industrial and civic associations, local and regional government) (see interviewees' profile in Appendix 3). Questions were designed to understand each university's engagement with smart specialization, their organizational adaptation and alignment with the strategy, the role of the units in framing university activities, and the impact on regional innovation. The aim was to investigate the extent to which these initiatives operate to match the priority areas of each region's RIS3, and the nature and focus of their activities. Interview guides generally followed the structure in Appendix 4 (Chapter 9.8). The grounded theory methodology utilized was developed by Gioia,

²¹ The authors were informed in January 2020 that the University of Girona, in Catalonia, has recently started implementing their very own strategic network interface units under their Sectorial Campus Programme. This was promoted through a local government-led RIS3 instrument. For more information, see: www.udg.edu/ca/campusempresa/campus-sectorial



Corley, and Hamilton (2013) and designed specifically for exploratory studies. Its proponents (see Glaser and Strauss 1967) suggest it as a systematic methodology enabling theory and concept construction based on informants' discourses and not 'a priori' codes from the literature, minimizing researcher bias. After a three-step analysis and coding process through the qualitative and data analysis software WebQDA and Microsoft Excel (Table 19; see also Appendix 5 in Chapter 9.8 for 3rd-order analysis categorization), charts were designed for illustration and procedural comparison (Figures 16–18).

Table 19 - Overview inspired by Germain-Alamartine & Moghadam-Saman (2019) of the application of the methodology developed in Gioia et al. (2013).

	1 st -order analysis	2 nd -order analysis	3 rd -order analysis
Aim	Coding from informants' discourses	Thematic categorisation of 1 st order codes	Grouping 2 nd order themes into aggregate dimensions
Iterations	3	2	2
Final number of:	Nodes	Themes	Aggregate dimensions
For UA case	156	18	7
For UAB case	128	21	7

9.4. Findings

This section highlights the characteristics and thematic configuration of each institution for an in-depth comparative analysis of their underlying similarities and heterogeneity.

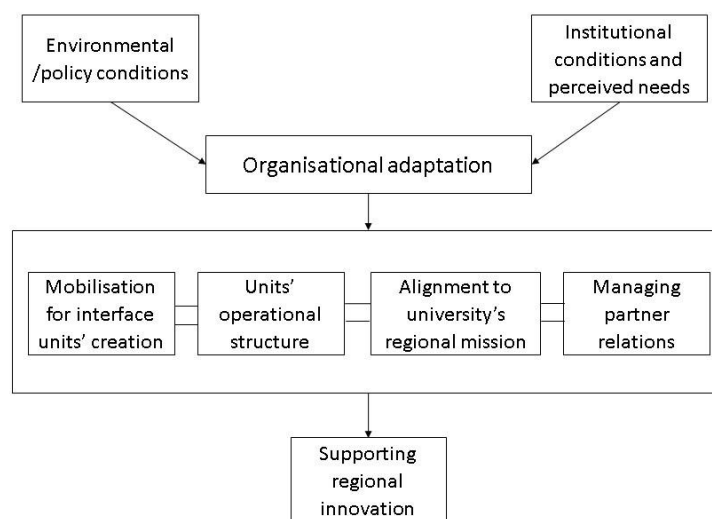


Figure 16 - Analytical model of the process of organizational adaptation and creation of interface units. Source: Author's own elaboration.

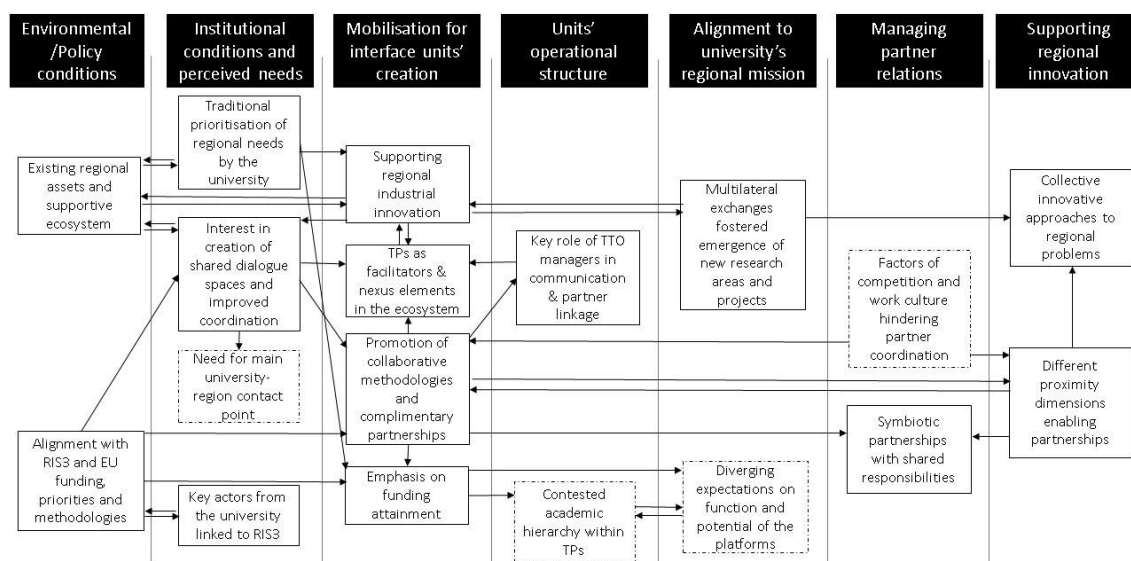


Figure 17 - Details into the process of creation, management and impact of the University of Aveiro's technological platforms. Source: Author's own elaboration.

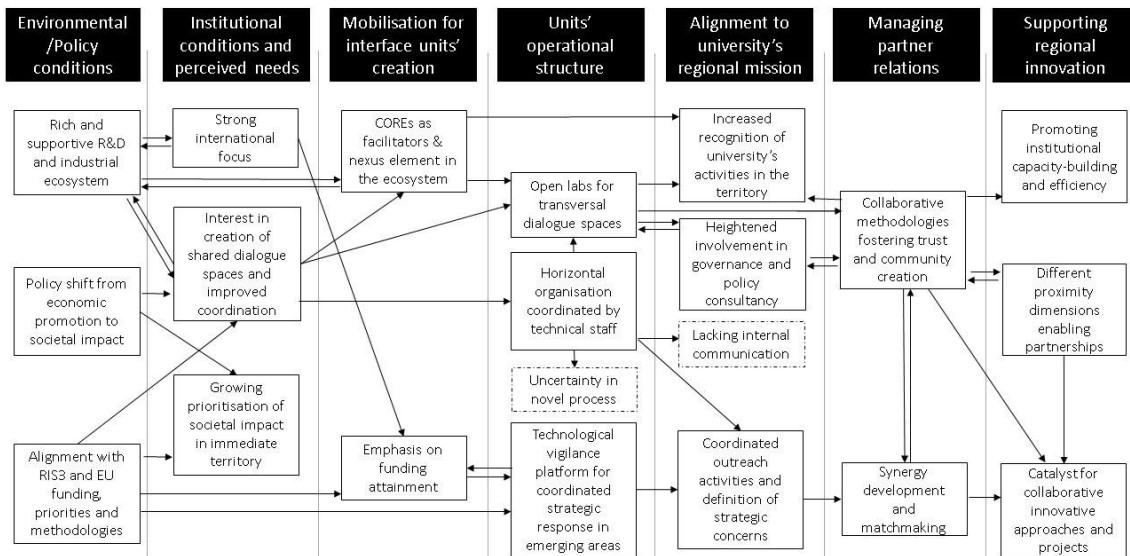


Figure 18 - Details into the process of creation, management and impact of the Autonomous University of Barcelona's strategic research communities. Source: Author's own elaboration.

9.4.1. Analogous processes

Despite the heterogeneous geographical and institutional contexts, both cases shared a similar process of creation of their respective interface units. Aggregate dimensions were identical in both models, considering internal and external motivators for organizational adaptation, and the sequential order in establishing, organizing and developing the unit within their wider university and regional contexts (see analytical model in Figure 16). The internal process of emergence of the new structure is represented by the 'mobilisation for the interface unit's creation', the 'units' operational structure', the perceived 'alignment to university's regional mission' and 'managing partner relations'. The output is the impact of this adaptation and the internal dynamics on the surrounding territory. As the case models show, phases are interlinked in a self-reinforcing process. For example, when universities' interest lies in regional engagement, collaborative institutional structures likely figure in their strategic plans. However, when a policy highlights strategic areas, like RIS3, this can lead universities to coordinate internal efforts in these collaborative structures, to link to those regional priorities. This follows Hladchenko, Dobbins, and Jungbluts (2018) idea of a political window of opportunity that can enable institutional and organizational changes.



9.4.2. University of Aveiro (UA)

9.4.2.1. *Conditions for organizational change: environment, policy and institutional context*

The regional environmental, policy and economic context was consistently highlighted by interviewees. These contextual conditions were enabling and supportive elements of the innovation ecosystem, and crucial determinants influencing UA's regional engagement mission. Interviewees referred to the existing UA-region tie and early linking to areas of regional industrial relevance. Similarly, respondents pointed to existing regional assets – e.g. infrastructure, specialized human capital, and key developing areas – that led to UA creating collaborative channels:

We have this ecosystem where we have the users, we have the economy and we have the research that is interested in learning and making something with them. (Interviewee A)

Concerning the policy context, alignment to EU priorities emerged as influencing the university's mode of regional engagement and the decision to create the interface units. Particularly the regional RIS3 (RIS3Centro) priority domains and clusters, such as agro-food, sea and sustainable solutions (like the Habitat cluster) (CCDRC 2014). By participating actively in the EDP and RIS3 working groups, UA was uniquely positioned to shape RIS3 priorities. UA actors' involvement in strategy design and other major regional structures (e.g. clusters) led to a greater promotion of this alignment. Notably, interviewees mentioned the opposite also occurred, with RIS3 providing greater awareness of regional assets: *'With the smart specialisation now (...) we have more availability over the actors and knowledge and skills.'* (Interviewee H). This intentional alignment facilitated UA's (and its partners) access to regional funding, further cementing inter-institutional collaboration.

Certain factors of UA's institutional context were also underlined as enabling conditions. Regional engagement was perceived by staff and outside partners as UA's vocation and responsibility, leading UA to promote dialogue with the region. This emerged from a certain institutional path-dependence, leading to multiple region-UA contact channels. According to interviewees, the emergence of certain opportunities, namely those associated with RIS3, led UA to streamline collaboration with the region by improving its internal coordination and response to strategic concerns through one main body.

9.4.2.2. *Creation, mobilization and operation*

The abovementioned conditions led to the creation of UA's TPs. These units were initially devised in early 2000s by the vice-rector for University-Society Relations, who sought to



promote university strength areas and establish and/or consolidate contact with major regional players to stimulate collaborative research. This idea developed in 2015–2016, when the TPs were officially created. Their current aim is to support regional industrial innovation through multilateral cooperation with diverse regional partners in relevant areas, namely within RIS3. Interviewees emphasized funding generation as a motivator for academic engagement. Despite its more material goals, the TPs have a component of inter-institutional support and capacity-building.

Interviewees argued the improvement of internal and external communication was needed to increase asset awareness. Emerging collaborative methodologies, like EDPs, design-thinking, etc., integrated within a strategic and multidisciplinary structure like the TPs, were believed to stimulate dialogue and complementary partnerships:

It was not to sell our knowledge. (...) But it was to create a space where we could dialogue, where we could make things together and we could start to put them in practice. (Interviewee A)

Despite the overarching collaborative objective, the TPs organization reflects an academic hierarchy that, according to interviewees, can hinder participation and cooperative dynamics. UA's platforms are composed of: coordinators, i.e. recognised academics in the area, often belonging to different departments to foster TPs' multidisciplinary character; and collaborators, i.e. other academics and external partners that have decided to participate in the network. TPs also have an assigned manager within UATEC, responsible for communication with external partners. A proposal usually arrives through UATEC's TP manager, who then contacts the platform coordinators. The coordinators should then distribute projects across their collaborators, but interviewees stated a tendency to amass projects, leaving other academics with little involvement and financial benefits. Aside from this contested hierarchy, TPs' operation managers were unanimously considered key contributors in enabling efficient and long-term productive network relations.

9.4.2.3. Alignment to UA's regional engagement

Considering their incorporation in UA's regional engagement mission and in the institution overall, most academic collaborators have engaged through the platforms with both private and public actors in a dynamic and multilateral way, leading to new partnerships and joint projects. This has manifested itself in UA supporting industrial innovation and in other benefits to the university such as companies engaging through



the platforms which has stimulated new research areas within UA, reinforcing mutual exchanges:

(...) We started to work with them [UA]. We brought them to the project (...). Because before they were not working at all with this [theme]. So we [company name] gave a new theme for the University of Aveiro to work on. (Interviewee I)

Nonetheless, opinions diverge regarding the platforms' utility. Interviewee E argued that expectations should be mitigated, and that platforms should be simply considered as flexible service-provision 'tools' to form networks and facilitate access to regional funding. The ambition of some academics to make TPs a nexus of the innovative ecosystem and dynamic spaces for collaborative activities clashes with this view. TPs have nevertheless become one of the main linking points for UA-region engagement in the areas tackled. Regional dynamics: managing partner relations and supporting regional innovation

Other dimensions emerging from TP operationalization and regional interaction relate to partner relations and ecosystem impact. Interviewees believed partner relations to be occasionally conflicting. Both companies and government authorities were believed to perceive UA as a competitor in the region, whether for R&D assets and potential funding, or in terms of UA's strong image in territorial governance: *'They don't want to meet us because they want to make their own planning, their own projects, and proposals'* (Interviewee A).

Work culture, namely partners seeing academia as 'slow', factors into this perception. Interviewees underlined the need to build trust between partners. Platforms thus attempted to build commitment through symbiotic relationships between partners, where each one had their own role and responsibilities in shared projects:

If the leadership of the company is not in tune with the project it doesn't matter if it's small or large, the project will not work. This is the most determinant factor, if there is a commitment from the management of the company to the innovation process. (Interviewee B)

Dimensions of proximity also played a role in the platforms' formation and activities. Besides the relational proximity noted between university actors and RIS3, interviewees mentioned the importance of geographical proximity, common values and objectives, and joint varied activities. With this implanted, addressing regional problems in a collective innovative manner was possible given the multidisciplinary and multilateral partnerships in these strategic sectors.



9.4.3. Autonomous University of Barcelona (UAB)

9.4.3.1. *Conditions for organizational change: environment, policy and institutional context*

Interviewees highlighted the advantageous economic and innovation-related regional conditions. Proximity to Barcelona and the industrial and research infrastructure surrounding UAB enabled closer relationships. The entrepreneurial ecosystem is believed to provide ideal conditions for collaborative innovative dynamics, warranting a strategic territorial lens on UAB's engagement:

Behind each CORE, there are strategic objectives, strategic in the sense that they are territorial, regional, in the context in which the university is situated. (Interviewee L)

The policy environment was also emphasized. A national and regional policy shift was referred to including both overall knowledge promotion and transfer and the generation of knowledge oriented towards addressing societal challenges. This follows international and EU action lines associated with Sustainable Development Goals and societal impact.

These shifts and priorities at multiple levels were considered influencing factors for UAB's organizational adaptation. Although UAB had less engagement in RIS3 design, in the context of the highly competitive regional environment, interviewees justified the creation of UAB's CORE by a desired alignment with EU and RIS3 priorities and methodologies for funding access:

Why these themes? Because they are European themes. Some of these themes that the university already has institutes that cover them, but there are other themes that the EU is financing that the university didn't have. (Interviewee N)

Regarding UAB's institutional context and potential determinants for the units' creation, the proximity to the innovative metropolis of Barcelona provided an important international orientation, but path-dependent prioritization relation with the territory suggests 'impact should be in your first immediacy area' (Interviewee P). This has recently grown in importance with an approximation to the campus' surroundings through a campus network (UAB-CIE). Mechanisms for this UAB-region relation have therefore been progressively promoted. A perceived need for a closer connection with the territory and for effective internal coordination led to the COREs' creation.



9.4.3.2. *Creation, mobilization and operation*

Created in 2013, the COREs were devised in the Vice-rectory for Research in conjunction with its Strategic Development Unit. The aim was to optimize the network of institutions established with the UAB-CIE sphere, ‘to search constructive relationships with the agents of the territory’ (Interviewee O) and help launch economically relevant projects.

They were also viewed as internal coordinators of UAB’s research assets, efficiently reorienting them towards regional needs. Similarly, funding was considered a key aim: a ‘way that our research teams can get finance’ (Interviewee N). The COREs were thus proposed as connecting bodies within the territory and a distinguishing synchronizing feature to facilitate funding access.

Each CORE has a manager within the Strategic Development Unit of the Vice-Rectorate for Research. This manager coordinates the CORE network and represents the academic community in their respective strategic theme. While previously an academic within that area, as CORE manager they do not conduct research which helps to mitigate hierarchical bias. The CORE structure is therefore more ‘horizontal’ academically. Their operation is also multidisciplinary in scope and encompasses as partners or collaborators, first, the UAB academic community and, in a later phase, other regional actors from the public and private sectors. Any partner can initiate projects but they are usually coordinated by the manager, who assigns/searches for relevant academic partners.

Based on this central structure, the COREs have been developing other spaces to promote dialogue across the units, the academic community and the region. Including, UAB Open Labs, and other labs across the region on municipalities’ invitation, designed to nurture innovation and closer links. A Technological Vigilance Platform is also being developed in association with the COREs to identify emerging economic areas and quicken UAB’s strategic response. As one interviewee highlighted, COREs are introducing novel ways of working:

The COREs weren’t created in the traditional way of creating a new body or entity within the university, like a cathedra, or a new centre. They weren’t made with a clear regulation. They let it be more open, more dynamic, to find a more flexible way to insert ourselves within the structure of UAB that will allow us to do several things that otherwise wouldn’t be possible. (Interviewee L)



This novel methodology and process, however, was considered one of the impediments to the COREs' operationalization, as interviewees identified that few within UAB knew this way of working. This suggests challenges in disseminating new methodologies in a rigid institutional context. For this reason, when a CORE is created, it focuses on the internal university community first before proceeding to external engagement.

