



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND



University of Lapland

This is a self-archived version of an original article. This version usually differs somewhat from the publisher's final version, if the self-archived version is the accepted author manuscript.

Higher Education Institutions as Knowledge Brokers in Smart Specialisation

Kangas, Riikka; Aarrevaara, Timo

Published in:
Sustainability (Switzerland)

DOI:
[10.3390/su12073044](https://doi.org/10.3390/su12073044)

Published: 10.04.2020

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Kangas, R., & Aarrevaara, T. (2020). Higher Education Institutions as Knowledge Brokers in Smart Specialisation. *Sustainability (Switzerland)*, 12(7), [3044]. <https://doi.org/10.3390/su12073044>

Article

Higher Education Institutions as Knowledge Brokers in Smart Specialisation

Riikka Kangas * and Timo Aarrevaara

Faculty of Social Sciences, ProSoc, University of Lapland, FIN-96400 Rovaniemi, Finland;
timo.aarrevaara@ulapland.fi

* Correspondence: riikka.kangas@ulapland.fi

Received: 28 February 2020; Accepted: 8 April 2020; Published: 10 April 2020



Abstract: The effectiveness of societal interaction has become a key aspect in evaluating the success of higher education institutions (HEIs) in performing their duties. These factors have been built into institutional funding models, and the funding of research follows a similar approach. External stakeholders are now having to share in undertaking some of the functions that will define higher education institutions' external activities, societal interaction and impact on society. The European Union's smart specialisation strategy is such a factor. This initiative allows higher education institutions to implement policies by building regional clusters. The counterparts of higher education institutions in these clusters of smart specialisation are knowledge-intensive enterprises, high-tech service providers, educational institutions, the Arctic Smartness Specialisation Platform and other centers of expertise for smart specialisation. In this paper, we have analysed the role of higher education institutions as knowledge brokers in smart specialisation through a qualitative analysis of 20 interviews conducted during the implementation of the smart specialisation project. Our findings show that the knowledge broker role can be promoted from four perspectives: the social dimension of networks; decision-making and control; cluster building; and exchange elements. The clarification and legitimization of the role of higher education institutions as knowledge brokers in these areas would give smart specialisation more impetus to reach its goals.

Keywords: higher education; knowledge brokers; knowledge intensive policies; smart specialisation; innovation ecosystems

1. Introduction

The European Commission is aiming to boost economic growth and jobs with the European Cohesion Policy and the Strategies for Smart Specialisation (S3) initiative, as a part of the Europe 2020 Strategy for smart, sustainable and inclusive growth. A total of €330 billion has been applied to the task of increasing European economic competitiveness and social welfare through research and innovation during the 2014–2020 funding period. All member states have research and innovation strategies for smart specialisation, and the regions are integrating development efforts and seeking financial support from the European Regional Development Fund (ERDF).

The objective of S3 is economic development through regionally driven priorities that correspond to the efficiency, research and innovation-related demands of the knowledge economy and knowledge society. It is about allocating the resources of research and innovation to enhance priority areas of regional funding, governance and regulation, forming a regional policy mix. It emphasises the importance of relationships between various institutions and stakeholders and encourages institutions to change by diversifying their position and goals in a global context [1,2]. A notable aspect of smart specialisation is whether or not it is the most ambiguous regional innovation policy in the world: there have been no pilot projects, nor was empirical evidence produced before it was launched.

Implementation occurred without any direct rules or guidelines for the actors or institutions to find their position in the changing environment [3,4].

Smart specialisation emphasises a place-based approach and the central role of the relational infrastructure of public institutions, as well as public and private sector cooperation, as a source of promoting regional growth [4]. However, even if public institutions including HEIs are embedded into the regional innovation system, there might also be also a gap in understanding among university management personnel about what the regional challenges are [5]. In this regard, public investment is the main source of the production of regional innovation systems, and transparent higher education institutions (HEIs) and other public institutions directly complement the support of innovation measures [1,6].

Actions to support the regional innovation system are developed through two main functions. First, the public HEIs and other research organisations have a role as a generator of new knowledge sub-systems. Second, companies and industries have a role as exploiters of knowledge sub-systems [7,8]. Earlier studies of the role of universities in smart specialisation redefined the classification of the two sub-systems mentioned above. The direction of research findings shows that, not only there are two separate roles for public and private institutions and organisations, but these roles are more diversified in the regions. Especially in small and less-developed regions, the role of public research organisations, like universities, is to have a more central role in generating and exploiting knowledge for firms and industries [4,8,9]. Previous studies have also shown that public institutions and other public resources have a significant role in regional development as institutions that connect and produce organisations and competence [1].