9.4.3.3. Alignment to UAB's regional engagement

Despite initial uncertainty, according to interviewees, the COREs are now a UAB regional branding tool. There is increased recognition of UAB actors and strategic knowledge assets and infrastructure, leading to more connections and proposals from the territory. One type of engagement UAB has been more involved in is policy consultancy and other associated governance activities. The COREs have prioritized linkages with local administration, leading to several proposals and joint initiatives with municipalities. The Smart Cities CORE has been involved in a RIS3 project with the municipality of Sabadell called 'Vallès Industrial' (€1.5 million in ERDF), and the Cultural Heritage CORE in the Library Living Lab of Volpelleres in the municipality of Sant Cugat del Vallès.

The COREs are believed to have contributed to UAB's research and knowledge asset coordination, and external engagement activities. An interviewee remarked: '*when I go to the territory, I tell a CORE*' (Interviewee O). Interviewees also highlighted that previously knowledge transfer was not a central focus in UAB but is now growing in importance. However, they noted a lack of effective dissemination of the initiatives and the results achieved through the COREs, difficult because of the small coordinating team. Interviewees argued this should be improved to further internal cohesiveness and the COREs' regional presence.

9.4.3.4. Regional dynamics: managing partner relations and supporting regional innovation

Interviewees frequently referred aspects of partner relations and their connection to regional innovation support, namely COREs' potential to find synergies between actors of complimentary sectors, or matchmake across various disciplines. An interviewee stated: '*you have to get good matches, for instance, between people of different specialties and trainings*' (Interviewee R) to achieve an innovative perspective on an issue. Consequently, by appealing to different interests, encouraging collaborators is easier: '*to convince them to participate, you have to think of how this is advantageous to all the participating actors*' (Interviewee L).



Related is the importance of collaborative methodologies for nurturing trusting relationships within the COREs. Open and cross-sectoral innovation, co-creation and co-ideation were terms utilized to signify this new working mode introduced through the COREs, which as one interviewee noted are '*not the traditional transfer methodologies*' (Interviewee N). In conjunction with other dimensions of proximity at play in the COREs' work, this strengthens regional connections through this network.

Finally, at a regional level, COREs are seen as potential catalysts for partnerships and projects. While financial and other material benefits are highlighted regarding their activity, other intangible advantages emerged in interviews. Specifically, these units are believed to promote efficiency and capacity-building among regional actors and institutions. One example is their relationship with municipalities for the open labs project, where COREs provided innovation support that local government lacked.

9.5. Discussion

This section provides comparative case study insights considering the research questions.

9.5.1. What were the determinants that drove the creation and development of the new organizational structures?

In both cases, interviewees acknowledged that an institutional path-dependence toward regional engagement was present in these universities which, combined with the policy landscape – window of opportunity – enabled a shift in the organization (Hladchenko, Dobbins, and Jungblut 2018; Prado and Trebilcock 2009). In both cases a supportive ecosystem, accompanied by a deliberate alignment to RIS3 strategic priorities and EU funding was prominent, highlighting potential institutional benefits. In UAB this also included a focus on societal impact. As entrepreneurial universities with strong regional ties, the path-dependency of their practices and identity was noticeable (Krücken 2003), as they were willing to create engagement structures and shared similar objectives: strengthening regional ties and multilateral communication through collaborative methodologies, becoming a supportive nexus for the innovation ecosystem, and attracting funding. UA had a particularly proactive and opportunistic stance by engaging directly in RIS3 design (Fonseca and Salomaa 2020), thus playing a role in priority definition and facilitating internal coordination and inter-institutional cooperation for funding access.



However, both institutions went through a cumbersome process in the creation of these structures, having to circumvent existing organizational complexities (e.g. streamlining university-region contact, UA), and clashing institutional orientations (internationalization, UAB). There is, nonetheless, validity in the argument that universities are shaping their directionality and selectivity according to the precepts, priorities and procedures of RIS3, and in considering that this functionality and opportunism constrain the academic 'ethos'.

9.5.2. How are these units linked to the universities' regional engagement strategy?

9.5.2.1. *Influence of the interface units' configuration*

The interface units analysed had similar objectives, but were operationalized in differing ways, reflecting their institutions' context, organizational dynamics, and overall regional engagement approach. In UA's case, even though the university has committed itself to several regional partnerships and touted the integration of an engagement mission, this meant difficulties in its formalization, diffusion and legitimacy in the academic community (Fonseca 2019). Despite UA's more horizontal structure – without the intermediary of faculties – its TPs reproduce a traditional hierarchy, with academic coordinators monopolizing initiatives, which represents a network risk (Dhanaraj and Parkhe 2006; Kolbjørnsrud 2017). In turn, even though UAB's COREs have emerged as a topdown directive, they attempt a horizontal and bottom-up approach in network management. This may relate to the recognized need to enhance UAB's internal communication, given its more fragmented, faculty-based structure. A horizontal structure enabled by bodies that lead inclusive integration may be suitable in this context to activate collaboration.

The schematic visualization of interviewees' discourse (Figures 17 and 18) shows what these work modes and operationalization entail and how they may be impacting internal coordination and external engagement. Within UA, TPs' contested hierarchy is mitigated by the harmonizing influence of UATEC's TP managers who ensure communication flow and encourage frequent collective initiatives (e.g. workshops). However, while new methodologies have cemented the networks in certain TPs, some perceive them as another 'tool' for traditional forms of technology transfer. Accordingly, there can either be an exaggeration in accounts, or a lack of legitimacy of new work modes and a 'layered' 'modus operandi', as these coexist with traditional ones (Hladchenko, Dobbins, and Jungblut 2018).

Within UAB, there are developing initiatives to enhance the COREs' transversality, with the most prominent mechanism being the UAB Open Labs. These structures have



furthered UAB's territorial outreach through collaborative methodologies. The gradual introduction of these mechanisms allowed adjustments based on results. Interviews suggest UAB also emphasizes COREs as learning vehicles. Conventional engagement methodologies are still prevalent, but UAB has succeeded in embedding new work modes by, like UA, 'layering' them over old ones (Hladchenko, Dobbins, and Jungblut 2018).

9.5.3. What are the implications of these inter-institutional dynamics on the regional innovation (policy) landscape?

9.5.3.1. *Effective and potential regional impact*

Interface units in both cases followed a similar regional approach. Units have been seeking to support the innovation ecosystem by providing R&D resources and linking existing actors and assets through leveraging different proximity aspects (Boschma 2005). This has enabled a more efficient approach to regional issues, given that resources are shared and matched for complementarity (Dhanaraj and Parkhe 2006; Pinto, Fernández-Esquinas, and Uyarra 2013). Achieving synergies and efficiency were distinguishing goals in UAB's case. For UA, sharing responsibilities and getting potential partners' interest through mutually advantageous partnerships were emphasized. Nonetheless, COREs appear aware of the benefits of working in these networks, a likely consequence of being their initiators. While UA is known for building regional institutional capacity (Fonseca 2019), this was not alluded to explicitly as a goal or benefit of its TPs; whereas that was clear in UAB's COREs. The consideration of more inclusive modes of collaboration suggests intangible benefits are a desired outcome for these units. Discussion of community and trust-building strengthen this argument, and support the greater benefits of collaborative networks, i.e. capacity-building and shared visions (Kolbjørnsrud 2017).

Consequently, this suggests these units are attempting to emerge as 'ecosystem connectors', i.e. enabling, encouraging and optimizing collective knowledge exchange to boost innovative capacity, and building relational and individual institutional capacities for the development of the entrepreneurial ecosystem. The question remains whether this is uniform across all units, or only in certain cooperation areas. Furthermore, it is still uncertain whether these units can be sustainable, and cement organizational change or a transformative regional effect. Stakeholder interaction and management is positive, and funding access is a shared and motivating goal, pointing to network sustainability (Dhanaraj and Parkhe 2006; Kolbjørnsrud 2017; Nieminen 2005). However, given issues in organizational structure and legitimacy, particularly in UA's case, actor isolation and



network monopoly risk the units' longevity and institutional integration (Dhanaraj and Parkhe 2006; Kolbjørnsrud 2017).

9.5.3.2. Risks and opportunities of (mis)alignment with S3

By focusing investment and assets on strategic areas, these interface units are following the principles of smart specialization. In both cases, their creation was inextricably linked to the opportunity window presented by EU priorities and RIS3. This was both indirect, by pushing for greater internal university coordination for facilitated funding access; and direct through targeted convergence with certain RIS3 clusters or priority dimensions resulting in a similar focus within the universities. Examples of the latter include: the Habitat cluster consistently highlighted in RIS3Centro and reflected in the TP Habitat@UA; and UAB's Cultural Heritage CORE, which follows RIS3CAT's Cultural and Experience-based Industries leading sector (Generalitat de Catalunya 2014).

This alignment has enabled complementarity and activation of regional resources, with universities helping to match RIS3 discourse to regional needs. Furthermore, they have promoted awareness of the innovation policy and supported its implementation (Fonseca and Salomaa 2020). Despite uncertainties regarding the smart specialization framework and implementation, these collaborative networks have demonstrated potential in balancing RIS3 mobilization and inter-institutional conflict traps (Capello and Kroll 2016; Sotarauta 2018). It is nonetheless important to question motivations and risks. Overreliance on universities to solve such traps should be avoided to avoid network monopolization. Similarly, while the strategic and specialized/diversified outlook on the part of the universities may be useful for stimulating certain sectors, it is important to consider risks of lock-in. In addition, in both cases, funding access emerged as these units' reasoning, highlighting an opportunistic logic that may dispute long-term commitment (Kempton 2019). In some cases, the RIS3 connection was unclear, like in UA's TPs on biking or high pressure. In others, this funding search went beyond RIS3 alignment towards Horizon 2020 and other schemes, even when area-specific resources were lacking in the university and region (more evident in UAB). Given that UA was actively involved in RIS3 priority identification, the risk of overdominance of the university exists alongside opportunism, with regional needs as secondary. Policymakers should notice that, although these units can stimulate existing or emergent areas and inter-institutional collaboration, the effective impact may be lessened due to typical academic constraints, i.e. funding. Intangible benefits can thus be advocated to ensure attention goes beyond immediate financial concerns to more sustainable advantages, like capacity-building.



9.6. Conclusion

This study contributes to literature on regional innovation systems, organizational adaptation and universities' engagement, while adding to the debate on regional innovation policy. It explores the emergence and contribution of universities' organizational structures – strategic network interface units – for network engagement. To our knowledge, this is the first study in the literature exploring the operationalization of these structures and their potential role in the regional innovation ecosystem.

Answering the research questions, the creation and development of these structures was motivated by an institutional path-dependence, or pre-disposition toward regional strategic cooperation. Moreover, an opportunity window in the policy environment enabled linking universities more closely to the policy sphere, with funding attraction as a primary objective. The units were generally well integrated in their universities' regional engagement strategy, though with UA following a traditional academic hierarchy and UAB a more horizontal approach. These units' wider acceptance and legitimacy was hindered in UA's case. Regarding their regional implications, they have motivated inter-institutional collaboration, capacity-building, new cooperative methodologies and innovations. While this could suggest network sustainability, their impact remains minimal. Moreover, alignment with the current policy framework may lead to lock-ins, linking them inextricably to mere temporary funding and themes.

Findings carry theoretical and practical implications for universities and policymakers. First, these units' creation was heavily influenced by the regional innovation and smart specialization discourse and by broader European debates on societal challenges and associated funding opportunities. Therefore, opportunity for similar linkages in other contexts remains, although awareness of the framework's shortcomings is advised. Second, while universities embrace a wide and varied scope of academic fields, focusing resources and branding on regional priority areas can encourage engagement activities and innovation-related territorial impact. This is heightened when these synergies are stimulated through cross-cutting communication. Lastly, inclusion of collaborative methodologies in regional engagement repertoires can further relational and cognitive proximity, acting as a mechanism for community and institutional capacity-building.

By exploring these structures, the authors anticipate a broader consideration of universities' roles in regional development and greater openness to explore different forms of collaborative work to further innovation efforts. Regarding limitations, the study only examines two early instances of this form of organization, focusing on generalization



to theory to better understand such structures. There is potential for these becoming more widespread, especially in large research-intensive universities trying to align with regional innovation policy. Nevertheless, these units were created recently and it is early to assess the full extent of their impact on the territories' research and innovation landscape (e.g. funding gained, key areas), even though they are building the appropriate foundations for inter-institutional collaboration. Further study can thus contribute to these points.

9.7. References

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9.8. Appendices

Appendix 1: University profiles

Name	Universidade de Aveiro (UA)	Universitat Autònoma de Barcelona (UAB)
Link	www.ua.pt	www.uab.cat
Creation	1973	1968
Students	13 675 (2018)	43 175 (2018)
Strategic Foci	<ul style="list-style-type: none"> • Teaching, research & cooperation with society; • Entrepreneurialism; • Innovation; • Regional development. 	<ul style="list-style-type: none"> • Innovation; • Internationalisation; • Social responsibility; • Knowledge transfer.
Engagement Support Structure	<ul style="list-style-type: none"> • Pro Rector for Regional Development; • Vice-Rector for University-Society Relations; • Technology Transfer Office (UATEC) (+ TPs); • University-Business Office (GUE); • Research Park; • Business Incubator (IERA). 	<ul style="list-style-type: none"> • Research park; • Vice-manager's office for Research (+ COREs); • Hub B30; • Vice-rector for Innovation and Strategic Projects; • Vice-rector for Research and Transference.
Education foci	Materials, Biosciences, Engineering, Planning and Governance	Health Sciences, Economy, Biosciences, Social Sciences and Law



Further relevant education institutions	4 other Polytechnic Schools that are a part of UA (Design, Health, Management, Accountancy).	11 other higher education institutions (detailed list in Generalitat de Catalunya, 2016)
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Appendix 2: Interview overview

	UA	UAB
Min-max length of interviews	00:42 – 02:14:37	00:20 – 1:24:19
Number of interviews	11	10
Platform staff	5	3
Other university staff	1	5
Public organisations	3	2
Private organisations	2	-

Appendix 3: Interviewee profiles

Case	Interviewee code	Type of organisation	Field of activity of organisation
UA	A	Technological Platform	Mobility
UA	B	Technological Platform	Sustainable Housing
UA	C	Technological Platform	Sea
UA	D	Technological Platform	Agro-Food
UA	E	Rectory team	Knowledge transfer
UA	F	Rectory team	Knowledge transfer
UA	G	Tech. Plat. Partner	Mobility
UA	H	Tech. Plat. Partner	ICT
UA	I	Tech. Plat. Partner	Sea
UA	J	Tech. Plat. Partner	Sea
UA	K	Regional government	Innovation & Development Policy
UAB	L	CORE	Smart City
UAB	M	CORE	Education & Occupation
UAB	N	CORE	Heritage
UAB	O	Rectory team & Intermediary	Uni.-Region Engagement
UAB	P	Rectory team	Knowledge transfer
UAB	Q	CORE partner	Smart City
UAB	R	Intermediary	Knowledge transfer
UAB	S	Rectory team	Strategic projects
UAB	T	CORE academic partner	Education & Occupation
UAB	U	CORE academic partner	Smart City

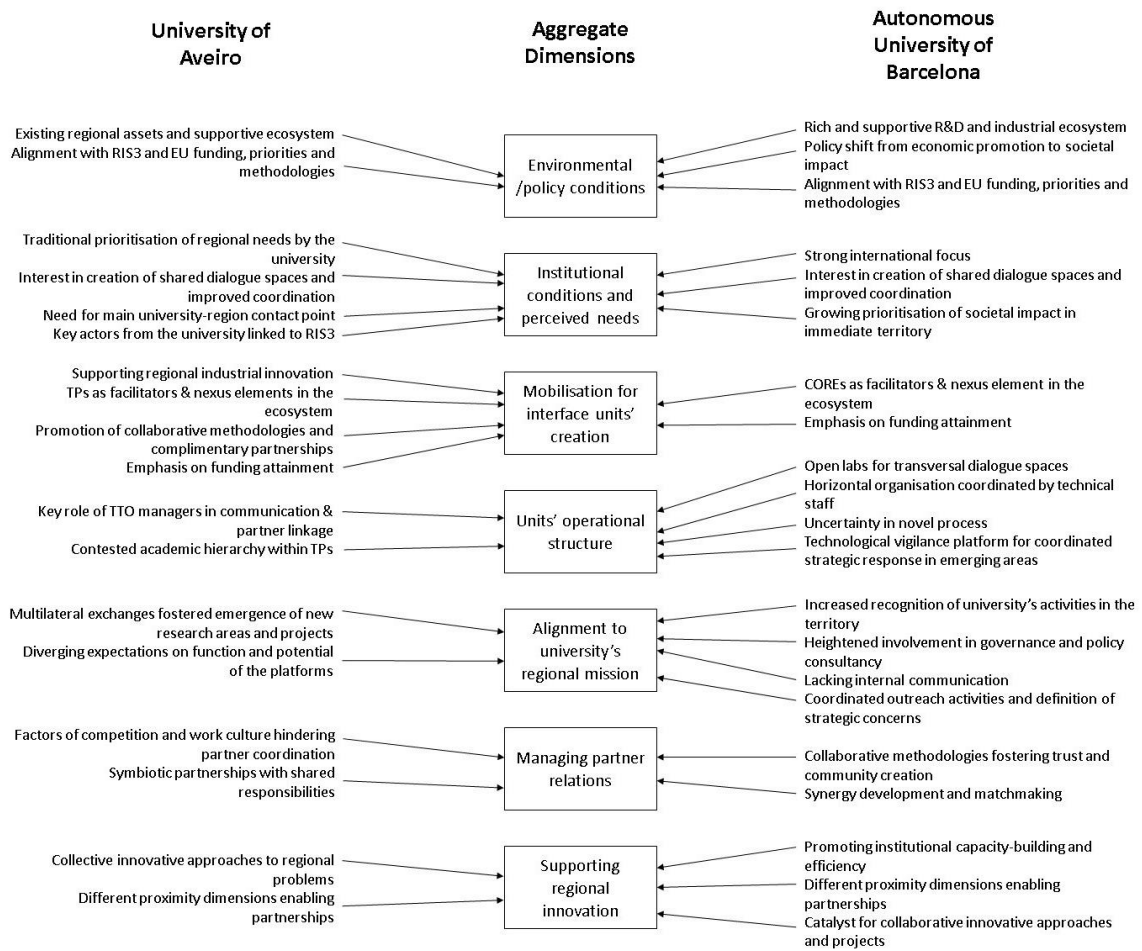


Appendix 4: General interview guide

1. Profiling of the interviewee
 - a. Position and institutional affiliation;
 - b. Link with university;
 - c. Link with interface unit;
2. University profile
 - a. University missions and engagement orientation;
 - b. University-region engagement;
 - c. University engagement through the interface unit;
3. Creation, organization and governance of the interface unit
 - a. Motives and conditions for creation and strategic lens;
 - b. Links with multilevel industrial and innovation policy;
 - c. Internal organizational structure;
 - d. Interactive structure and dynamics with internal and external partners;
4. Potential shifts, tensions and impacts
 - a. Changes emerging with the creation and development of the interface units;
 - b. Operational, institutional and interorganizational challenges;
 - c. Existent and foreseen university impacts;
 - d. Existent and foreseen regional innovation impacts.



Appendix 5: Structuring of second order themes into aggregate dimensions.
Author's own elaboration.





PUBLICATION VII

10. Universities and Place Leadership – A question of agency and alignment

Abstract

There is increasing interest in the question of how different stakeholders develop, implement and lead regional upgrading processes with the concept of place leadership emerging as one response to this. Simultaneously, universities face growing expectations that they will contribute to regional development processes – often through their collaborative relationships with other regional stakeholders. But universities are complex in terms of their internal and institutional structures, which undermines their capacities to enact coherent place leadership roles. We seek to understand how strategic leadership in universities can contribute to innovation and regional development in the context of the fundamental institutional complexity of universities. We address this through a qualitative, explorative case study comparing six European regions where universities have sincerely attempted to deliver place leadership roles. We identify that the elements of agency and alignment are vital in that: firstly, university leadership has to align with regional coalitions on the one hand and internal structures on the other hand, while secondly, this leadership must give room to individuals to enact agency in their regional engagement activities.

Keywords

Place leadership, higher education institutions / universities, regional development, institutional complexity, agency

Reference

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10.1. Introduction

There is an increasing interest in and growing literature on place leadership, aimed at answering diverse questions around the agents and/or institutions that lead regions to desired future outcomes. Regional leadership has thus been labelled as a determinant for regional growth and policymakers, practitioners and academics are eager to understand the nature, origins and different appearances of place leadership (see for instance Sotarauta et al., 2017). Concomitantly, higher education institutions (HEIs) are increasingly seen as important agents in regional development, providing both generative activities like patenting and licensing, creating spin-offs and transferring technology, as well as more developmental activities that upgrade and improve their regional innovation ecosystem (Gunasekara, 2006).

Universities' developmental roles can involve both the direct upgrading of the environment as well as co-operative activities to collectively achieve those improvements, including through the exercise of leadership. To date, there has been little systematic consideration of the ways in which universities exercise place-leadership (Benneworth, Pinheiro & Karlsen, 2017) and it is a natural process to wonder where HEI's can be situated in the leadership puzzle. Within this context, we pick up a discussion initiated recently, in that a better understanding of the role of agency in policy and development processes is needed (Uyarra et al., 2017). In parallel, we note that universities' place leadership roles inevitably reflect the complex institutionality of universities as 'loosely coupled' institutions facing mission overload and struggles of internal leadership. Therefore, in this chapter, we reflect on the way that complex organisations (universities) can exert place leadership, and specifically the relationship between universities' internal organisational structures and their capacity to exert place-leadership. Interested in the ways 'strategic leadership' in universities contributes to innovation and regional development within the wider context of these overall institutional architectures, shaping their achievement potential, we ask: To what extent does universities' institutional architecture affect their regional leadership roles?

We address this using a comparative case study that crosses six national and regional settings (Aveiro (PT), Lincolnshire (UK), North Denmark (DK), Satakunta (FI), Vallès Occidental (ES) and Twente (NL)). Our analysis shows that the different leadership roles taken by HEIs are dependent on a diverse set of factors, like regional settings, relationships with regional partners and the internal institutional structure within which universities operate. We use this empirical data to develop a better conceptualisation of



university place-leadership and the way internal structures (top-management, administrative machinery, academic tribes, support structures and coupling/coordinating institutions) are in interplay with top management. These five elements provide us with a basis to, firstly, sharpen the concept of university place-leadership and problematise that internal complexities and misalignment of actors within the university structure often limit external leadership. On this basis, we argue that a model must be found in which alignment (internal and external) as well as individual agency are combined.

This chapter is structured as follows: the first section develops a model of university elements relevant for regional leadership activities and provides an overview of the literature relating to regional leadership roles and universities in regional development. The next section outlines the data and research method and provides an overview of the cases. Section 10.2 describes the empirics of the six universities along the outlined elements defined before. Section 10.3 discusses the nature of the five different elements and how they interact and support regional leadership. Finally, the chapter closes by highlighting the implications of our analysis for policy and present concluding comments.

10.2. Understanding practical constraints on university regional leadership

Universities' regional policy roles are commonly discussed as if they were part of higher education's legally mandated responsibilities, which confuses two complementary elements of universities' contributions. Universities' generative contributions occur as a side-effect, through spillovers from university knowledge communities resulting of physical proximity and occurring simply by the HEIs' presence. However, developmental contributions rely on the exercise of leadership by university managers, with no a priori reason why universities should choose to do this. After all, universities are not development agencies nor private businesses and, though they receive public funding, there is no reason why they should arbitrarily restrict their societal contributions to an arbitrary region chosen for strategy-making purposes. Concomitantly, universities do benefit from their regions in terms of the ways those regions benefit their knowledge communities. Therefore, the art of leadership by higher education must be understood as a search to construct mutually beneficial sets of knowledge activities that drive regional innovation as well as enrich innovation activities.

10.2.1. The contemporary innovation policy challenge

In recent years, knowledge has become increasingly recognised as the key to unlock economic growth, productivity and competitiveness. The rise of the knowledge-based



economy (cf. OECD, 1996) has made the interactivity inherent in the transmission of knowledge between markets, policy, science and technology an essential driver of innovation dynamics (Edquist, 1997; Krammer, 2017). This is particularly the case when considering the territorial dimension, as collective learning mechanisms are more easily developed in more local and regional levels (Goddard & Chatterton, 1999; Morgan, 1997; Santos & Caseiro, 2015). It is therefore unsurprising that public policies, namely science, technology and innovation policies, have emphasised the role of networks and knowledge-intensive actors – especially HEIs – in stimulating regional competitiveness in what is an increasingly global context (Arbo & Benneworth, 2007; Drucker & Goldstein, 2007; Smith, 2002).

Innovation policy has become ever more important to driving regional economic development, and more place-based approaches reflecting on contextual variances have further emphasised this (Barca et al., 2012). McCann and Ortega-Argilés (2015) argue that innovation is highly influenced by factors such as population density, economic diversity and regional market potential. This implies that peripheral and less-developed regions tend to be disadvantaged, characteristically by low local business demand for innovation, inefficient locally-based R&D activities and a lack of inter-institutional interaction (Huggins & Johnston, 2009; Rodrigues et al., 2001). However, with policy discourse coordinating new knowledge-based, place-based and collective approaches to regional development innovation policy, which consider not just infrastructural but also institutional and social dimensions in fostering collective learning and territorial competitiveness (Morgan & Nauwelaers, 2003; Santos & Caseiro, 2015), these development gaps may be bridged.

The Smart Specialisation framework emphasises this explicitly, as a tailored policy aimed at decreasing regional disparities by exploiting and promoting innovation's collaborative character. Central to smart specialisation is a partnership-based policy process of entrepreneurial discovery constructing regional advantage (Foray, 2016) based upon a vision in which 'partnerships [...] are essential in order to elicit the knowledge regarding the most severe obstacles to growth, the major bottlenecks or missing links, the optimal remedies' (McCann & Ortega-Argilés, 2015, p. 1298). These stakeholder partnerships have been referred to as multi-level partnerships (Morgan & Nauwelaers, 2003), regional innovation coalitions (Benneworth, 2007) and regional innovation networks (Rodrigues & Teles, 2017). While these policies tend to expect stakeholders to work together straightforwardly (as 'happy family stories' (Lagendijk & Oinas, 2005)), recently, the urgent call for a consideration of agency has been voiced (Uyarra et al., 2017).



At the same time, the extent to which regional leadership is emerging in practice and enabling strategic steering of regional development is in question. Leadership, understood as a capacity to unlock collaborative engagement in a 'sustained' and 'purposeful' manner, can be seen as transformative and highly impactful in performance (Bass, 1990; Stough et al., 2001). Regional place-based leadership in particular is necessarily a collective endeavour, delivered as much through the effective roles that key regional actors perform, their influence and significance, as their formal institutional titles (Sotarauta, 2014). This raises the issue of which leadership roles can be played by universities in regional innovation coalitions.

10.2.2. The complex institutional dynamics of universities

The importance of higher education in supporting economic growth has become increasingly evident across a range of policy frameworks (Roper & Hirth, 2005; Vorley & Nelles, 2009; Zomer & Benneworth, 2011). Universities' regional contributions may come through a variety of interventions, from mobilising collective resources (Bergek et al., 2008) through developing a more robust regional knowledge base (Asheim et al., 2011) to directly constructing regional advantages. Policy places complex expectations on universities to function as flexible, integrated and strategic actors (Uyarra, 2010) but, in reality, responding to regional needs and embedding engagement to the academic core can be somewhat problematic (Benneworth & Sanderson, 2009; Uyarra, 2010) because of universities' internal mechanisms (Chatterton & Goddard, 2000; Foss & Gibson, 2015).

Universities' depict their regional contributions through explicit engagement commitments (Pinheiro, Benneworth, & Jones, 2012), such as strategic mission statements. But this downplays the fact that universities are not biddable organisations (Pinheiro et al., 2012) and external interests are not necessarily aligned with those of their regions (Benneworth et al., 2014a). Universities are complex and 'loosely coupled' (Weick, 1976) organisations, held together by institutional structures. Therefore, engagement with the region – and potential leading roles in regional development – is not a straight-forward process.

Universities' regional orientations are shaped by several factors primarily related to the extent to which the knowledge activities they undertake around teaching and research can involve regional partners. This means universities' regional contributions are dependent on several external factors, such as regional job market, public funding and cultural and historic characteristics of the region (Breznitz & Feldman, 2012; Vorley & Nelles, 2012). Likewise, what universities can achieve in their regions are shaped by



their existent portfolio of knowledge activities, and the extent to which internal knowledge actors can involve regional actors in these activities (Benneworth, Young & Normann, 2017). Any serious consideration of university regional contributions – including their capacity to exert leadership in a regional context – reflect these factors, particularly regarding the extent to which their engagement activities are embedded into their internal dynamics (Vorley & Nelles, 2012).

Contemporary regional innovation policy frameworks all too quickly assume rather simplistic ‘one-size-fits-all’ approaches to universities’ engagement (Benneworth et al., 2016; Kitagawa et al., 2016). But universities’ engagement cannot be effectively delivered by solely adding new engagement activities to the institutional periphery – only by rooting engagement activities across the organisation within these core knowledge processes (Foss & Gibson, 2015; Gibb & Hannon, 2006; Vorley & Nelles, 2009). To date, there have been few considerations of how universities embed engagement within their internal architectures and the consequences this has on their regional contributions (Salomaa, 2019). Therefore, we turn to consider the ways in which universities play regional leadership roles – enacted through their diverse portfolios of knowledge processes – and how they may become embedded in universities’ institutional architectures.

10.2.3. Universities and regional leadership

Following Benneworth, Pinheiro and Karlsen (2014b), Clark (1998) and Nedeva (2008), we characterise university institutional architecture as comprising five elements, where each of these may or may not support the university’s institutional contribution (see Table 20). First, the ‘steering core/strategic leadership’ is represented by senior management, which is responsible for articulating the university’s strategy and policy documents, its mission and vision. The second component is the ‘administrative machinery’ of the university, which translates the strategic aims from top management and thereby aims to guarantee the quality of engagement, while also considering the diverse ‘academics tribes’ (Becher & Trowler, 2001) and their different needs and interests. The third component is ‘academic tribes’, i.e. either individual agents or groups of individuals. Fourth, ‘peripheral support structures’ are those that do not contribute directly to the core teaching and research activities but give universities capacities in other areas, like student exchange or conference facilities. Finally, the fifth element is ‘internal coupling/coordinates mechanisms’ that validate and legitimise universities’ core activities, e.g. teaching, where committees exist to allow both medical and arts degrees



– with their vastly different contact hours and teaching methods – to both be seen as valid teaching and to warrant the award of degree status.

Each of these may find an expression in terms of their regional contribution. However, we will foreground leadership as the primary determinant of university institutional change, given that strategic leadership has the greatest capacity to exert change. The strategic leader could, thus, decide to focus on and support regional engagement, leading a discourse of engagement and freeing necessary resources. Regional leadership has a dual nature, experienced by local partners but conditioned externally. Universities regional leadership is dependent on universities’ capacities and institutional architecture as a whole, and therefore we consider how its institutional architecture, influences universities’ capacities to exert leadership. We regard a university’s institutional architecture as defined by the way that five elements relate to each other (see Table 20). The university may create internal structures that coordinate regional engagement processes/activities internally and seek to ensure that they embody the activities already undertaken by academics. There may or may not be a widespread culture of involvement of regional partners in local knowledge activities in various kinds of formal or informal ways. Peripheral structures might help academics better involve external partners in their core knowledge activities and facilitate various kinds of knowledge spillovers from the university to the region. And finally, internal coupling mechanisms – such as promotion committees – might also shape universities’ capacities for regional engagement by legitimising it within the university, or as representing a lower or higher quality of higher education activity. This is summarised below.

Table 20 - University Institutional Architecture Elements in Regional Engagement /Leadership. Authors’ own design after (Benneworth et al., 2014b; Clark, 1998; Nedeva, 2008)

University element	Strategic engagement nexus element	External: deliver the visible benefits	Internal: build the activities into the university core structure
Strategic leadership	Rector+ ‘heroes’	The Rector ‘platform’ improving associative governance.	Rector’s position evolves, seen as legitimate that wider management team pushing regional engagement
Administrative machine	The organ overseeing the rules and strategies of engagement	University administration more intertwined and integrated with regional funding and collective activities	Development of strategy and formal routines associated with engagement activities



Academic tribes	Engaged agents in academic tribes	Academics more engaged with external firms and politics fitted to core research/ teaching	More academics doing engagement and willing to undertake the task
Peripheral support structures	Structures for delivering university external engagement	Visible HEI structures (e.g. technology transfer office) active in receiving regional funding	Peripheral structures better embedded into core: projects become central organisations / institutions
Coupling/ co-ordinating institutions	The structure that exerts-asserts the power/ legitimacy of regional engagement	A clear set of policies for regional engagement that demonstrate HEI takes engagement seriously.	Peripheral engagement activities (centres of special funding) develop legitimacy, power & significance

Since the capacities to provide strategic leadership are a function of the university architecture (of which strategic leadership is one element), we here distinguish between the regional leadership contribution to collective innovation activities, and then the way that leadership is by the other four elements this institutional architecture. Our overall research question is:

To what extent does universities' institutional architecture affect their regional leadership roles?

10.3. Methodology & Cases

10.3.1. Methodology

To address this research question, we draw upon Table 20 which provides us with a conceptual framework of the way in which the 'iceberg' of the university affects the capacity of the 'iceberg tip' to exercise formal regional innovation leadership. Although derived from Benneworth et al. (2014), this conceptual framework has not yet been validated empirically extensively. We choose an exploratory approach to understand whether universities' institutional architecture does affect the way they visibly play regional leadership roles. We are interested in the ways in which different configurations of university institutional architecture may affect these regional leadership roles. For this purpose, a comparative multiple case-study approach across different national and regional settings was deemed appropriate to facilitate identifying patterns across cases and furthers theory-building. The case studies were selected as corresponding sufficiently to the research needs of: regions where universities have been active in



regional development; universities where the region is an important partner for them; and where the universities profess that they strategically choose to exert regional leadership. There is some variation here in the cases, from a small “edge city” on the border of Barcelona’s urban space, to a remote Finnish region, along with four other regions going through industrial transition and with substantial rural hinterlands (Aveiro, Twente, North Denmark, Lincolnshire). This mix of variety and similarity along with the intensive case study method chosen provides sufficient depth for interpretation through our conceptual framework to derive detailed place understandings of relationships between internal institutional architecture and external visible leadership roles.

Data collection took the form of secondary document analysis and primary data by way of in-depth, semi-structured interviews, with a similar approach in each of the regions analysed. Questions focused on the universities’ organisational structure and institutional mission, their role in their region and particularly their participation in regional strategy processes. Interviewees included university staff, like top-managers at a central university level, technical and administrative staff and academics, intermediate offices and other regional stakeholders involved in regional coalitions, namely regional government authority staff (policymakers, managers, technicians) and other relevant institutional actors (e.g. businesses, industrial or social associations). The total number of interviews is 186, with the following distribution: 31 in Aveiro, 35 in Lincolnshire, 32 in North Denmark, 34 in Satakunta, 20 in Vallès Occidental and 34 in Twente. Interviews had an average duration of one hour and were recorded and transcribed by the authors.

10.3.2. Case Studies

10.3.2.1. Aveiro

Aveiro region is located on the coastal area of the NUTS II Centro region between the cities of Lisbon and Porto. Composed of 11 municipalities associated in 2008 under the Intermunicipal Community of the Region of Aveiro (CIRA), it has a population of around 370.000, mostly concentrated in the city of Aveiro. It is considered less-developed under EU’s categorisation, SME-predominant and geographically and sectorally diffused. However, it ranks as the third best performing Portuguese region in relative weight of GDP and exports (Rodrigues & Teles, 2017). With the University of Aveiro’s (UA) implantation in the 1970s, the region has moved from a more traditional agricultural sector and stagnant industry towards more knowledge-intensive activities, mainly in the areas of ceramics, forestry, metallurgy, agro-food and ICT.



Since 2007, regional development and part of funding management have been delegated from the Centro's regional authority to intermunicipal communities like CIRA, pending their elaboration of territorial development strategies. Thus, in recent periods (2007-2013; 2014-2020) CIRA has done so through a knowledge-based and collective approach, partnering with UA, the sole HEI in the region. UA has approximately 14.000 students, not only in its main Aveiro campus but also spread throughout the territory in its four polytechnic schools. Since its creation it has developed close regional ties, emphasising an entrepreneurial approach and technical areas of regional industrial relevance such as ceramics, biochemistry, agro-food and ICT. Furthermore, at a discursive and practical level, UA has progressively considered more governance and associative-based forms of engagement, namely with local and regional government.