The roles of HEIs in processes based on smart specialisation implementation are diverse. There have been few case examples about HEIs' participation in S3 processes in regional areas, but it has been recognised that, especially in sparsely populated areas and less developed regions, HEIs tend to have had a minor role in knowledge production [10,11]. Changing practices guide the regions in coping with a changing operating environment [12]. HEIs can increase building infrastructure and administrative mechanisms to deal with knowledge absorption and new connections via institutional management [5,10]. The core missions of smart specialisation is to increase the competitiveness and sustainability of regions through specialisation activities. Internationalisation and linkages outside regional borders are significant when discussing sustainability and innovation potential. With the knowledge broker activities of HEIs, it is possible to improve at least the capacity of regional information management, exchange and linkage of knowledge, as well as the capacity building of actors in innovation systems [13].

Our aim with this paper is to analyse the role of higher education institutions as knowledge brokers in the European Union's smart specialisation program. How do knowledge brokers increase the competitiveness and internationalisation of regions? In this regard, HEIs can take a role that influences the effectiveness, interaction or renewal of the actors' work.

2. Increasing the Competitiveness of the Regions with Knowledge

HEIs as knowledge brokers in smart specialisation refers to their ability to achieve political goals, but also to the task of HEIs to increase the effective use of knowledge in regional and international networks and develop the knowledge society. Competitiveness and sustainability through responsible actions in the regions are leading goals to pursue, especially in sparsely populated areas. Responsibility that leads to sustainability forces research to be conducted about the changing role of universities in society. Understanding the development of society provides a basis for the changes needed.

2.1. Knowledge Brokers in Smart Specialisation

In regional development and innovation networks, the knowledge broker's role is to act as a gatekeeper, and to provide multiple overlapping groups with similar explanations as gatekeepers to multiple overlapping groups when knowledge brokering makes knowledge sharing possible for

other actors in the innovation system. In the literature, few academics seem to have a direct impact on companies or have contributed to technological development in their regions [14]. Since few academics are working in this field, their importance to institutions' embeddedness in the regions is crucial. These actors are described in this paper as "knowledge brokers". Our aim in this paper is to describe the knowledge brokers as individuals in HEIs. Individuals facilitate the transfer of knowledge between various groups based on institutional strategies and mandates [15–17].

The concept of the knowledge broker refers to the literature of boundary work between science, industry and policy, and communication, translation and mediation work within those boundaries [18, 19]. The knowledge brokers can be defined as organisations such as firms, public authorities or associations, and acquire and exchange knowledge to foster competitiveness [19]. In this case, they can be defined as collective actors and as individuals working in HEIs [20] providing knowledge-brokering goals and strategies from different organisational perspectives [19]. Knowledge brokering can be seen as processes, organisations, or individuals that increase or connect relationships, co-evolution and knowledge production between academic actors and other actors in policy processes [21]. Institutions and individuals as knowledge brokers analyse the impact and use of datasets and classify the roles of networks and levels of knowledge and knowledge transfer [21]. The actions of knowledge brokers in the communicational decision-making process must increase effective communication. The literature identifies brokers as third-party members; that is, they are trusted, and they facilitate the knowledge brokerage activity [22]. However, HEIs are still key actors in the transfer of knowledge and enhancing innovation as a part of the knowledge-brokering process [4,23]. In this regard, we will define the knowledge broker's role in the concluding section. There are many alternative frameworks to define knowledge brokers in publicly funded organisations, but knowledge brokers have often been undefined or unrecognised [17].

The knowledge broker's role includes a broad range of activity, and they are seen as actors in the system framework, focusing on knowledge production, management and passive communication. The knowledge broker's most important role seems to be being in charge of the knowledge production and valorisation process, in which knowledge is not transferred but is valorised (redefined and valued) into a format to be utilised in another context [16]. The result of a knowledge broker's efforts might be financial, but in the case of a HEI it can also be an operational model that strengthens the institution's role in society and its service practices. A result of knowledge brokering can be support for evidence-based decision-making or other utilisation of knowledge. Thus, the main product of a knowledge broker may be the legitimacy of the HEI. Indeed, knowledge brokers can be described as knowledge exchange professionals, often associated with work conditions, casualisation and performance management demands [15].

In the knowledge broker position, HEIs would be able to develop smart specialisation actions that support the program objectives, but also enhance the development of the knowledge society. HEIs have access to global knowledge sources, as well as national and regional sources, so they can recombine and enhance knowledge diffusion for multiple needs. In networks, knowledge brokers acquire knowledge from partners in their network more often than from partners without knowledge broker positions [16,24]. Smart specialisation activities are embedded in a fundamental role of HEIs, but with particular emphases. University—industry linkages and the HEI's core role are naturally formulated in the S3 process, but with the knowledge broker role it is possible to add impetus for HEIs to promote future policies, and to increase the use of the knowledge which has been embedded in regions and largely in public and privately funded institutions [25].

There is growing evidence that HEIs have adopted the role of knowledge broker [26]. This role is even defined as a sign of a postmodern profession which has links and embedded institutional connections to platforms in the innovation process. Especially in the regions, with the absence of large firms, there is a growing need for public knowledge brokers [11,13,16,26,27]. The Smart Specialisation strategy will provide empirical evidence of the manner in which these phenomena can become more collaborative and more visible.

In regions with major industries, entrepreneurs are often found in the role of knowledge broker. In smart specialisation programs, HEIs have a role that can be defined as being a knowledge broker for regional, national and international actors. These roles are crucial, mostly because other organisations, including industry, are not in direct contact with each other. The HEI's role is based on collaborative actions, the trust of society, and the engagement of stakeholders for cluster building [28]. As research has shown [29], currently it is important for HEIs to increase the emphasis on the wider usefulness and uptake of research, which will increase the mobilisation of knowledge and enable the emergence of innovation.

2.2. *Creating a Sustainable Knowledge Society*

In contrast to the industrial economy and competitiveness, the knowledge society focuses more on the production, valorisation and the usability of knowledge in different contexts [12]. Knowledge enhances actors' understanding of drivers for the future, in which knowledge, research and education, as well as human capital and new technologies, are the components shaping the knowledge society [30].

Integration policy in the EU can be accomplished by reforms and implementation projects which also enhance the functions of the knowledge society. From the perspective of European higher education policies, the European-level integration policy and knowledge society policy have enabled new development conditions. The underlying idea was to increase the competitiveness of Europe by building an innovation-sensitive society with common rules for the welfare society [31] (p. xxxvi).

A key level of analysis in this paper is the HEI as a knowledge-based organisation. Individuals working in HEIs are engaged in their own institutional structure, and HEIs are embedded in broader systems such as national innovation strategies and networks [32]. In this way, HEIs also strengthen the legitimacy of their activities by supporting companies and knowledge-using organisations both regionally and locally [14]. A key element for implementing the embeddedness of HEIs in their urban and regional surroundings is achieving mutual benefits [33]. In this regard, the Smart Specialisation Program highlights the roles of individuals and institutions as knowledge brokers. Competitiveness and internationalisation are the policy goals of smart specialisation and goals for HEIs. Regional collaboration and cluster strategies are also important for HEIs, because they embed HEIs tightly into the regional structure, leading to significant investment [34].

In this paper, we find universities and universities of applied sciences to be actors in national innovation systems. The system of universities of applied sciences was being formulated in the early 1990s, and, since then, their foci have been on teaching and regional impact. The Polytechnics Act (2013) in Finland strengthened their role in research, and several mergers with universities have legitimised their role in the innovation system. The Universities Act (2009) emphasises universities' role in national and international research systems, and their role in teaching and societal impact. The third key actor in the research sector in the Smart Specialisation Program comprises research institutes, and they have a key role in sector research and a major regional impact [35,36]. In the Finnish case, their regional role and contributions to the regional economy are the driving force behind innovation. From this angle, HEIs have a special regional mandate, referring to legitimacy which is based on factors related to economic growth and well-being. The strong regional impact also provides a possible role for influential individuals as academic entrepreneurs [9,28]. In Section 4, our analysis recognises the role of knowledge brokers in particular in this context.

Strategies to increase universities' competitiveness have changed their focus to emphasise the creation, transfer and application of knowledge. R&D actions, the application of knowledge and the ability of higher education to create and transfer knowledge have especially been a central focus for the development of ideal institutional profiles [37,38]. Competitiveness-related institutional strategies have changed the nature of the knowledge required. Stronger emphasis on R&D actions based on scientific grounds is seen as a key factor accelerating economic growth and persistence.