10.3.2.2. Lincolnshire

Lincolnshire is a large, rural region in eastern England with around 750.000 inhabitants. Its primary land use is agricultural, being the UK's biggest vegetable producer, and with the local business environment largely dominated by SMEs. Lincolnshire County Council (LCC) is headquartered in the City of Lincoln, one of seven County districts. The most important strategic document driving local innovation and economy is Greater Lincolnshire Local Economic Partnership's (GLLEP) Strategic Economic Plan. It was produced collaboratively involving many local stakeholders, including the University of Lincoln (UoL), which has assisted GLLEP in setting the priorities (e.g. food production and engineering) and in writing the plan (Regeneris Consulting, 2017).

UoL has always had a strong regional mission; the main campus in Lincoln was first established as a branch campus in 1996 after long regional lobbying for local higher education (University of Lincoln, 2010). Since then, it expanded quickly into a multidisciplinary full-range university. Currently, it has 14.000 students and 1.600 staff members across three campuses. The two smaller rural campuses, the Lincoln Institute for Agri-Food Technology (LIAT), in Riseholme, and National Centre for Food Manufacturing, in Holbeach in Southern Lincoln, both serve the local agri-food sector. UoL has actively sought to meet local job market needs, of which a good example is the establishment of an Engineering school together with Siemens to facilitate access to skilled workers in the region. There are also several collaborative incentives to both strengthen graduate entrepreneurship and to attract larger businesses to the region.

10.3.2.3. North Denmark

The region of North Denmark has around 600.000 inhabitants spread over 11 municipalities, with a strong divide between urbanised city centres and agricultural, rural



hinterland. In terms of its industrial profile, the region has undergone significant structural changes since the 1990s. While being dependent on traditional labour-intensive manufacturing and primary industries in the past, today it can rely on growth-oriented knowledge industries (competence clusters in industries such as IT, communication, nanotechnology). Regional development was, until 2019, the task of the regional council and the Growth Forum (GF), the later consisting of representatives from the business sector, education and knowledge institutes and public authorities (North Denmark Region, 2014). Together these representatives advise the region on their multi-year regional growth and development strategy (REVUS), as well as the distribution of funds. While the former REVUSs were described as very broad, current strategies (especially 2014-2018 and the one designed for 2019) were said to be more focused, highlighting regional assets.

Aalborg University's (AAU) rector is a representative of knowledge and education institutions in the GF, alongside the director of the Center for Education and Business (EUC Nordvest) and the University of Applied Sciences' (UCN) rector. AAU, founded in 1974 and with some 21.000 students, played an important role in stimulating the transition to new growth areas, emphasising education and research in technical and engineering fields. While AAUs is currently shifting towards a stronger focus on global excellence and internationalisation, the long-standing problem-based learning (PBL) approaches uses joint projects that strongly connects the university to the region.

10.3.2.4. Satakunta

The Satakunta region consists of 17 municipalities with a population of 220.398 (OFS, 2017) and two major regional centres, cities of Pori and Rauma. The economy relies on energy production, engineering, offshore process industry, ports and logistics and food, with automation, robotics and maritime performing well. However, annual R&D expenditure underperforms the national average, with clear GDP differences between urban centres and more remote municipalities (Regional Council of Satakunta; Satamittari, 2018). The Regional Council of Satakunta (RCS) has designed the Regional Strategic Plan (RSP), and RSP priorities (e.g. bio-economy, ICT and maritime environment) form the RIS3 strategy's basis. The RSP priorities include increasing local access to higher education. The University Consortium of Pori (UC-Pori), a higher education network located in Satakunta, plays an important role in achieving that goal.

The Finnish university consortia was created to enhance HEIs' societal role and respond to local needs (FINHEEC, 2013). UC-Pori is coordinated by the former Tampere University of Technology (TUT) , providing engineering degrees within the region since



1989, along with the University of Tampere (UTA), University of Turku (UTU) and Aalto University (Aalto). Today, UC-Pori has 170 employees and 2.500 students, primarily in arts/culture (Aalto), technology/engineering (TUT), social sciences (UTA) and economics/maritime studies (UTU) (UCPori).

10.3.2.5. Twente

Twente Region is situated within Overijssel Province in the Eastern Netherlands and has 650.000 residents in 14 municipalities. Having suffered industrial decline since the mid-20th century, Twente has actively sought to reindustrialise, and today, manufacturing, trade and healthcare are the main economic sectors. Several strategic bodies merged to create the 'Twente Board' in 2012 intending to drive Twente's economic development. Currently, the Twente Board (TB) is actively involved in developing the Agenda for Twente (2018-2022), a regional development strategy initiated by the municipalities. The TB involves representatives from various societal partners including two knowledge institutes: Saxion University of Applied Sciences and the University of Twente (UT). UT opened in 1964, offering degrees in mathematics, applied physics, mechanical, electronic and chemical engineering with the aim to be closely connected to the region's industrial base. Today, the university has a more diversified research and educational profile, including social sciences, and has over 10.000 students. UT has been described as being successful in repeatedly reinventing itself, and for having become a source of regional growth and innovation as a consequence of its historic collaboration with diverse stakeholders, such as policymakers and companies (Benneworth & Pinheiro, 2017). One of such areas of reinvention was entrepreneurship and innovation, cementing it as a centre of regional innovation and knowledge networks (Stam et al., 2016) with a range of start-up initiatives.

10.3.2.6. Vallès Occidental

Vallès Occidental is a county located in Catalonia, the most highly industrialised and highest GDP region in Spain. It comprises 23 municipalities with approximately 900.000 people, and its main centres are Sabadell and Terrassa, the dual county capitals which overshadow the other municipalities both economically and demographically. While a predominantly textile-based region since the 19th century, today it is more diversified, with other relevant sectors including metallurgy, mechanical engineering, biochemistry, agro-food, tourism, services, IT and industry 4.0. The County Council of Vallès Occidental (CCVO) provides policy and service coordination between municipalities, including cooperation for regional development, although the regional authority of Catalonia (Generalitat) retains most public policy and innovation competencies, including



RIS3 and structural fund allocation. The County has promoted collective innovation support both autonomously and through RIS3-funded instruments; in these both its universities (Autonomous University of Barcelona – UAB – and the Polytechnic University of Catalonia - UPC) have played a leading role alongside other technical schools.

UAB is by far the largest and most multidisciplinary HEI in Vallès Occidental. Established in 1968, and with around 37.000 students today, it has strengthened its campus' integration with the region as an innovation support resource. UAB focuses upon the fields of social sciences and humanities, economics, bioscience, medicine and engineering, and emphasises entrepreneurship and societal engagement along with international excellence.

10.4. University institutional architecture elements in regionally engaged HEIs

10.4.1. Strategic Leadership

Out of the six cases, four prioritised regional engagement in their mission statements, often with this orientation being enacted at top-management levels. Nevertheless, a lack of appropriate organisational mechanisms to anchor it in the wider academic community and effectively promote engagement was sometimes evident. Several cases presented a 'strategic mismatch', in which strategic declarations of university strategic leadership did not correspond with what takes place in practice. In the Pori case, academics and staff choose to autonomously (and perhaps opportunistically) collaborate with the region, despite the absence of any strong strategic push to do so from the universities (Salomaa & Charles, 2019). In both Barcelona and Aalborg, there is a strategic emphasis on regional engagement, but with a simultaneous emphasis on internationalisation, with interviewees reporting experienced tensions between these two goals. In Lincoln, there is a strong strategic goal to engage with the region, but only the vice-chancellor is providing leadership, whereas managers and academics mainly focus on more traditional missions, i.e. teaching. In Pori, Twente and Aalborg, the primary drivers for engagement were academic and student activities (such as Aalborg's problem-based learning projects), which were promoted by institutional leaders, but not particularly effectively, being limited in their reach.

There were four regions where the universities were institutionally involved in associated platforms that sought to develop collective regional strategies for innovation, namely Aveiro, Aalborg, Twente and Barcelona. In these four regions, the universities were



perceived as necessary and legitimate partners for these platforms and the strategies they developed. This was due to their access to substantial volumes of knowledge and other needed resources for the eventual successful implementation of those projects and, ultimately, the construction of innovative regional advantage. The universities enjoyed an influential position in the development of regional rhetoric, most evident in the case of Twente, where the region adopted a strategic position in 2014 that foregrounded 'technology' as the single pillar for regional development, echoing UT's desire to profile itself around its then slogan 'high tech, human touch'. In Aalborg, AAU's increased emphasis on internationalisation was undermining its capability to contribute to regional strategy processes, leading to some frustration in the regional partnership. In Lincoln, UoL was heavily dependent on the vice-chancellor as the single external representative, and although this brought visibility for the university, it places practical limits on what that engagement can achieve. In some cases, there have been efforts to create additional senior management positions to support engagement, notably Lincoln and Aveiro, although there were difficulties in ensuring that their external engagement remained coupled to institutional activity.

10.4.2. Administrative machinery

A range of different 'administrative machineries' to support engagement exists across the cases' universities, varying from top-level activities focusing on specific regional priority sectors (Aveiro, Barcelona), to more practical models indirectly guiding institutional engagement (Aalborg's PBL approach, Lincoln's European Structural Funds projects). All six universities have collaborative activities, regional networks (Aveiro, Pori, Lincoln) and/or made efforts to win external funding for engagement activities (Barcelona). Some universities have specific administrative departments to oversee these tasks (e.g. Twente's department of Strategy and Policy, Lincoln's Research and Enterprise Team, Aveiro's Technology Transfer office, UATEC). Pori lacks a formal administrative machinery, even though the region remains important for the University Consortium there. In the absence of these institutional mechanisms to support engagement, these activities are not built on strategic/formalised routines, but more on individual academic's efforts to engage with the region. Even if the university has not formulated evident institutional strategies to encourage regional engagement, the region can still be regarded as an important partner for the university (e.g. Twente, Pori, Aalborg). In some cases, the regional funds – such as ERDF – are the key resource for delivering regional engagement activities (Lincoln, Aveiro, Pori).



One tension in all the cases was the fact that these regional funds were not regarded as relevant for universities and, in practice, they were often managed in ways that held them at a degree of distance from the core institutional setting (e.g. in Twente, Pori & Barcelona). It was not just the position of the administrative machinery that was affected by this institutional attitude to the regional funding. In most cases, regional engagement was perceived as unimportant to career development, resulting in little natural impetus within the institution to align those core activities to external engagement activities. Some universities have tried to overcome this dilemma by prioritising collaborative, large-scale initiatives that match academics and businesses to work together on regional priority sectors. Aveiro funded technical platforms in regional strategic priority areas, and Lincoln used ERDF funds to stimulate university-business interaction around innovation. Aalborg was relatively exceptional in that regard since staff members' external connections generated suitable regional projects that allowed their PBL teaching approach to function successfully.

10.4.3. Academic tribes

There were different kinds of dominant academic identities between the various case study institutions. In Lincoln and Barcelona, there were relatively traditional academic values in which the emphasis lay on delivering teaching and research. In other cases, academic identities were more focused towards engagement (e.g. Twente, Aalborg and Aveiro), where dense connections to particular regional partners and users can be detected at the individual and departmental level. Finally, in Pori, there was much less emphasis on regional engagement at the institutional level, even where there were many academics who prioritised it as being important to their core business activities. They drew primarily on personal needs and interests rather than institutional strategies, although this undermined the capacity the university had to steer those activities institutionally. This is not to downplay the capacity that individual academics can make to regional priorities and innovation capacity; UT had a number of partnership centres that had come to Twente to work with those individuals, and likewise, there were examples of individuals leaving for better employment taking their whole research group (and in one case associated spin-off partner companies with them). Some of the universities introduced structures to empower engaged academics; Barcelona created Hub B30 and the CORE as bodies to assist these bottom-up engaged academics, whilst Lincoln created innovation voucher schemes as part of their ERDF activities to provide a direct mechanism to reward academic-innovator engagement.



Not all academics sought to be engaged or were successful in engaging through their individual networks. In Aveiro, academics were undermined by a general lack of resources which made a deviation from formally mandated activities extremely difficult to arrange. In Lincoln, the general lack of alignment between engagement and core teaching and research activities also disincentivised engagement. Pori failed to develop a persuasive narrative of its innovation activities, particularly relating to the absence of institutional or national performance indicators for engagement, in turn reducing the institutional steering of academics to engage. In all cases, academics' motivation for regional engagement was heavily dependent on their own preferences and motivations, and at least partly reflected the extent to which regional engagement was supportive of other core knowledge activities.

10.4.4. Peripheral support structures

A range of support structures was used to promote regional engagement, mostly focused around science parks and technology transfer activities. There was a split within the universities between those that tried to centralise these structures – such as Aalborg where AAU Innovation was supposed to be transformed into a single point of contact – and those that placed support activities within the academic units – as was the case for Aveiro. A key issue with these structures is that most of them did not have an explicitly regional mandate, but rather were responsible for generally promoting entrepreneurship and innovation. Although science parks represented specifically regional development assets, technology transfer and valorisation offices were primarily concerned with technology commercialisation. They did become involved in delivering specific projects related to regional engagement, often funded by European funds, and this had the result of further fragmenting and peripheralising regional engagement within the already institutionally peripheral commercialisation structures.

Five of the regions had science parks, namely Barcelona's Research Park (PRUAB), NOVI science park in Aalborg, Lincolnshire Innovation and Science Park, Kennispark Twente and Aveiro's Creative Science Park, providing both physical spaces but also support structures to promote regional innovation and entrepreneurship. Those parks were typically located at or near the universities, and often included shared space, such as incubators or laboratories, for shared use. Finally, no formal support structures to deliver engagement activities were identified in Pori, where key financial tools (and, critically, access to the European Structural funds), were the sole 'structure' enabling external engagement, depending heavily on individual researchers' motivations and interests. Similarly, Lincoln established many engagement mechanisms, which were



primarily opportunistic responses to funding opportunities and were not managed to build and facilitate systematic interaction between regional stakeholders and academics.

10.4.5. Coupling/ co-ordinating institutions

In most cases there were no, or extremely limited, formal structures in place to link engagement to core university teaching and research activities. Individual academics were often in charge of this coupling, in turn making them responsible for identifying and applying for appropriate funding from different sources. Aveiro attempted to create an academic career evaluation system that included regional engagement, but its inefficiency ultimately discouraged and demotivated academics to report their engagement efforts. Barcelona recently formally announced the intention to factor engagement activities in academic career evaluation, but these have not yet achieved any kind of purchase within local academic communities. Although Twente made a high-level institutional claim towards supporting regional engagement, institutional incentives and internal financial mechanisms primarily reward large numbers of students and research council funding, with regional engagement only seen as legitimate when aligning with those activities.

The one region that did have formal structures was Aalborg, where even the PBL mechanism was under pressure to become internationally excellent. There was a sense that, whilst in the past regional engagement had been important to the university's academic identity, more recent changes undermined the realisation of the existential importance of that regional engagement. The region was seen as a provider of projects for the PBL approach, rather than as a partner and beneficiary of those activities. In some cases, there were examples of management to create new kinds of internal regulatory structures that rewarded engagement, primarily the industrial PhD's offered at UAB and UT.

10.5. Discussion

We are concerned in this chapter with the ways in which elements of universities' structure affect the formal capacity of their 'leadership' (as understood in Clark's (1998) terms) to constructively contribute to regional processes. When there was an effective alignment between the regional capacities within the university structures, and the managerial leadership intentions, then this provided legitimacy for those managers in regional leadership coalitions. Conversely, when there was a dissonance between these capacities and intentions, this undermined the capacities for managers to exert leadership in these coalitions. Constructing that legitimacy depended on there being



good faith in terms of the claims made by university managers, that related to their core knowledge processes being regionally embedded. When engagement was approached more instrumentally or opportunistically by university managers, then those managers' legitimacies in the coalitions was undermined by the evident mismatch between manager claims and university regional knowledge spillovers.

In terms of the supportive factors, first, administrative machinery supported regional engagement and leadership by institutionalising senior manager intentions in various ways throughout the university. Namely in specific offices to support researchers, students and leadership in their engagement activities, as well as to try to make regional engagement viable as part of a successful academic career. This became important in terms of the presence of architectural elements that support management legitimacy in regional innovation coalitions, when existing regional activities aligned with managers' strategic intentions. Academics' networks with regional partners were important in legitimising university managers in regional innovation coalitions, and this support was strongest when the benefits that these networks were bringing to the region were congruent with the visions managers projected to their regional partners. Related to that, support structures played a role in helping to generalise regional engagement and upscale individuals' bilateral linkages to create regional networks, which formed the basis for managers' legitimacy claims. When this did not occur, there were the risks that key individuals' departures also saw those networks removed from the regional mix. Finally, academic activities including regional engagement in teaching and research activities also contributed to the potential to exert manager legitimacy.

The six cases also highlighted ways in which university institutional architecture can constrain the exercise of regional university leadership, most notably when there was a mismatch rather than alignment between the activities of these regional knowledge communities and strategic intentions. Some institutions had university managers who were keen to exert a strong regional leadership role, but absent strong regional knowledge communities experienced difficulties in meaningfully shaping internal and external change. There was a lack of engaged academics in several universities, and managerial intentions alone were not enough to compensate for a lack of value to the academics in putting effort into regional engagement activities. The issue was not one of academic resistance or recalcitrance to managers, but rather a simple calculus that effective knowledge activities (teaching and research) could be created without the unnecessary effort of involving regional partners. Conversely, despite the presence of strong regional networks in some institutions, there were university managers who



sought to remove themselves from regional innovation coalitions because they deemed other priorities more important. One factor that sometimes surprisingly undermined alignment and legitimacy was the presence of regional funding, because it stimulated its pursuit rather than the development of sustainable knowledge activities well aligned with the academic core.

Our analysis suggests that universities' ability to exert regional leadership requires more than the generation of spillover effects by the mere presence of the university. It requires a purposeful exercise of transformative initiatives and construction of enriching regional knowledge activities; whilst historical pathways and regional contexts do influence what can be achieved, universities can themselves influence the situation through their activities. What our analysis highlights is the importance of bottom-up leadership, constructing situations where there are meaningful knowledge spillovers through the involvement of regional partners in university knowledge communities around teaching and research. In turn, this allows university managers to mobilise a legitimacy for their activities within regional innovation coalitions and participate in collective processes that seek to improve the overall regional innovation environment. The key variable here is the alignment of the top-down management with the bottom-up engagement. Good alignment builds legitimacy that allows the exercise of leadership, whilst a lack of alignment undermines that exercise. A 'strategic mismatch' was evident in several of the cases, with managerial intention decoupled from academic community's practice; where knowledge communities were not regionally engaged then strategic leadership repertoires were not enough to stimulate these bottom-up engagement activities.