HEIs are key actors in developing wealth in society and the knowledge economy. The role of HEIs is as key players in knowledge production, and their entrepreneurial mission as players in the

Quadruple Helix for science and knowledge [39]. HEIs are strategising their activities to fulfill wealth creation demands in society by co-creating activities. In general, the role of HEIs in the regional innovation system is necessary because of the longstanding experience and embeddedness of funding systems and international research systems, as well as the experience of developing framework programs [40].

The importance of HEIs can also be seen from other perspectives. Firstly, their role as active knowledge brokers encourages institutions to change their structures and networks to be more innovative in a way that increase innovativeness and long-term relationships in national innovation systems as well as in global innovation networks [7]. Secondly, the mission-oriented universities face many demands from society. The development of a knowledge society requires the fulfillment of certain expectations, such as funding models when regional and international networks are seen as a requirement for effective action from universities. This connects universities more closely to society [29].

The literature on the role of HEIs in innovation systems points out the importance of knowledge-brokering actions. Without these actions, there is a risk that innovation activities will not be based on scientific knowledge. The academic knowledge produced is used for other purpose and not for local networks [16]. From the regional perspective, the absence of university knowledge brokers refers to the lock-in discussion of the need for knowledge transfer, management and linkages across borders as a mix of specialised regional knowledge and globally dispersed knowledge. These are crucial for solving the problems of inflexibility in the innovation system and enhancing the potential for innovation. In the end, all these problems reflect the political achievements and the evolution of smart specialisation, as well as increasing the use of knowledge and the absorptive capacity of enterprises. These activities reduce the sectoral differences between industry and HEIs and can create a more common regional future based on shared visions and the in-betweenness of sectors; they can also create sustainability [5,13,24].

3. Materials and Methods

The data in this paper were collected from the implementation project of Smart Specialisation strategy- Arctic Smartness Excellence project (ASE) in the Lapland region of Finland. Smart specialisation in Lapland is based on the Arctic Smart Specialisation strategy that was published in 2013 [41]. Smart specialisation is based on cluster activities, strengths, value chains and new forms of cooperation in the Lapland region. The analysis of multiple projects and the strengths of the industries are the basis of the construction of five clusters. The construction of clusters is mostly made by regional authorities, research organisations and HEIs, and actions are based mostly on public projects.

For this paper, documentation on smart specialisation and interviews have been examined. The data include 20 interviews with key actors in regional smart specialisation, including cluster managers, members of the program board, management of the participating organisations, officials of the funding organisation and representatives of the enterprises. Actor groups in Arctic Smart Specialisation are clearly identifiable, and for this reason the organisation has not been named, but the interviewees' gender and status in the organisation have. The topics for the semi-structured interviews were knowledge, collaboration, leadership and the role of companies in Arctic specialisation.

Interviewees were selected according to the structure of the ASE project. Partner organisations had their key actors in project roles in the clusters or work packages of the project. Also, some interviewees were selected from outside the project in order to provide more holistic perspective of regional development and innovative actions based on funding instruments. Because the clustering is at an early stage in Lapland, only three participants from companies belonging to the cluster were selected. The core parameter for selection was that interviewees were leaders of the program or clusters, members of clusters or work packages, funding agencies or companies related to cluster activities. The organisations, their roles and the contribution of the interviewees' are presented in Table 1.

Table 1. Organisation and role and contribution of Interviewees’.

N	Organisation	Role	Contribution
4	Regional Council of Lapland	Members of the program board, funding authority, developer organisation	Creation of specialisation, S3 participation and implementation, actions relations to policy instrument, subprojects and thematic platforms
2	University of Lapland	Project and cluster management	The direction of the project, coordination and development of Arctic design cluster
4	University of Applied Sciences	Cluster management and member of program board, developer organisation	Coordination and development of Arctic safety and Arctic development environments clusters, relation between specialised areas and funding opportunities
3	Centre for Economic Development, Transport and the Environment	Funding authority, network and innovation cooperation	Clusters vs. innovation project, cluster building and regional strengths and funding
2	Rural advisory services	Cluster management, developer organisation	Coordination and development of Arctic rural network cluster, cooperation with entrepreneurs
2	Development centers	Cluster management and program collaboration, developer organisation	Coordination and development of Arctic industry and circular economy cluster, value chains and cooperation with companies
3	Representatives of enterprises	Emerging industries, organisation of entrepreneurs and company collaborating in cluster activities	Needs of entrepreneurs, needs and future directions of health sector, willingness of companies to join cluster activities

The data were collected between December 2016 and February 2018 and include an estimation of the regional actors’ investments in the realisation of smart specialisation objectives. The data for this paper were based on the program documentation and interviews with representatives of Research and Innovation Strategies for Smart Specialisation (RIS3) implementation in Lapland. The document analysis also included the perspective of the ERDF funding instrument for the ASE program and definitions of the smart specialisation clusters. The data from the ERDF funding instrument shows the number of projects funded by the ERDF in Lapland in 2016, and therefore complemented the interviews and constructed the basis for understanding the capacity building and other needs of the region.