10.6. Conclusion

In this chapter we have sought to address the overall research question of: To what extent does universities' institutional architecture affect their regional leadership roles? The model sketched out above provides some insights which allow us to answer this question, and in turn reflect on the consequences for research and practice. We here highlight two elements that appear most important in determining managers' capacity to exert leadership, namely alignment and agency (Figure 19). Alignment involves university managers engaging with regional innovation coalitions in ways in which their legitimacy is reinforced by their existing internal activities. But this alignment depends on those activities which are constructed by academic agents at the grassroots' level, involving regional partners in their knowledge activities and thereby creating knowledge spillovers and crossovers that deliver regional benefits.

The exercise of that academic agency is clearly influenced in profound ways by university institutional architecture, whether through the existence of formal support structures, or policies and incentives rewarding or mandating (as in the Aalborg case) regional engagement. But those architectural elements play a supporting role enabling academic agency, and that mechanism seems to be out of step regarding the institutional architecture as a means for institutional managers to impose their will upon those academic agents. Instead, alignment supports engagement through academic agents, and channels it to allow university managers to best play a wider (informal) regional leadership role.

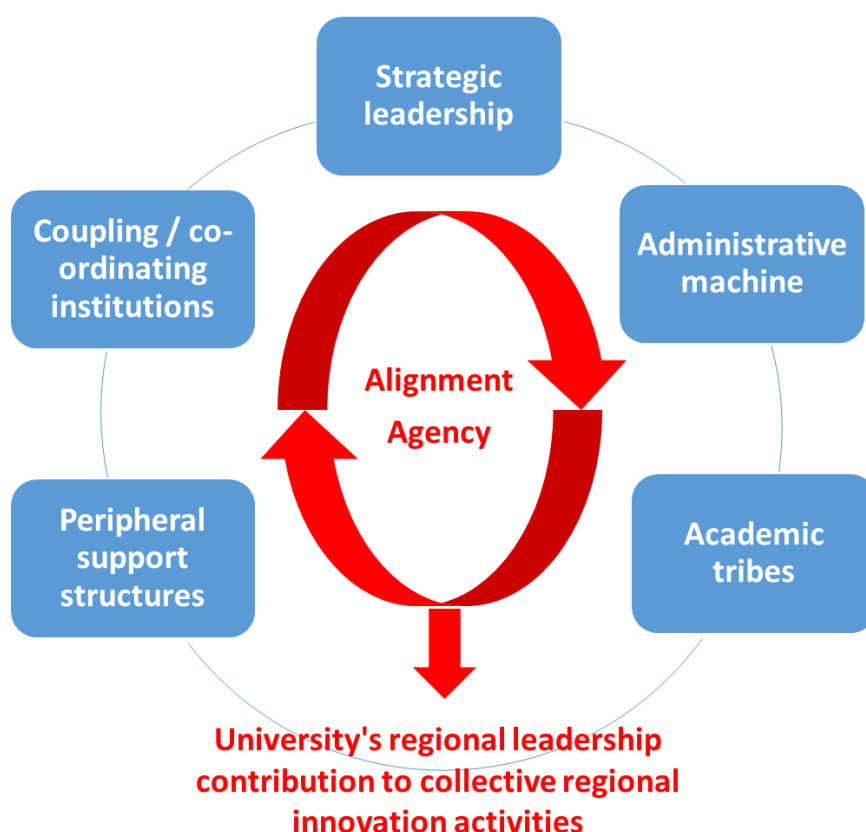


Figure 19 - Alignment and agency as emerging elements. Source: Authors' own elaboration.

Many agents, institutions as well as networks/coalitions of stakeholders have the potential to take on regional leadership roles (Ayres, 2014; Sotarauta, 2010; Stimson et al., 2009). Nevertheless, universities have only recently shifted into focus in place-based leadership studies (Benneworth et al., 2017; Raagmaa & Keerberg, 2017). This study thus contributes to both literature strands, linking the debates within the regional development, place-based leadership and higher education management literature by considering how universities' exertion of strategic leadership is influenced by its internal dynamics and assets, thus shaping its regional contribution. Understanding how this



particular institution – the university – can contribute to regional development in different contexts and due to different internal preconditions as well as settings thus becomes vital not only for academia, but also policy. While each university of our individual case studies showed a distinctive approach and setting for place leadership, we were able to draw some wider conclusions, considering their similarities and differences.

It is widely acknowledged that universities are complex organisations, and we see our model as reflecting that complexity, with agency and alignment allowing university managers to play these informal leadership roles. There are many factors that undermine dealing with that complexity, particularly from external regulation of higher education that demands simplistic, ‘one-size-fits-all’ approaches to inherently complex situations. This implies that one key area for university leaders in that regard might be protecting their academic agents from the worst of those pressures to ensure they are able to exert that regional agency, encouraging the use of national languages in education and research, recognising applied research, allowing local guest lectures, etc. It is in this area that university managers have the opportunity to exert direct leadership, to use elements of institutional architecture to protect their academic agents and allow them to engage in their knowledge activities. In turn, that will support the exercise of this bottom-up agency by academics, generating legitimacy for university managers, and thereby enhancing the strategic regional leadership role they can play and optimising their university’s contributions to innovation-led regional development.

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Part III - Conclusions





11. Cross case discussion

This thesis seeks to understand university contribution to regional development and innovation dynamics through its engagement with regional government in regional innovation policy processes. This engagement and contribution are often hindered by regional development barriers (e.g., path inertia, fragmented networks) and (inter-)institutional tensions (e.g., lack of administrative resources, differing interests). It is proposed by this thesis that through this engagement in regional collective strategy processes, universities can help address these tensions and barriers across different regional contexts and contribute to guide the positive transformation of regional development pathways.

In particular, this thesis has focused on highlighting the path-dependencies, institutional and organisational arrangements and dynamics, and the micro-processes at play in universities' engagement in these strategy processes. It has done so by taking into account the different rationales, expectations, interests and capacities that have affected universities in their performance of this engagement. Particular attention has been given to universities' collaboration with regional government, as the latter are managers for these regional innovation policies and strategy processes, and an understudied partner in universities' regional engagement. Universities are the central institution under analysis in this doctoral research due to their unique role in a knowledge or learning economy, and for being institutions with a varied set of organisational arrangements and capacities that are suggested in the literature as able to contribute to regional development in multifaceted ways.

First, characteristics of university engagement in the innovation policy process are analysed (Chapter 11.1). Detail is provided regarding university collaboration with regional government, in particular, and the constraining and auxiliary elements involved in engaging within the policy sphere. The bidirectional nature of university-government relationships is highlighted, namely how this collaboration may help transform organisational arrangements in both institutions and normalise broader regional collaborative dynamics. Engagement in the policy sphere is discussed from the perspective of variances in expectations and contributions across the policy cycle. Alignment with policy is identified as a key mechanism influencing university strategic positioning in the region and overall regional contribution. A final heuristic is suggested for understanding university engagement in the innovation policy process.



Second, agency and place leadership are highlighted as key themes shaping universities' regional contribution (Chapter 11.2). Conditions for universities to activate these components successfully are detailed, providing a greater understanding of how universities can reorient their resources and capacities to play an orchestrating role in regional innovation dynamics. Legitimacy is also highlighted here as a key mechanism to enable both internal alignment for a cohesive university response to regional challenges, and external alignment for a recognition of university capacities and roles by regional stakeholders.

The third and final theme discussed is that of change (Chapter 11.3), specifically the organisational, institutional and policy change that can either result from the university's performance of this regional engagement, or that needs to occur for an adequate response to regional challenges. Impact of university policy engagement on regional innovation dynamics and on organisational arrangements is discussed, as well as the challenges involved in activating transformative change. Alignment is again identified as a key element in this thematic, but the focus is on broader external alignment and internal alignment within the university. A model that considers the elements discussed in this chapter is then proposed: a 'spiral' model that considers both the mechanisms of alignment and legitimacy, as well as the broader interplay between university agency and leadership, and regional government and policy in the enactment of change (Chapter 11.4).

The different dimensions of the research problem are addressed in the seven empirical chapters/publications (4-10), with each providing contributions to both theory and practice. This discussion chapter will provide a consolidated cross-synthesis analysis of the overall findings of each of these publications and will be followed by a conclusion chapter with summary contributions and implications of this thesis. This doctoral research is based on three main cases: the University of Aveiro (PT), the Autonomous University of Barcelona (ES) and the University of Twente (NL). Nonetheless, due to collaboration with other authors for the publications herein include, the analysis of other case studies has contributed to the findings. These cases are therefore discussed in this chapter as well to allow for a more comprehensive assessment of the topic and results at hand. The empirical chapters address this thesis' main themes and mechanisms in distinct ways, as shown in Table 21, thus illustrating from which publications the stylised facts (Hirschman, 2016) described here are extracted from.



Table 21 - Emergence of key themes and mechanisms within empirical chapters

Empirical chapters	4	5	6	7	8	9	10
Themes and mechanisms							
<i>Engagement in policy process</i>	X	X	X	X	X	X	
<i>Agency and leadership</i>	X	X	X	X	X		X
<i>Change</i>	X	X	X	X	X	X	X
<i>Legitimacy</i>	X	X	X	X		X	X
<i>Alignment</i>	X	X		X	X	X	X

Following the critical realist research process and the inductive and exploratory approach, this discussion chapter proposes a conceptual heuristic (Chapter 11.1.3), which will be refined based on the empirical chapters, findings, and stylised facts (Chapter 11.4). This is done with the aim of understanding the broader picture, clarifying regularities, and styling the process. The final reflection on the implications of these findings for theory and practice will be done in Chapter 12.

11.1. University engagement in the innovation policy process

University engagement in the innovation policy process has been identified in the literature review as an understudied aspect of university regional engagement. Two related gaps have been considered for this thesis: university-regional government collaboration and university engagement in the policy sphere. These knowledge gaps have led to a skewed perception of university engagement in regional innovation dynamics and in the strategy process, with assumptions that its contribution is done primarily as knowledge transfer to industry. Without undervaluing that form of engagement, the findings in this thesis suggest that university engagement with regional government in the innovation policy process is a significant, and often preferred aspect of university engagement activities. Furthermore, this specific form of engagement is found to enable universities to address certain identified regional challenges. Alignment with regional government expectations and with regional innovation policy further provokes the restructuring of universities' institutional architecture and enhances their regional contribution.

The following sections will address the identified gaps, demonstrating the potential for this form of engagement but also its related challenges. They will thus contribute to a



richer theoretical and empirical knowledge of university regional (policy) engagement and governance roles. First, the synergistic aspect of the university-regional government link is highlighted, with a discussion of empirical data that suggests this engagement can boost inter-institutional capacity and regional collaborative dynamics. The second subsection highlights the importance of universities taking account policy sphere characteristics and variances of engagement. Finally, university-regional government collaboration will be examined through the mechanism of alignment, with a heuristic illustrating how this dynamic can work towards achieving desired regional pathways.

11.1.1 Engagement with regional government

The findings presented in this thesis strongly argue for potential of university-regional government engagement activities and overall collaboration, emphasising the need to revise innovation interaction models and university engagement modes that dismiss this form of engagement. Indeed, it highlights the often intangible and undervalued capacities and university roles in its surrounding region. Additionally, with regional government being sometimes responsible for managing both domestic and EU funds, thus establishing strategic priorities and funding criteria, this may be a particularly profitable avenue for university engagement, in contrast with existing assumptions.

As previously emphasised, inter-institutional collaboration for innovation benefits from mutually beneficial and reinforcing knowledge flows. When two institutions are concerned – such as universities and regional government – this means that engagement should be at least bidirectional to provide the most advantageous outcomes. Institutions will therefore influence and learn from each other through this collaboration, whether this is an intentional or conscious outcome. Consequently, both university and regional government will be shaped by engaging with each other. While for the university this engagement may result in a better understanding and response to regional strategic priorities, on the other hand, regional government will access not only knowledge, but also certain administrative resources and capacities that it may lack, especially in the context of less-developed regions (see Table 1 and Table 5). Moreover, in building this link, university and regional government collaborative activities and efforts to address regional challenges may spillover to other institutions and actors in the region, originating new initiatives and collaborations, developing networks and resolving potential tensions. While these positive spillovers in collaborative methodologies are also present in more developed regions, the relationship with government tends to not be as accentuated as in less developed regions, perhaps due to the existence of several higher education



institutions in those regions, leading to more competition and more dispersed collaborative efforts (Chapter 7, 9 and 10).

The empirical chapters have enabled the identification of four main mechanisms through which university collaboration with regional government can contribute to regional innovation dynamics: a) government demand and support can stimulate university broader regional engagement; b) university agency and mediation can help resolve tensions between government and other regional stakeholders (namely industry); c) university-regional government engagement can help articulate broader regional industrial needs, trends and opportunities, and stimulate complementarities; d) in a mutually beneficial and reinforcing relationship, university and regional government can adapt or create new institutional arrangements supporting regional engagement and innovation dynamics.

In Chapters 5, 6 and 7, this *push-pull* or alignment dynamic can be clearly observed. Empirical evidence shows regional government motivated universities (e.g., University of Lincoln, UK, and University of Aveiro, PT) to prioritise engagement with other regional partners and/or reinforce engagement in specific regional strategic areas, encouraging university leaders to acknowledge existing academic research strengths (e.g., University of Twente, NL), and promote the creation of new organisational arrangements (e.g., University of Aveiro). Additionally, regional governments have directly subsidised universities to stimulate its agency and leadership in the region (e.g., University of Aveiro, and University of Pori, FI). On the other hand, universities have energised regional governments in multiple ways, namely by encouraging them to utilise certain resources and strategic tools to better support regional development (e.g., University of Lincoln and University of Pori). Universities are also generally seen as actors that provide a trustworthy perspective, counterbalancing the more political and power-dominated side of government (University of Aalborg, DK). Depending on the organisational and regional needs, either university or regional government can thus take the lead in this collaboration.

Therefore, flexibility and trust are needed for this collaboration to be mutually beneficial and have wider positive impacts for other regional institutions and regional innovation dynamics. When one of these spheres overly controls the process, there is a risk that the link may be significantly impaired, then requiring further leadership efforts, at times by individual actors, for collaboration and development efforts to resume. This is evidenced in the case of the University of Aveiro (mainly Chapters 6 and 9), whose participation in the regional strategy development process of the region of Aveiro, while



desired, was limited by municipalities' hesitation in sharing the leadership. In turn, when one of these spheres abandons control or their leadership in the collaboration, this may cause hindrances to the process. Namely, if regional government relies too much on universities to fill certain administrative gaps and play roles that would be the characteristic governmental, local and regional administrations may be less inclined to develop those needed skills and resources. And by universities assuming too many roles and responding to higher expectations for institutional and operational steering in the region, this can cause a strain on university capacity.

While management of expectations is needed for the mutually beneficial and broader positive impact of this engagement, evidence provided in this thesis suggests that there is a significant potential in university-regional government engagement to positively impact on regional innovation dynamics. Moreover, this engagement can meaningfully change university and regional government institutional arrangements and regional activities, thereby improving on the overall engagement capacity of these two institutions.

11.1.2 Engagement in the policy sphere

University engagement in the innovation policy process, besides including engagement with regional government, also includes engagement in the policy sphere and involvement at least in some phase of the policy cycle. As previously mentioned in this thesis, the policy sphere is a particularly unique environment of collaboration, as it is not only a variable and dynamic one, involving alignment between multiple government levels, different stages, policy areas, and actors. Moreover, it is characterised by power and authority asymmetries. It is therefore not a particularly easy arena to navigate, especially for an institution like the university. Characterised as fragmented institutions, therefore imbuing its individual actors with, generally, high degrees of autonomy, universities may struggle to exert a cohesive vision while having different representatives in the various policy stages.

As previously discussed, the tendency for policy environments to create further tensions between actors (or to make these fragilities more apparent), has been highlighted in the literature and was also empirically observed, namely in Chapter 4 and 6. But as also emphasised, this could be managed not just through the promotion of more effectual modes of reasoning in collective policymaking (Chapter 4) but also with the help of an "honest broker" (Chapter 5). Universities do not have to, necessarily, fulfil that role, but as findings in this thesis suggest, they have successfully performed this role in various contexts (e.g., University of Aveiro, University of Aalborg), and specifically in the design stage of the innovation policy process (Chapters 5, 6 and 7). This leadership role will be



discussed in further sections, but it is important to emphasise here that universities are often resorted to in policy processes as not just knowledge brokers, but also as mobilising and mediating agents. Contrary to general assumptions related to the concept of leadership, it is not university top-management that tends to play these roles. Indeed, top-management tends to play a merely representative role, with academic staff often taking a more active involvement in the collaboration with regional government (Chapter 7), therefore leading these on these governance roles. This suggests university capacities and contributions to the policy process can be varied, but also that they are significant, with universities taking on roles previously reserved to the government sphere (Chapter 5, 6 and 7).

Furthermore, besides utilising a wide assortment of agents in their engagement in the policy process, universities may play differentiated roles depending on the policy stage. Research herein conducted shows that while universities can and have participated in all the stages of the innovation policy process (formulation/design, implementation, monitoring and evaluation), they tend to have a stronger input in the initial stages, especially in the design phase, performing varied roles here related to stakeholder mobilisation, knowledge transfer, network management, mediation, among others (Chapter 6, 7 and 8). As mentioned in Chapter 6, this may reflect the implementation gap, or gap between policy and practice, with increased actor fragmentation occurring in the implementation stage. However, this may also demonstrate that university capacities are underutilised or undervalued in the other stages of the process. This is especially evident in the monitoring and evaluation stage, which could take advantage of the knowledge resources of the university. While there may be impartiality concerns involved, findings suggest that regional government itself has often dismissed this policy stage (Chapter 7). This more granular analysis of university roles in the innovation policy process has thus enabled to identify these variances in university roles and actors, but also in the administrative levels, stages, scope, and timescales that need to be considered when taking part in what can be a quite long-term and complex process.

Alignment with policy was identified as a key influencing mechanism of this engagement of universities in the policy arena, enabling the following: a) influencing of policy priorities, advancing policy change and imbuing the policy process with a long-term perspective, therefore also reinforcing university regional leadership (Chapter 4 and 7); b) reorientation of university academic and technical resources in accordance to regional strategic priorities and funding streams (Chapter 9); c) increased awareness of regional needs and challenges and a reorientation of university activities to the local and regional



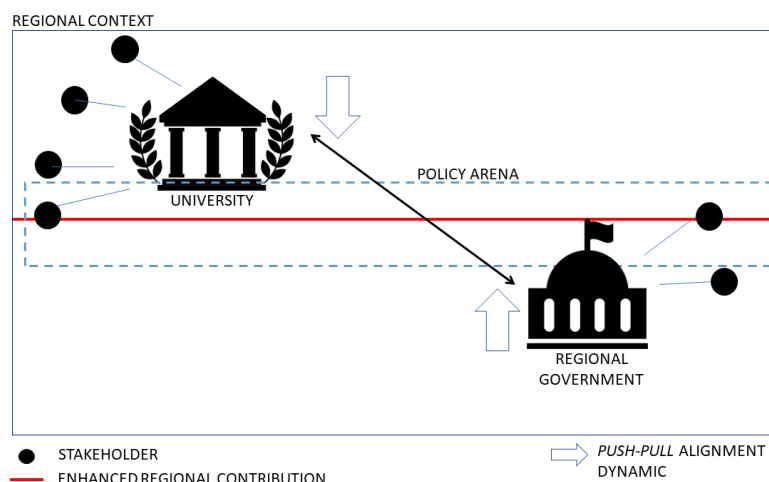
scale (Chapter 6, 7 and 9); d) strengthened collaboration with regional government and other regional stakeholders, thus promoting regional innovation dynamics (Chapter 6, 7 and 9).

Therefore, despite existing challenges in the engagement in the policy arena, findings suggest there are opportunities and potential for universities to have a heightened role in this sphere. Indeed, they may advance their own self-interests while simultaneously addressing regional challenges and promoting regional collaboration and development.

11.1.3 Towards a heuristic for alignment

Alignment emerges as a key mechanism in an interplay between university and regional government. It demonstrates a shifting dynamic and progression which requires the maintenance of a delicate balance between two main sides. Figure 20 attempts to encompass this interplay. First, as referred in Chapter 11.1.1, the university and regional government interact in a bidirectional and mutually reinforcing collaboration, inserted within a particular regional context. Both institutions may find themselves on even playing fields, with none overly exerting control or influence, or putting too many demands on the other. This would ensure a more balanced and mutually beneficial relationship that can not only further each of these institutions' interests, but also spillover some of the benefits to other regional stakeholders. Additionally, a more balanced interplay would allow for universities and regional government to further align with a desired pathway for the region – one in which the potential of the regional contribution emerging from this relationship is enhanced. The policy arena here is seen as one of the possible collaboration areas for university and regional government, but one in which an enhanced regional contribution is sought, or more successful regional development pathways, are sought. Given its challenges, it is also an arena where balance and alignment in this collaboration can be most beneficial for all parties involved.

Figure 20 - Alignment dynamic in university engagement in the innovation policy process.



Source: Author's own elaboration

The relationship between university and regional government (Chapter 11.1.1) in the innovation policy sphere (Chapter 11.1.2) can be a field of tension – these are two complex actors interacting in a complex arena. However, it is an interplay further enabled by the alignment of these two spheres. Thus, this section proposes a heuristic for alignment to relate university governance and wider regional contribution with the contending tensions inherent to these inter-institutional interplays. Via alignment with broader policy priorities for the region, university can mobilise its various resources and further contribute to regional transformation.

11.2. Agency and place leadership

Agency and place leadership have been identified as knowledge gaps in the context of this thesis given the limited, though emerging, literature on the topic. Specifically, a better understanding of the role of agency and leadership in policy and development processes has been considered an area requiring exploration. As key participants in these processes, and as mentioned in Chapter 2.3.2, universities have the capacity to display key institutional agency and place leadership. This chapter thus relates to the agency and leadership that the university – as institution and as comprising individual agents – have in order to operate within the innovation policy process.

The policy sphere comprises a complex system for the exercise of agency and leadership. As mentioned in the previous chapter, this is an arena often characterised by a web of tensions that can constrain collaboration and, similarly, the enactment of agency and leadership. At the same time, there are elements that facilitate university action in the policy process. In particular, alignment and legitimacy have been found to



be key mechanisms that can support university agency and leadership in the policy sphere. These will be discussed in the following sections.

11.2.1 Supporting internal and external strategic alignment

The empirical chapters of this thesis have demonstrated several examples of universities assuming a heightened regional role, namely through the (sometimes imperfect) exercise of agency and leadership. It was observed throughout these chapters that university internal institutional structures (e.g., Chapter 10), the existence and articulation of its strategic external orientation (e.g., Chapter 7) and the somewhat acceptance of external influence (e.g., Chapter 8) – that is when both internal and external alignment are supported – the exercise of leadership and agency in the region are then imbued with legitimacy and facilitated. This creates the conditions for the university to respond to regional needs more easily.

Chapter 10 argued for the need to reinforce the engagement capacities within the university structures and align these with broader strategic and managerial intentions toward the region – allowing for the exercise of leadership (e.g., Autonomous University of Barcelona). When in turn the loosely coupled organisational structures of the university were dissonant in their capacities and intentions (e.g., University of Aveiro), managers were less capable to exert leadership in the region, namely in innovation policy processes. As previously mentioned (Chapter 11.1.2), it is often the case that university top-management will play more of a representative role in regional innovation strategy processes. Academics and technical staff are then engaging with regional government and other stakeholders on the day-to-day tasks of the process, thereby building closer relationships and being responsible for several tasks and decisions (Chapter 7). When the support and knowledge agents' interests diverge then from top-management, university regional action may become discordant, and thus lose credibility or legitimacy in the face of other regional actors.

Indeed, the interests of university individual actors are particularly important to emphasise here given the career incentives that are at play in the academic career. These incentives often push academics to prioritise the teaching and research missions and have a more international – rather than regional – outlook, as they are being compared and judged against standards at this scale. While they may have interest to engage with the region, these sorts of career advancement standards within university structures inevitably limit their action. There is therefore little natural impetus for the alignment of individual university agents, and even university in general, with the region.



When this does occur, the impetus might be more opportunistic, namely related to funding attainment (Chapter 8 and 10).

Nonetheless, Chapter 5 highlights that regional leadership may emerge from these non-management levels. Specifically, stakeholder mobilisation, inter-institutional interaction and capacity, and the broader mediation of conflicts within regional innovation networks are often enabled by individual actors from the university, as also mentioned in previous chapters. This was constant throughout all regional and university contexts, demonstrating that institutional agency can at times be more prominent at lower, operational levels. The analysis thus suggests that the mere presence of a university is not sufficient for the generation of spillover effects and the enhancement of regional innovation dynamics. Rather, a purposeful exercise in transformative leadership is required for a better integration in regional networks and response to regional challenges. This further implies that university activities can make a significant difference given the right direction (Chapter 10).

Further efforts thus seem required to support alignment between the two possible levels of university leadership – the managerial and operational. The latter provides both scientific and technical expertise, as well as connections that can be explored and combined to further regional innovation processes. In turn, the managerial level can steer broader action, providing the strategic direction and the incentives for agency to emerge at various levels, and for leadership to be enacted (Chapter 7 and 10). Four dynamics are thus involved in this alignment mechanism: a) steering of internal strategic priorities and action from the top-down (e.g., University of Aveiro); b) stimulate bottom-up engagement and agency through organisational arrangements and incentives (such career development associated with regional orientation/contribution) (e.g., Autonomous University of Barcelona); c) orienting internal cohesive vision and action for external needs, allowing for the building of both internal and external legitimacy and the exercise of place leadership (Chapter 10); and, d) accepting external influence for the dissolution of internal tensions (Chapter 8).

The latter dynamic considers the involvement of regional actors in university core activities, for example by co-designing curricula or cooperating on projects. This reflects previous points (Chapter 11.1.1) that argue that alignment with the regional innovation policy process and regional government in particular can steer university toward regional action (Chapters 5, 6 and 7). Nonetheless, it is important to note that alignment with regional innovation policy is still broadly opportunistic (Chapter 8), with academics largely unaware with what it involves. Furthering university engagement in the policy process



could potentially work to reinforce this alignment and strengthen orientation towards regional needs. However, this same enforcement of alignment may constrain the creative agency of individual agents. Therefore, another balancing act emerges here (see Chapter 11.4).

11.2.2 Addressing regional challenges through university place leadership

Place leadership in innovation policy processes could therefore be greatly constrained or advanced depending on the internal and external mechanisms of alignment and legitimacy. For the activation of leadership in these inherently complex processes, there must be a promotion and careful balancing of individual and institutional agency. This would thus allow for an enhanced regional contribution on the part of universities and other actors, and therefore enable regional transformation.

The empirical and discussion chapters have demonstrated the broader constraints and enabling conditions for the exercise of university and place leadership. In accordance with Table 2 and Table 5 in Part I of this thesis, university governance roles have been largely confirmed in the empirical chapters, demonstrating potential for further activation of place leadership. This is particularly the case of less developed and peripheral regions, confirming previous assumptions in the literature that consider this regional context as enabling closer stakeholder alignment and a collective action for the building of successful regional pathways. The University of Aveiro (Chapter 4 through 10) is the main example of this, nature of a path-dependent connection to the region combined with the continuous steering from university leaders at all levels and regional government for this continued collaboration.

The University of Twente (Chapter 4, 5, 7, 10), while relatively peripheral, is still located in a more developed old industrial region, which (among other factors) has meant less availability of European regional development funds and a more sector focused (high-tech) international orientation of its academics. Its integration in regional innovation coalitions and in strategy processes is nevertheless prominent, though limited at some government levels. The Autonomous University of Barcelona (Chapter 7, 9, 10), located in a more developed metropolitan region, is faced with a more competitive environment, though employing innovative collective methodologies and ways to anchor its international knowledge to the surrounding area. However, engagement with regional government and the regional innovation policy process is more limited in this case, being shared with multiple other institutions. Therefore, it is a university more distanced from this arena. Table 22 provides an overview of the findings and estimated regional



contribution of these universities through their engagement with the innovation policy process.

Table 22 – Potential regional contribution from primary research cases of university engagement in the innovation policy process.

		UA	UT	UAB
Engagement type		Entrepreneurial and argued move to civic	Entrepreneurial	Entrepreneurial
Region type		Less-developed, peripheral	Old industrial and peripheral region	Metropolitan region
Engagement in innovation policy process		Strong strategic alignment with regional policies and performance of governance roles and support to regional government	Strong involvement in regional innovation coalitions and in sub-regional innovation strategy making	Limited and indirect engagement in regional innovation policymaking, but increased involvement at local level
Examples of estimated regional impact	Positive	<ul style="list-style-type: none"> • Inter-institutional capacity-building; • Regional problem-solving; • Industry support infrastructure; • Network enabler 	<ul style="list-style-type: none"> • Industry support infrastructure; • Network enabler; • Creation of collaborative dialogue spaces; • Anchoring of international competences 	<ul style="list-style-type: none"> • Strong network building at local levels; • Anchoring of international competences in the region; • Inter-institutional capacity building.
	Negative	<ul style="list-style-type: none"> • Underutilisation of capacities due to lack of internal alignment between operational and managerial levels; • Potential of network monopolisation and policy capture. 	<ul style="list-style-type: none"> • Focus on high-tech dismissing more intangible innovation capacities; • Limited regional (contrasted with sub-regional) policy engagement due to highly competitive environment and more government/firm control. 	<ul style="list-style-type: none"> • Limited policy engagement due to highly competitive environment; • Policy arena with more government control, hindering collective participation and problem-solving.

Source: Author's own elaboration

The primary case studies included in this doctoral research have therefore assumed several governance roles through which university and broader place leadership was activated. There is still an observable trend of prioritisation of university opportunistic

interests over regional needs, potentially undermining the broader flexibility of the regional innovation strategies (Chapter 4). Moreover, this engagement, while widely present in certain contexts and reinforced at punctual moments and stages, is overall still inconsistent and dependent on actor commitment (Chapter 7). Nonetheless, empirical evidence has shown universities and their individual agents have been successful in mobilising resources, capacities, and networks in an exercise of leadership for the construction of a promising regional future. The opportunity for this engagement and potential to be furthered is also present, though the need for balancing expectations, and internal and external pressures and interests as referred to in the previous chapters is underlined.

11.2.3 Integrating the mechanisms of alignment and legitimacy

Besides alignment, legitimacy is highlighted also as a key mechanism to enable both institutional and operational cohesion within the university, and external credibility and leadership recognition (Figure 21). Therefore, integrating legitimacy and alignment in the conceptualisation of university policy dynamics, allows for a more comprehensive perspective of university regional contribution.

Legitimacy is broadly understood here as the recognition and acceptance of leadership by an actor or institution. This final mechanism thus needs both the assumption of university leadership, and its internal consolidation, but also an external materialisation and the reflection of this agency on other regional actors. Ultimately, through legitimacy, regional stakeholders recognise the university as not just ‘another actor’, but as a protagonist in the regional innovation policy process – an institution with the capacity to provide wider guidance and orientation for regional action. Besides this attribution of credibility, the mechanism of legitimacy also provides a sense of broader continuity to partners of the roles that university can play. In this sense, universities are seen as honest brokers also because they provide a stability that other regional actors, like regional government, cannot.

Figure 21 - Illustrating the mechanisms of internal and external alignment and legitimacy





11.3. Organisational, institutional and policy change

The previous sections have discussed important knowledge gaps and mechanisms for understanding the conditions for enhanced university regional contribution in the context of innovation policy processes. This section will focus on the empirical findings suggesting through university engagement in the policy process and with regional government, change has occurred in multifaceted ways. First, organisational change is discussed as possible to occur within the university through this form of engagement. Second, the chapter approaches institutional change, pertaining to regional actors' behaviour and engagement culture induced by the university policy engagement. Finally, reflections are provided on the topic of policy change. While all these forms could drive transformation of regional innovation dynamics, the two latter are indications of a more collective form of change, and therefore symbols that wider regional path transformation is being orchestrated.

11.3.1 Organisational change

Organisational change has been discussed in particular in relation to the entrepreneurial university engagement model, as discussed in Chapter 2 of this thesis. It demonstrates universities' willingness to respond to external demands and align with broader opportunities and trends, even though greatly linked to university-industry engagement.

Findings in this thesis demonstrate an emerging dynamic alluded to in previous chapters: self-reinforcing university alignment with regional innovation policy, which involves changes in university organisational structures and arrangements. While this dynamic is referred to in several of the empirical chapters, it is explored and discussed in detail in Chapter 9 of this thesis. In this, the cases of the University of Aveiro and the Autonomous University of Barcelona illustrate how there has been a significant restructuring of university engagement structures to further align with regional and EU thematic priorities. The creation of what this thesis designates as strategic network interface units is, therefore, directly linked to university alignment with innovation policy priorities and methodologies. The recent emergence of these structures also suggests they are correlated with the evolution of innovation policy towards a more specialised, interactive and experimental framework, with universities leading on these collaborations. Chapter 9 therefore confirms that a change in the regional policy framework can lead to a



rethinking of the positioning of the university in the territory, and therefore organisational change occurs to respond to new demands and/or expectations.

Organisational change is not easily promoted, as deviating from existing arrangements can carry significant costs. It is a risky investment of funds and other resources towards an untested mode of working. However, it can also position universities in the frontline of these experiments, and further establish them as regional leaders. The emphasis of the external pressure for this organisational change does not intend to dismiss the importance of the endogenous processes that can prompt it. Both universities analysed in Chapter 9 have made several efforts towards better responding to regional expectations and opportunities. Nonetheless, the window of opportunity created by the regional innovation policy framework has confirmed a trend for the universities and diminished the risks in the experiment, spurring a transformation in the institutional path of the university.

Change is not straightforward, and these experiments are still finding their footing. Issues of internal alignment and legitimacy, especially, have hindered their full integration into the universities' broader engagement activities (University of Aveiro). Additionally, while these may be formally operating organisational structures for engagement, their capacity in stimulating constructive relationships between the university and regional partners is still unknown. And again, there are risks in this alignment with policy becoming constricting to the university agency and that of its academics and support agents. Nonetheless, the rationale and procedures of the regional innovation policy have allowed for the universities to consider their capacities, academic strengths, and areas of potential and restructure them in a cohesive way for regional external engagement.

11.3.2 Institutional change

Institutional change is here understood in the context of place leadership. Namely, it considers how broader processes and behaviours can be transformed. This section discusses how university agency and leadership in the regional innovation policy process has driven broader institutional change and therefore has the potential for transforming regional development pathways.

As discussed, empirical chapters have demonstrated several aspects of university regional contribution. In what particularly concerns institutional change, most of the empirical chapters demonstrate that universities have contributed to institutional capacity building. As examples, Chapter 5 details the University of Lincoln's Matchmaking Scheme, where universities have clarified their internal offer to firms and stimulated



clarification of external expectations in return. This contributed to facilitating strategic steering of priorities and activities by the regional government. The case study of the University of Aveiro in Chapter 6 demonstrates how the university has mobilised stakeholders for inter-institutional collaboration and has fulfilled administrative needs in regional government. Chapter 8 also provides evidence for multidisciplinary collaboration and other university and individual agency-propelled endeavours stemming from the University of Aveiro structural funds'-led projects.

Moreover, Chapter 9 suggests that the new units emerging from the organisational change discussed in the previous chapter have encouraged and optimised collective learning by building relational and institutional capacities. As a whole, this chapter furthers our argument that regional innovation policy can influence university organisational change and contribute to transform its institutional path; and in turn, universities can then more greatly influence the broader regional institutional landscape by creating spillovers from this organisational change to the broader region. While policy change or external influence is not necessarily required for this latter effect, it is an interesting dynamic emerging from this thesis.