The analysis was carried out using NVivo software, using qualitative content analysis to have a flexible but systematic analysis of the role of universities in smart specialisation. The analysis was based on analytical concepts (nodes) of network cooperation, knowledge capacity, the role of actors and project management. Nodes were combined into the main nodes and subnodes were created under each main node previously introduced. Subnodes were decision-making, control and roles in decision-making bodies, prerequisites for continuity, the role of companies, the needs of the companies, the roles of public organisations and subgroups, competence and knowledge, the growth of competence and effectiveness, as well as change with cooperative network actions. NVivo subnodes are categorised between those having something in common [42] (pp. 105–106). Four key themes of defining knowledge brokers were created by generalising the subnodes and they are cluster building, decision-making and control, the social dimension of networks and exchange elements. Themes have been introduced in the conclusion section, and those themes introduce the four dimensions of knowledge brokers in the case networks.

Even though the analysis for this paper was based on concept-driven content analysis, the data had the most important role in creating the subcategories, and the coding frame itself provides a comprehensive description of the data collection [43] (pp. 170–173). The analysis of the networks revealed the functional opportunities that could be provided by the clusters, and the results of the program have been verified by the concepts of external effectiveness, reflexivity and societal interaction and the interpretation of knowledge brokers.

The data provided information on building knowledge as capacity for the key actors, and the support of the program in terms of funding, competitiveness, digitalisation and sustainable development of the environment. The purpose of these perspectives is to make the strategic priorities and effectiveness visible. Regarding external effectiveness, the criteria should be clarified for openness

and locality. Transparency refers to changes in work practices that improve the ability to achieve goals. Locality refers to activities that support the construction of clusters that are linked to the capacity-building functions of the regional actors. The criterion of external effectiveness is based on the smart specialisation monitoring definition, which emphasises learning, trust and accountability [3].

4. Analysis

The smart specialisation funding instrument is configured here in line with cluster policies, which were carried out purposefully and were formed with the evaluation of research and innovation policies, joint platforms for dialogue, the coordination of research and innovation policies, and cross-border research and innovation strategies in mind. HEIs can play a key role in the institutional frameworks founded for the formation of clusters, and society has major expectations of the role of these institutions to control information and practices to build a successful cluster policy.

4.1. The Role of Actors

Based on the interviews, it seems that the objectives of the program and the expectations of the actors did not intersect. The problem appears to be with the incompatibility of the defined program goals and the expected results. This can also be influenced by the structural basis of the program. The clusters have been primarily created by publicly funded organisations, making the role of HEIs even more crucial:

“In this case, the enterprises are mostly not participating in the clusters, as we have built up the background for their participation. There are more civil servants and researchers and sympathisers of these clusters. This situation has been necessary, and it has taken a lot of time to reach. The clusters’ development stage varies a lot.”

—representative of the developer’s organisation, female.

The cluster work with companies is still at an early stage in Arctic Smart Specialisation. Based on the data acquired for this paper, the engagement of companies may vary and their intention to belong to a specific cluster is still unpredictable. It seems that some companies do not find international funding to be attractive. For example, tourism entrepreneurs and forestry operators have an identifiable threshold for launching or participating in EU projects. It is still unclear which decision-making companies engage in clusters and what rights and obligations attached to the network will follow:

“... most of the micro enterprises are not interested in . In these kinds of projects, it should be able to demonstrate the measures much more clearly directly to those enterprises you want to make results ... must show the resources that are either financial or human resources to help enterprises to the internationalisation and growth.”

—representative of developer’s organisation, male.

The knowledge brokers’ role can be seen as being innovative leaders of the regional innovation system. The work involves formal and informal meetings with local and international stakeholders, especially making connections with thematic platforms, finding new projects, funding or partners, or finding new technological or market opportunities, which also refers to the idea of higher education as a postmodern profession [26]:

“There have been education activities and there has been knowledge dissemination on funding programs. We give advice and make comments, for example, on how certain ideas of organisation fit with specific funding programs.”

—representative of developer’s organisation, female.

The above quotation is an example that shows that the knowledge broker's role is to discover and produce interactive and new information about the activities which will empower actors from various sectors. The quotation emphasises recent scholarly findings that show the importance of public institutions as connectors in regional innovation systems [1]. Knowledge brokers develop funding proposals and connect partners from a range of levels and areas. Knowledge brokers' interactive role can be found as communicators and supporters for the regional and international needs of stakeholders:

"... there are also actors without previous experience of working in international projects but get an opportunity as a member of the cluster. They finally were part of a very large network for this purpose."

—representative of developer's organisation, female.

This is a core task of knowledge brokers, and as supposed, many companies willing to grow need connectors from regional networks to link local and global knowledge sources [5].

Based on the interviews, the overlapping roles of actors have led management and decision-makers to become confused. The members of the steering group and the members of the project leaders' group have overlapping roles that have an impact on project dynamics. The different roles undertaken by the same actors are caused by tasks and mandates based on the division of work between the member organisations of the consortium, and from various communication practices.

4.2. Network Cooperation Model

The knowledge broker's role in social networks is quite valuable regarding social capital effects rather than empirical indicators [23]. To differentiate between the HEIs, the authority structure should work well and in a proactive fashion [44]. This is not always the case, and external actors are needed to ensure fairness and the predictability of performance. This looks like a task for knowledge brokers.

There is a clear need for the clusters to form a dynamic network mode of action. This perspective also allows for a more active communication of information, for example, through the location of information, and thus becomes part of the actual knowledge broker's role [29,45]:

"... If they are to receive public support, then their clusters must be so closely coupled that it would not matter if I contacted any cluster member or guide (any of them) down the path towards direct European funding."

—civil servant, male.

Large- and medium-sized enterprises are broadly socially networked, and their needs are more evident than small- and micro-sized enterprises. Interviewees from these enterprises discussed the need to develop a role in the regional innovation system that is related to the pursuit of non-international efforts, such as access to valuable information on markets and investments.

Discussion about knowledge brokering emphasises the natural, embedded role in the innovation system which makes it possible to organise and connect new and old connections to regional needs. [21]. Overall, participants indicated that the solution for the management and decision-making processes would be strong and committed management that coordinates the processes of all the clusters and adapt information:

"... the management system of all the clusters should be professionalised for the organisation with a longstanding experience about international operating environments."

—representative of developer's organisation, male.

From this perspective, the knowledge broker's role is an opportunity for HEIs to enhance smart specialisation program goals and regional development [25].

Universities offer a lot for the smart specialisation program as knowledge brokers in cluster building. Many of the problems of organised cluster activities have connections to an unclear

governance model. For example, cooperation in clusters varies widely. None of the cluster businesses have information about smart specialisation and belonging to the cluster, which raises a problem about how to transfer benefits to the region and companies:

*“ ... there are multiple needs for internationalisation for example sharing the costs and support. It would be important for someone to be able to search networks in advance and matchmake companies ...
Unfortunately, the information about cluster work and possibilities has not reached our business.”*
—entrepreneur, male.

The above quotation emphasises the role of knowledge brokers. The implementation of programs should work as an interactive process between entrepreneurs, organisations and policy-makers based on their needs. It is notable that the task of a knowledge broker seems to include mapping and experimenting with opportunities and risks as well as needs.

4.3. Knowledge-Capacity Building and Effectiveness of Actions

Regional smart specialisation clusters have been built on the needs of business sectors, but confusion comes from a situation in which several companies are connected to several clusters and the construction of the clusters is too directly based on a sectoral starting point. As an alternative, a more functional starting point could be considered. Research and development actions are widely used and implemented actions in HEIs, but not in all companies, especially small companies [37,38]. In sparsely populated regions, unmanned micro-enterprises may be a challenge for regional effectiveness. In this regional case, for example, tourism is a strong actor, and the sector companies are often small companies that are not willing to open their business concepts to international markets. Their interest in forming a tourism cluster without separate functions is low:

“ ... there is a need for more functional clusters. And clusters where it is possible to “surf” based on your own needs ... for example if a company needs more information about internationalisation etc ... ”
—representative of entrepreneurs, female.

A functional starting point would clearly support business needs such as development, internationalisation and joint marketing channels. As has been outlined in earlier studies, the mainly public funded institutions like HEIs in Finland have an identified role to act between companies and international markets. Small- and medium-sized companies do not take the role of knowledge broker, as pointed out in the case example [4,46]. The role of HEIs as knowledge brokers is similar when discussing the sectoral and functional starting points of clusters, and this role is similar in cluster networks:

“Around the universities, research institutes and development organisations, there are many companies so close or sharing the same activity that they do not think about how close they are to clusters work. If our starting point is to build functional clusters, we have to pay more attention on their interaction.”
—civil servant, male.