11.3.3 Policy change

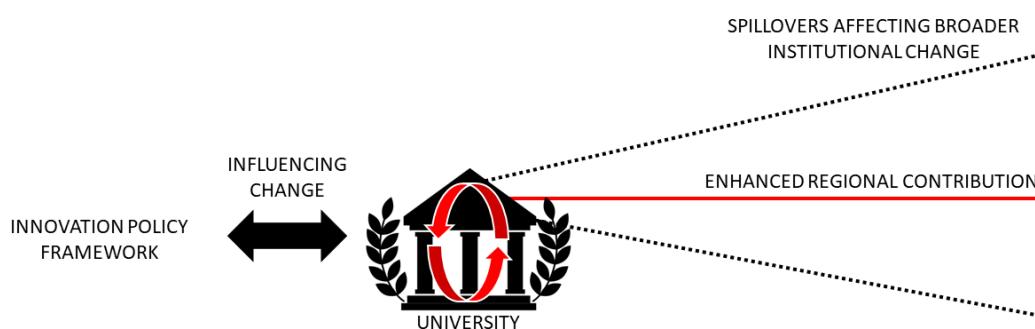
As described in Chapter 2, policy change refers to the process reinforcing or breaking down an existing policy monopoly or vision. Agency and place leadership are thus ways to influence on policy and divert it to more desirable regional visions. Chapter 4 suggests that for innovation policy processes to be constructive and build upon existing assets and repertoires for regional transformation, these must utilise what is referred to as “effectual reasoning”. This consists of a more flexible agency activation approach to collective strategy processes that considers a more adaptive response to emerging challenges. Policy change is inevitably a long-term process that thus demands institutional commitment. In this context, as more stable actors, universities can more easily support the flexibility and constructive process required to activate agency and influence policy change.

Several of the empirical chapters demonstrate how university-regional government collaboration has shaped not just the policy process, but the policy priorities emerging from it. Chapter 8 for example describes how the University of Aveiro has influenced the regional Smart Specialisation Strategy through its active participation and contact network, thereby increasing the probability of aligning its internal resources and strengths to funding opportunities. Chapter 4, 6 and 7 also substantiate this. While this influence may generate larger benefits for the region by steering it in a more successful

development path, it may also show the risk of policy capture by major regional institutions. As agglomerations comprising several different interests, universities may be more 'neutral' than other regional actors. However, their engagement in the policy process may need to be balanced with broader collective action to avoid monopolisation.

11.3.4 Driving wider regional transformation

Figure 22 - Illustration of change dynamics



Source: Author's own elaboration

This chapter has discussed how organisational, institutional and policy change can occur when in relation to universities' engagement with the innovation policy process. Empirical evidence has shown that the interplay between university and policy and/or regional government can not only shape the university's strategic and operational positioning, but further wider transformation in the region. Figure 22 illustrates this dynamic, where a broader innovation policy framework can meaningfully change university's internal operation. In turn, the university can shape policy, namely through the enactment of agency and leadership. With a renewed engagement structure, aligned with current regional needs and experimental thinking, universities can then provide wider regional benefits, leading to institutional change. Through this, universities may have an enhanced regional contribution for an idealised regional development path.

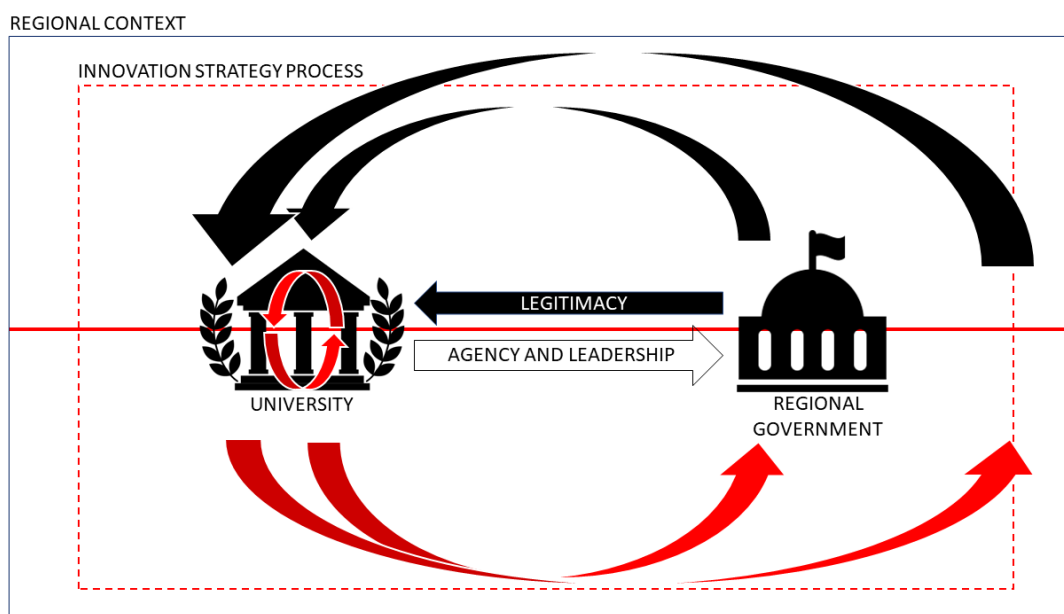
11.4. A new approach

In the conclusion of the critical realist process, this chapter provides a revision of the conceptual model (Chapter 2.4) and heuristic (Chapter 11.1.3) previously proposed. The goal is the conceptualisation of the conditions and dynamics that allow for universities to effectively engage with regional government in the innovation policy process and thereby address regional challenges. Therefore, this research work and conceptualisation have sought to go beyond the more simplistic and reductive views of university regional engagement, and in particular their engagement in the innovation policy sphere. From the knowledge gaps identified in Chapter 2.3 – namely those of university-regional

government engagement in interaction models, agency and place leadership and engagement in the policy sphere – and the empirical chapters (Chapter 4 to 10), key mechanisms and dynamics have emerged that allow for the enrichment of this conceptualisation. Alignment and legitimacy, as well as a further delineation of change dynamics, have provided an illustration of how universities position themselves and interact in the wider regional innovation policy arena, potentiating the collective capacities needed for the orchestration of regional transformation. Complex internal dynamics of universities, as well as the elements that affect collaborative interplays, have thus been considered.

The final conceptual model adopts a sort of spiral configuration. It starts with university internal alignment between strategic and operational reorientation to the region. This alignment is then reproduced in the collaboration with regional government and in the broader innovation policy process and framework. In turn, both regional government and innovation policy exert influence upon the university. In this idealised alignment, the university exerts agency and leadership in this engagement, which in itself has the potential to also expand to wider spheres. Similarly, this allows for university legitimacy to be acknowledged.

Figure 23 - A spiral model of university enhanced engagement in the innovation policy process



Source: Author's own elaboration

The key themes and mechanisms are therefore problematised and conceptualised within this 'spiral' model. By distinguishing between regional government as a partner and the



innovation strategy process as an arena, this has allowed for more granular research of the constraining and enabling factors involved in this form of university engagement. This results in an interplay that considers a careful balancing act, or a push-pull dynamic that could lead to a more collective and empowered response to regional challenges. Furthermore, this conceptual model considers the complex internal dynamics of universities, that greatly condition their external engagement.

This thesis has focused on trying to understand how universities, through their engagement with regional innovation policy processes, can address regional challenges and therefore contribute toward transformative regional development pathways. Findings indicate this is a complex dynamic that is enabled through a conscious and balanced internal and external alignment. Legitimacy is seen as a way to support university agency and leadership efforts by providing them with credibility in the region and enabling the university to build on their collaborative innovation activities. The regional context has provided a backdrop for analysing these interplays, and the region is ultimately the starting point and, ideally, the main consideration in this engagement. The output of this complexity is therefore a more detailed illustration of the regional innovation dynamics that can be shaped for an enhanced regional development contribution.



12. Conclusion, contributions, and suggestions for future research

This thesis aimed at exploring the role of universities in regional innovation policy and practice, more concretely how universities engage with regional government in innovation strategy processes and, through that, address regional development barriers. Section 1.1 set out an overview of the evolution of universities' roles in society, and particularly at the regional level. Section 1.2 described the increasingly associative character of regional innovation policies and demonstrated how institutions like universities are expected to contribute to these collective strategy processes and help the region achieve positive transformative change.

Section 2.1 established the problematic by analysing the literature on regional development and innovation studies, and identifying the tensions and barriers (e.g., lock-in, path inertia, institutional rigidity, mismatch between R&D offer and demand) that different regional contexts face in their development efforts. Section 2.2 proposed that universities, through their engagement with regional government in regional innovation policy processes, could contribute to resolving these tensions and barriers and thus activate regional development. Given these considerations, the problematic was then operationalised through a main research question and four sub-questions in Section 2.3.

Sections 4 through 10 provided the empirical evidence, in the form of publications, to allow for these questions to be answered, and Section 11 discussed these findings and proposed a new model to represent these concepts and dynamics. The answer to this thesis' main research question can be assembled from the answers to the sub-questions, which will now be addressed, in order to integrate the findings into the broader literature in Section 12.2.

12.1. Key results

Sub-question 1 (RQ1) – *How and under which conditions can universities effectively engage in the regional innovation policy arena?*

The empirical and discussion chapters have shed light on various experiences of university engagement in regional innovation policy processes. In the face of the complexity of the policy arena, it is demonstrated that through the mechanisms of alignment and legitimacy, and accordingly, through the activation of agency and leadership, universities are empowered in this engagement. While motivations and institutional policy landscapes and path-dependencies vary across regional contexts, it



was established that effective interplay can be orchestrated in diverse ways considering the same base mechanisms. Nonetheless, considering the complexity of this arena and the balancing acts involved between the involved partners and the influencing mechanisms, it is not realistic to assume this to be a straightforward or easy form of collaboration for universities. It is thus corroborated that further exploration of micro-processes is useful to estimate the actual capacity of university actors to engage in the innovation policy process and arena.

Sub-question 2 (RQ2) – *How do universities support regional innovation and development dynamics in their engagement with regional government in the innovation policy process?*

This question refers to the capacity for universities to address regional development challenges through this form of engagement. The potential for universities to contribute to their region was discussed in detail throughout this thesis and supported in the empirical chapters. Through engagement with regional government in the innovation policy process, universities have contributed to, for example, inter-institutional capacity building, regional problem-solving, the support of industrial infrastructure and general network building and management (see Table 22). The activation of university agency and regional leadership has enabled and/or extended on these governance roles, further asserting universities in their region through the attribution of legitimacy or credibility. Through this form of engagement, universities have also activated change processes, both internal and externally. In this are included the creation of organisational arrangements to consciously align with regional policy priorities (Chapter 9) and the efforts in influencing wider policy change (Chapter 8).

Sub-question 3 (RQ3) - *How does engagement in the regional innovation policy process shape universities' institutional and organisational structures?*

Empirical evidence has shown that university engagement with regional government and alignment with the innovation policy process and wider framework have spurred a rethinking of their institutional and organisational structures. This is approached in several of the empirical chapters, and more specifically in Chapter 9, which details universities' organisational adaptation in the creation of strategic network interface structures in the University of Aveiro and the Autonomous University of Barcelona. Dynamics of influence have also been noted in the empirical findings and discussed in Chapter 11.1.1. Specifically, regional government support and demands can help



university awareness of areas of academic strength and potential regional alignment and stimulate wider university regional engagement.

Sub-question 4 (RQ4) - *How and under which conditions can universities address regional needs and further innovation goals in different regional contexts?*

Finally, the regional context has served as a backdrop for this doctoral research as it enabled a richer comparative analysis. Each of the case studies included in this thesis was located in a distinct regional and national context, with particular regional challenges that need to be addressed. The case universities have been found to be able to address these challenges through their engagement in the innovation policy process and with regional government, albeit in imperfect ways (more detail on primary case universities in Table 22). Again, mechanisms of alignment, legitimacy, agency, and leadership act here as enabling conditions that allow for universities to, in this form of engagement, enhance their regional contribution and thus contribute to transform regional development paths.

Thus, the main operating question of “*How and under which conditions can university engagement in regional innovation policy processes address regional development barriers?*” is answered and conceptualised through a the potentially operative ‘spiral’ model (Chapter 11.4). This considers university engagement with regional government in a broader innovation policy process and arena, and the interplays that must be balanced – agency, leadership, alignment, legitimacy – for this collaboration to be enhanced and enact regional-wide change. Under critical realism this demonstrates the observation or discovery of something new, though not necessarily one that applies to reality. This ‘spiral’ model thus simply illustrates a potential dynamic, demonstrating that to address regional needs and trigger path transformation, universities’ internal structures and dynamics and external interplays of influence must be considered. By steering internal alignment, university’s regional orientation and action becomes more cohesive. This can thus activate university broader agency and leadership and legitimate its actions by other stakeholders on the regional innovation policy arena. Ultimately, these act as necessary conditions for universities, through innovation policies and practices, to contribute to positive regional transformation.

The following section (Chapter 12.2) will discuss how this doctoral thesis contributes to the overall theoretical debates on the literature that has inspired it – mainly, evolutionary economic geography and university contribution to regional development (higher education and regional studies). Subsequently, policy implications are discussed in



Chapter 12.3. Finally, limitations and directions for future work are explained in the final chapters of this thesis (12.4 and 12.5).

12.2. Contribution to theory

Part I of this thesis has highlighted that in a context of emphasis on collaborative forms of policymaking and the importance of knowledge for innovation, universities are increasingly expected to integrate the regional innovation policy process and contribute to regional development. However, this form of university engagement has had limited, though expanding, exploration in the academic literature. Theories and concepts on university engagement and regional development contribution have greatly focused on university-industry interaction. And while the topic is attracting interest, there are few studies on the micro-processes that allow for this engagement to occur, develop, and contribute to addressing various regional needs. Additionally, a multi-disciplinary approach would provide a better understanding of the complexity of this form of engagement and interplay. This would further allow for existing, though understudied, concepts to interrelate in a way that can model reality on the ground.

The following sections will thus describe the contributions of this multi-disciplinary and granular approach and highlight the utilisation of the different mechanisms and conceptual elements (e.g., agency, institutions) of this research. Ultimately, this section argues for the combination of these different concepts and theories for the enhancement of regional studies and a better understanding of universities, stakeholder interaction, regions, and development.

11.2.1 Regional development and innovation policy

This doctoral thesis has sought to contribute towards the theory and literature on regional innovation policy under the conceptual underpinning of Evolutionary Economic Geography. In recent years, multi-stakeholder processes have figured prominently in the regional innovation policy literature, though lacking in their exploration of the micro-processes that are involved in the collaborative construction of regional development pathways (Flanagan et al., 2010; McCann & Ortega-Argilés, 2015; Uyarra et al., 2017). This thesis thus advances this literature by emphasising the complexity of this process, and how an institution like the university can navigate it for an enhanced regional contribution. Specifically, this research suggests that activating institutional agency in a strategy process is far from simple. Beyond institutional actors, there are also individual actors involved in these processes, with their own interests at play. Particular attention in this thesis is given to universities and regional governments. Inevitably, at all levels,



regional actors are influenced and motivated by a range of contextual, historical, organisational, and operational factors that shape how collaboration materialises. This demonstrates a high variability to these processes, and a great potential for their comparative study.

Therefore, the deployment of successful collaborations and strategies for regional transformation requires more understanding of these constraining and enabling conditions, as well as of the micro-processes and ever-shifting dynamics needed for their effectiveness. Furthermore, there is a need to consider regional diversity in these studies, and avoid tendencies to focus on the innovative success of more developed or core regions (Eder & Tripl, 2019). Ultimately, and as the pandemic and subsequent crisis has demonstrated, there are regional challenges to be addressed everywhere. These do not simply need a 'tech'-focused, quantitative-based response. Intangible impacts are equally needed, and community engagement and social innovation, for example, are undervalued strengths. Attention is therefore needed to different environments in order to assess their various challenges but also unique opportunities.

11.2.1.1 Institutions

This thesis argues against assumptions in regional innovation theory that consider institutionally thick regions are always favoured in the innovation process. It highlights the existing barriers and challenges present in a variety of regional contexts, and demonstrates that institution building can occur across these – namely also in peripheral and less developed regions (McCann & Ortega-Argilés, 2016; Rodríguez-Pose & Wilkie, 2016).

The thesis also contributes towards studies on university institutional practices, demonstrating the conditions necessary in order to make their engagement in the regional innovation strategy process more efficient (Rodríguez-Pose, 2013).

11.2.1.2 Agency and place leadership

Explorations of agency and place leadership have gained more attention in the literature in recent years, exploring multi-stakeholder coalitions for policymaking (Grillitsch & Sotarauta, 2019; Sotarauta, 2018; Uyarra et al., 2017). However, the intersection of universities with these concepts and literature has only recently come to the fore (Benneworth et al., 2017; Raagmaa & Keerberg, 2017). This thesis has thus attempted to link these literature strands, taking into account debates on the role of higher education institutions for regional development. This aligns also with recent calls in EEG for more in-depth analysis of the concept and operationalisation of agency (Grillitsch & Sotarauta,



2019; Uyarra et al., 2017), namely placing emphasis on how actors are imbued with agency and contribute to change processes, which this thesis has attempted to foreground.

11.2.2 Universities in regional development

This thesis has contributed to the theory and literature on universities in regional development by, firstly, demonstrating that their roles in regional innovation strategy processes are multifaceted and go beyond mere knowledge provision. Secondly, it has also made efforts to provide detail on the operationalisation of university roles in this context, going beyond the simple identification of roles to, rather, understand who exactly within the university plays them, when and how they are played, and what are their estimated impacts. Thirdly, the why these roles are played was an important driving factor for this thesis as well, allowing for understanding the contextual features that shape university regional orientation, and thus what needs to be taken account for university regional engagement in policy processes to be triggered and better orchestrated.

Universities are therefore considered in this thesis as complex actors, agglomerating various interests, and playing multiple roles. Expectations on them performing in a certain way are bound to remain unrealised unless specific university agency and leadership wills it. The conceptual model presented in this thesis reflects that complexity of the university, not just internally but also in its regional positioning and engagement.

Additionally, the model and thesis overall contribute toward the analysis of the influence of university internal structures and dynamics for the exertion of agency and place leadership. In turn this then contributes toward the university regional contribution. Therefore, this thesis argues for the rethinking of the impact of university internal architecture, namely in the exercise of external engagement and collaboration.

Most of all, this thesis demonstrates the importance of analysing university's engagement with regional government and the innovation policy process. This contraries decades of focus on university-industry interaction and argues for further explorations of less studied aspects of university engagement and regional contribution. It also reinforces the institutionalist literature by considering how universities are shaped by external (policy) pressures. Overall, this doctoral research has focused on the fundamentals of innovation policies by analysing if and how universities can deliver on the high expectations being placed upon them to contribute to not only the innovation policy process, but regional development as a whole.