The quotation above reflects upon the needs of the interaction and emphasise the role of knowledge and the ability to fulfill the weaknesses of the innovation system with the knowledge-brokering function [47,48].

It seems that the operational benefits and incentives can be built in cooperation between the providers of project funding and the companies [3]. The companies' engagement in long-term cooperation will be a key issue with these companies, as in the short term, the evidence of effectiveness is seldom visible. For example, the project has produced around 30 new internationally funded projects,

double what was in the project goals. Their effectiveness and coverage within companies has not yet been verified.

Businesses and publicly funded organisations may have expectations of clustering that is based on a different time span. The knowledge brokers in HEIs play a significant role in meeting the needs of industry, higher education, development organisations and stakeholders. The higher education knowledge broker role is a valuable resource for increasing the institutional autonomy, building the capacity and developing a knowledge-change strategy for the HEIs [49]. Knowledge capacity can vary, and, for entrepreneurs, indirect and tacit knowledge of investment or cluster activities means more than just general information, and makes the regional embeddedness of universities as knowledge brokers even more important to smart specialisation. [5,7].

4.4. Decision-Making and Control

Based on the interviews and other data available, operators of smart specialisation have many simultaneous tasks related to decision-making, implementation and planning. This is partly due the fact that knowledge is focused. The interviewees emphasised that the commitment and the opportunity to commit to the program activities required tangible justification of an organisation's management of the usefulness of the operation. The various organisations and levels of government seem to require the benefits and results of the project to be justified by way of examples to strengthen national cooperation and to drive the joint strategy forward, and a more robust commitment. The knowledge broker concept focuses on network actions, but according to the European University Association [50] and our interviewees, there are multiple needs and challenges [51] to develop multilevel governance through knowledge-brokerage actions in smart specialisation:

“... the activity depends on the mandates to act we have ... Companies without management at the regional level must have the ability to commit to the cluster actions from higher levels of management ... We need to give practical arguments to managers, about what the goals and intended results of smart specialisation based cluster work are.”

—representative of developer's organisation, male.

The network's stability requires that the decision-making is made with organisations that are actors in smart specialisation. The key players are national, European or global companies, or organisations operating in large markets. From the corporate perspective, this highlights project management and directs attention to external communications and the ways in which it is possible to join clusters, and what are the benefits of joining.

The overall picture that emerged from interviews with a network model was based on the various needs of companies. This result is a chance for knowledge brokers to enhance the capacity of cooperation at a regional, national and international level. A joint agreement and understanding of the dynamics are key for enterprises to engage in smart specialisation [12].

Knowledge brokering includes three main features: information management, information exchange and capacity building [13]. Sustainability and the creation of a sustainable mode of operations are significant when describing the HEIs role as knowledge brokers in smart specialisation. The essential benefit of the cluster network is the opportunity for internationalisation, which appears to be an interesting way forward for some companies. The role of knowledge brokers is crucial on this point, because the paths of internationalisation and regional development are not yet entirely clear, and the cluster actors must therefore have a range of opportunities to attach to internationalisation. The problem is that the S3-funded thematic partnership agreements with operators may not relate to the clusters, while the benefit might remain narrow. In addition, the simultaneous roles of actors as implementers and developers, and also the role of authorities, reduce the chances to profit from the benefits of internationalisation. The actors hope for a clearer understanding of how international efforts promote regional impact, the benefits it provides, and how the benefits are returned to the area [5].

In this paper, the role of HEIs as knowledge brokers has been defined through four themes. The role of the actors is not completely clear in smart-specialisation-based projects. There is a clear need for a knowledge broker who encourages and guides internationalisation activities. This work for capacity building is a well-known but sometimes forgotten phenomenon in smart specialisation [5,7,44]. Creating common rules and decisions based on regional need, not only internationalisation, is a task for the knowledge broker. This as well as knowledge capacity emphasises the embeddedness of knowledge brokers and the starting point for clusters [7,52]. Decision-making and control refer to the common understanding and legitimisation of S3 activities. Without a common understanding of the mandates and actions, there is no common future in developing smart specialisation. Information management and the creation of a vibrant atmosphere seems to be a core task for universities as knowledge brokers [5,7].