12.3. Implications for practice

With the policy process at the centre stage of this thesis, the empirical findings and discussion can provide a valuable and direct contribution to practice. First, the promotion of multi-stakeholder involvement in regional innovation policy processes highlights the need to not just understand how these processes can effectively function, but also how regional actors can be empowered to participate and advance regional development. Moreover, closer collaboration with these actors is suggested to build up trust-based relationships, alignment of interests, consensus-building, and commitment to a regional vision. The creation of collaborative initiatives and the promotion of shared collaboration spaces are a way to facilitate this understanding (Kempton, 2015). Inclusion of collaborative engagement repertoires and collaborative methodologies in a region can further relational and cognitive proximity, enhancing knowledge complementarities and institutional-capacity building (Aranguren et al., 2012).

Particularly emphasised in this thesis is the role of universities in these collaborative strategic processes. Therefore, it is recommended that policymakers take on the insights discussed herein to gain further understanding on how universities can take on strategic roles in the region and their agency can be developed in different regional contexts. A carefully weighted consideration of university roles in the governance process is recommended, mainly to ensure that other actors are not neglected in favour of these knowledge institutions. Policy capture should be avoided to ensure a fairer process. Additionally, overreliance on universities to support governance tasks may, as discussed, hinder the development of technical capacity in local and regional government. It is therefore suggested that an approach of 'learning how to fish' be employed, so that university knowledge and capacities are utilised to build up regional resources and institutional capacities, and not replace them.

Another practical implication is related to the influence of government and policy on university activities. This is not limited to higher education policy, extending to innovation policy frameworks. As discussed in this thesis, innovation policy priorities at multiple levels can shape university institutional positioning and trigger the wilful restructuring of university organisational structures. This can be adopted in various contexts, with policy serving to further relate regional needs with university areas of strength. Awareness of interdependencies is advised, as this may constrain the creative autonomy of university actors. Related to this influence of government, the clarification of needs is a crucial point that can not only facilitate university response to regional challenges, but also that of



other actors. Policymakers can therefore also exert influence – and lead by example – so that other stakeholders follow suit.

This thesis further emphasises the variance in policy processes and suggests there is a need for more evaluation of strategies. As previously referred, universities have largely participated across the policy process, except in the phase of monitoring and evaluation, which is virtually inexistent in the contexts analysed. Assuming this is the case in other regions, with evaluation being assimilated into the design process or skipped entirely, this suggests reflexivity in policy needs to be emphasised. Evaluation and monitoring also represent a policy stage where formative learning should occur. Universities are particularly equipped to contribute to this.

On the university side, this thesis suggests implications for both internal and external alignment and engagement. First, as suggested in the model herein presented, the promotion of internal alignment between managerial and operational levels is recommended. It promotes university cohesive action in the region. But mostly, it can stimulate internal cooperation and awareness of university capacities and strengths. For this, incentives for career development especially must be aligned with regional orientation, if this is desired to be promoted. Simultaneously, creative agency must be promoted as well in order not to ‘squash’ individual entrepreneurship and innovative thinking. Again, it is a fine balance. This internal alignment, however, will facilitate external action in exchange for legitimacy in the region, allowing universities to further assert themselves and enhance their regional contributions.

Universities should also consider if their capacities and engagement structures are being utilised to their full potential. Namely, if structures or arrangements are duplicated, if services and capacities are clearly communicated to the region, and if these support the broad range of potential partners and areas in which the university could be involved in. Related here, while regional engagement is emphasised here, this does not imply a dismissal of cross-regional, national, or international university engagement. This is equally important as it allows for the university to develop knowledge and network assets that may be embedded to regional needs.

12.4. Future research avenues

Suggestions for future work are also provided within the publications stemming from this research. This section will detail these, as well as use the scientific and practical recommendations presented in the last sections for a reflection on what future research avenues inspired by this thesis might look like.



First, this thesis has potential to be furthered by the continuation of work on universities' roles in the innovation policy process and their collaboration with regional government. As mentioned, it is an understudied topic that is growing in importance with the heightened focus on associative modes of governance in EU innovation policy and the overall role of knowledge in regional innovation and development. Even though this thesis has focused on the role of universities in these strategy processes, other institutions, organisations, and actors could be analysed in future research. Particularly, throughout the conduction of this research, there have been prevalent examples of government authorities and their staff at both local and regional level that have taken a lead on some aspects of this collaboration in strategy processes. Similarly, intermediate organisations (e.g., science parks, collaboration hubs), industrial associations and firms, and non-governmental organisations and citizen associations are often crucial innovation and knowledge actors and could provide valuable perspectives on innovation strategy processes and on regional governance. Thus, further research could also be conducted on the agency and place-leadership led and supported by these other regional actors and the interplay between them. Non-governmental organisations and citizen associations' engagement in these processes is especially understudied and may increasingly come to the fore with the growing emphasis on inclusive and sustainable transformative change.

Second, while this thesis has considered path-dependence and past experiences in university-regional government engagement in a region, it has mostly focused on the 2014-2020 programming period of EU Cohesion policy. This work thus has the potential to be reproduced in future programming periods, analysing policy trends in both innovation and higher education, as well as exploring the more long-term institutional and regional impacts of universities' engagement in these strategy processes. The continuation of the Smart Specialisation framework in the 2021-2027 period could allow regional government authorities and regional actors to become more familiar with its bottom-up associative methodology and allow for a comparative analysis between these two periods.

Third, a more granular, in-depth analysis of the individual actors involved would provide a perspective on relevant institutional entrepreneurs or boundary-spanning agents that play a crucial role in establishing, maintaining, and transforming this university-regional government link. Similarly, an analysis of the resulting projects and initiatives emerging from this university engagement in the regional innovation strategy process has the potential to not just identify strength areas within the university and other regional



partners, but can also shed light on organisational arrangements, inter-institutional dynamics in implementation, and the effective impact of these projects on regional development. Contrasting with the more granular approach, a broader scope study could also be carried out, including more universities in other regional contexts to enrich the comparison, strengthen the reliability of the findings and expand on them.

Lastly, upcoming publications are planned based on this doctoral work, namely focusing on university engagement with Smart Specialisation Strategies in the three main regional settings of this thesis. The objective is to reflect on the policy traps that may originate from such a strategy process, analyse how or if universities could help overcome these shortcomings, and consider the lessons that can be taken from this for the future of Smart Specialisation and other regional strategy processes. A more planning and public policy-centred perspective could thus be used in future work to cultivate the research work and findings of this thesis.

12.5. Limitations

It is life's inevitability that all work will carry its own limitations. Although this study is considered to have met the aims and objectives set out at the start of the research project, this doctoral work is no exception. While some limitations have been described in each of the publications inserted within this thesis, this section will discuss these in more detail, considering implications and perspectives for future work.

The first main limitation is related to the very nature of case study research and of the doctoral project as inserted within an H2020-funded Marie Skłodowska-Curie Innovative Training Network. Projects benefitting from this grant are generally pre-planned, with pre-stipulated thesis coordinators for each Early Stage Researcher, with case studies defined and research stays anticipated at other institutions within the project network. Among other benefits, this grants the researchers a privileged position among other doctoral students. Nonetheless, it also limits the flexibility of the student within their own doctoral research project. While the relevance of the cases is justified, their choice is also greatly based on convenience bias and accessibility of data. Within this project, the author/PhD student was expected to fulfil a six-month research stay – divided into two separate visits – to the Autonomous University of Barcelona. However, research considerations led to modifications to this restrictive plan: namely, given the necessity for rich material for regional comparison and the focus on higher education and innovation policy, it was deemed appropriate for one of these research stays to be altered to another partner institution, namely the University of Twente. Highlighted here is the



limitation of having to work within the confines of a pre-defined project, where not all the researcher's proposed modifications will be accepted. Nonetheless, support by the network community provided the PhD student with the means and feasible alternatives for the benefit of the doctoral project. Furthermore, active reflection on the research project enabled the continuous adjustment necessary for its realisation.

Second, the researcher carried out its doctoral studies and was also placed as an employee at the University of Aveiro, where part of the data collection for the doctoral research project also took place. By conducting doctoral studies at this university, the researcher had more data available for this case study than others, resulting from course work or contacts made in this academic community and region. This originated an imbalance in the data, which the researcher sought to correct by carefully selecting the relevant interviews for each paper included in this thesis. Nonetheless, all interviews conducted are accounted for in the methodology section of this thesis. The researcher was professionally embedded within an institution from which they were meant to produce a critical analysis. The author thus had to find alternative ways that would enable a certain distance between themselves and the context of work. Research stays and active engagement and collaboration with the academic community facilitated by the Innovative Training Network contributed to this, enabling this more critical distancing and reflection that allowed for a more objective analysis of the Aveiro case-study. The thesis' central problematic, the comparative methodology and the adequate conduction of data gathering served as anchor points for an unbiased view. Furthermore, the stylisation and confidentiality provided to the people and groups involved in the research granted the possibility for a more critical appraisal of the context by the actors.

The third limitation is an ontological one, related to the philosophical stance permeating this doctoral research. Finalising the critical realist research process implies the proposal of novel theoretical structures based on empirical observation. While such structures have been suggested in Chapter 10, these are meant to serve as merely the starting point for future work and are not definite or attributed the full authority of theory. There may thus be a lack of ontological closure in this work, even though theoretical contributions have been made (Chapter 11.4). Similarly, the recommendations formulated for various stakeholders, while based on theory and empirical results, have not been verified in practice, and therefore the author cannot vouch for their effectiveness in implementation.



13. References to Chapters 11 to 12

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14. Annexes

Annex I: Key concepts

The concepts collected in this annex refer to how these terms are utilised in this thesis. Therefore, these definitions pertain to their consideration in this dissertation, and are not meant to be all-encompassing descriptions of these terms.

University

An institution that delves into both the pedagogical process of teaching and knowledge production through research. In this thesis, the term is used as a shorthand or abbreviation for a diverse range of higher education institutions – e.g., public or private universities, polytechnics, colleges – that encompass various active academic communities in an assortment of disciplines.

Region

A territorial scale and context where local actors and organisations conduct the activities related to the phenomena studied in this thesis. This definition is based on those of Boschma (2004), Grillitsch & Sotarauta (2019) and Nieth (2020), for which regions are not predefined, but described as a territorial context that can only be uncovered empirically, that is, by revealing the scale at which the phenomenon in question occurs. Nonetheless, the regional territorial scale is mentioned throughout the empirical chapters of this thesis in both NUTS II and NUTS III levels, in order to provide an understandable frame of reference.

Governance

A form of multiorganisational action in which public and private actors engage in problem solving in conjunction with other societal actors, for the strategic steering of society. It encompasses interaction among structures, processes and traditions that determine decision-making, power, responsibility, and stakeholder involvement. This definition is based on the work of Asaduzzaman & Virtanen (2016), and references therein, namely Graham et al. (2003) and Kooiman (1993).

Throughout this thesis, other terms were used with no analytical or conceptual intention, namely those of power, authority, legitimacy, performance, and trust. Their function is merely descriptive.



Annex II: RUNIN project²²

The author of this thesis is an Early Stage Researcher in the H2020-funded Marie Skłodowska-Curie Innovative Training Network RUNIN, or the Role of Universities in Innovation and Regional Development (call H2020-MSCA-ITN-2016).

The RUNIN project involves a total of fourteen early stage researchers pursuing their doctoral degree at the project's partner universities, in seven different European regions. These universities are: Aalborg University (DK), University of Stavanger (NO), University of Lincoln (UK), University of Twente (NL), Autonomous University of Barcelona (UAB), Linköping University (SE) and University of Aveiro (PT). The aim for these PhD fellows is to contribute to the interconnection of the fields of higher education, regional development and innovation, specifically exploring universities' regional roles and the range of their external engagement, and identifying practices and policies universities and regional stakeholders can adopt to improve regional innovation.

In order to explore the different facets of this dialectic between universities and their region, four research themes or working packages were developed within RUNIN's research programme. The author of this thesis, Liliana Fonseca, is a part of the second working package.

- **People and Networks** – explores knowledge transfer between universities and firms, focusing on the role of individuals and their networks;
- **Policies and Interventions** – delves on university-public policy interactions, with universities being recognised as both subjects of policy interventions and participants in policy networks;
- **Places and Territories** – considers the influencing role of territory on university-firm engagement, from local to global production structures and value chains;
- **Practices and Governance** – examines changing modes of university interactions with regional stakeholders and their influence on university governance and engagement arrangements.

²² This annex provides a summary of the RUNIN project proposal. For more information, please refer to the RUNIN webpage: <https://runinproject.eu/>



Annex III: About the author

Liliana Fonseca is a PhD Candidate at the University of Aveiro (PT). She is conducting her PhD research as a Marie Skłodowska-Curie Early Stage Researcher within the Innovative Training Network RUNIN (The Role of Universities in Innovation and Regional Development). She is also currently a Research Assistant at the European Policies Research Centre of the University of Strathclyde, in Scotland (UK), focusing on the areas of public policies, sustainability and regional development.

Liliana obtained an MSc in Eco-Cities from Cardiff University's School of Geography and Planning (UK), and a BA in Political Science and International Relations from the Faculty of Social Sciences and Humanities of the New University of Lisbon (PT). Before pursuing her post-graduate degrees, Liliana worked in academic and research-related administrative services, and as an international business developer in countries like France, Spain, the Dominican Republic and Senegal.



Annex IV: Overview of the data, methods, and case-studies in the thesis' publications.

Chapter	Title	Authors	Purpose of the study	Data sources	Methods & Analysis	Cases/Regions (external in parenthesis)
4	Embedding entrepreneurial regional innovation ecosystems: reflecting on the role of effectual entrepreneurial discovery processes	Nieth, L., Benneworth, P., Charles, D., Fonseca, L. , Rodrigues, C., Salomaa, M. & Stienstra, M.	Study on the different approaches to regional innovation strategies, namely through the causal vs effectual categorisation, and which factors encourage one approach versus the other, specifically in less developed regions.	<ul style="list-style-type: none"> Literature and other documentary evidence; Semi-structured interviews. 	<ul style="list-style-type: none"> Exploratory-hermeneutic; Comparative case-study; Thick description approach; Stylization and schematic abstraction of regional strategy processes. 	<ul style="list-style-type: none"> Aveiro, PT; Twente, NL; (Lincolnshire, UK)
5	The role of universities in building dense triple helix ecosystems in sparse regional environments.	Salomaa, M., Fonseca, L. , Nieth, L., Benneworth, P.	Study on the roles universities play in sparse environments in building triple helix (collaborative) relationships and stimulating regional innovation processes.	<ul style="list-style-type: none"> Literature and other documentary evidence; Semi-structured interviews. 	<ul style="list-style-type: none"> Exploratory-hermeneutic; Comparative case-study; Thick description approach; Stylisation of collaborative initiatives in the regions. 	<ul style="list-style-type: none"> Aveiro, PT Twente, NL (Lincolnshire, UK) (Satakunta FI) (North Denmark, DK)
6	Designing regional development: exploring the University of Aveiro's role in the innovation policy process	Fonseca, L.	Study on the dynamics of collaboration between universities and regional government authorities in the innovation policy process, and how this in turn shapes innovation policymaking and	<ul style="list-style-type: none"> Literature and other documentary evidence; Semi-structured interviews. 	<ul style="list-style-type: none"> Exploratory; In-depth single case-study; Thick description approach; Thematic analysis and theory-building. 	<ul style="list-style-type: none"> University of Aveiro, PT



			institutional capacity in a less-developed region.			
7	The role of universities in regional development strategies: a comparison across actors and policy stages	Fonseca, L. & Nieth, L.	Study on the roles of universities and university actors in designing, implementing and evaluating regional development strategies, providing a granular analysis on actor participation within the different policy stages.	<ul style="list-style-type: none"> Literature and other documentary evidence; Semi-structured interviews. 	<ul style="list-style-type: none"> Exploratory; Comparative case-study; Elaboration, application, refinement and validation of conceptual framework; Pattern identification and stylisation; Theory-building. 	<ul style="list-style-type: none"> University of Aveiro, PT University of Twente, NL Autonomous University of Barcelona, ES (Aalborg University, DK)
8	Entrepreneurial universities and regional innovation: matching smart specialisation strategies to regional needs?	Fonseca, L. & Salomaa, M.	Study on the role of entrepreneurial universities in the implementation of regional policies driven by S3, and the universities' potential in matching regional assets, needs and policy priorities.	<ul style="list-style-type: none"> Literature and other documentary evidence; Semi-structured interviews; Centro 2020's dataset on SF projects. 	<ul style="list-style-type: none"> Mixed methods through the use of both qualitative and quantitative data and analysis; Exploratory; In-depth single case-study; Thick description approach; Thematic analysis and theory-building. 	<ul style="list-style-type: none"> University of Aveiro, PT
9	The organizational adaptation of universities to smart specialization: the emergence of strategic	Fonseca, L., Rodrigues, C. & Capelleras, J.-L.	Study on the context of creation, integration and operationalisation of new engagement mechanisms within universities, the organisational adaptation to regional	<ul style="list-style-type: none"> Semi-structured interviews. 	<ul style="list-style-type: none"> Exploratory-hermeneutic; Grounded theory; Comparative case-study; Theory-building; Stylization and schematic abstraction of 	<ul style="list-style-type: none"> University of Aveiro, PT Autonomous University of Barcelona, ES



	network interface units		innovation policy associated with their emergence, and the implications for inter-institutional dynamics in the regional innovation system.		university engagement mechanism.	regional	
10	Universities and place leadership – a question of agency and alignment	Fonseca, L.; Nieth, L.; Salomaa, M. & Benneworth, P.	Study on the influence of universities' institutional architecture in their assumption of regional leadership roles, and the role of agency in policy and development processes.	<ul style="list-style-type: none">• Literature and other documentary evidence;• Semi-structured interviews.	<ul style="list-style-type: none">• Exploratory;• Comparative case-study;• Theory-building through pattern identification;• Application, validation and refinement of a predefined conceptual framework.		<ul style="list-style-type: none">• Aveiro, PT• Vallès Occidental, ES• Twente, NL• (Lincolnshire, UK)• (Satakunta FI)• (North Denmark, DK)