5. Discussion

Our task in this paper was to outline the role of HEIs as knowledge brokers in smart specialisation and define how knowledge brokers can increase the competitiveness and internationalisation of regions through data which have been collected as part of the implementation of the ASE- project on smart specialisation (Figure 1). The authorisation status of individuals as actors is based on the legitimacy of the HEIs. Without HEIs, individuals cannot play a legitimate role as knowledge brokers. An actor's position is to fulfill the needs of the institutions and the institutions' goals, but as individuals as well as institutional knowledge brokers, they also benefit from their position. The starting point for the implementation project on smart specialisation was innovative, intelligent, constructive and complex. The aim of smart specialisation is regional development, and it requires the beneficiaries of the activity to recognize the potential of new operating models. Defining the benefits and responding to needs should turn to the conscious benefit and involvement of the beneficiaries. The conscious strengthening of the beneficiaries' own activities requires a more extensive role for management and the steering group.

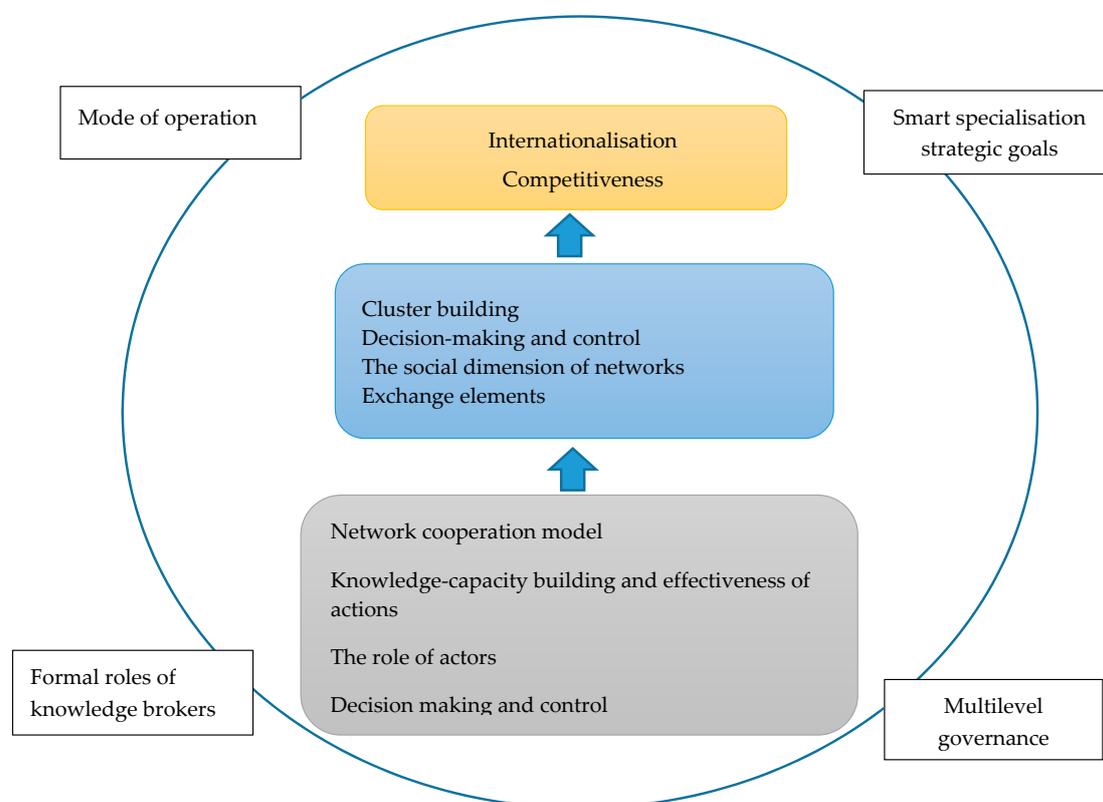


Figure 1. The key themes of defining the knowledge brokers' role based on the data of the regional smart specialisation program, Artic Smartness Excellence (2016–2018).

According to the European University Association, HEIs can play an important role in the formation of multilevel governance models based on a smart specialisation strategy [50]. Based on the interviews conducted for this paper, the strengthening of this role requires clarification of the knowledge broker role, which can be promoted from four perspectives. First, achieving effectiveness goals can be verified with regard to the smart specialisation strategic goals achieved. The projects produce many unexpected and unpredictable results, which at best also support the strategic goals of the project. It is essential for the region's businesses and developer organisations to be in a position to know the smart specialisation actors' roles. Clear business practices and tasks create the prerequisites for enterprises to be aware of the future opportunities that smart specialisation can pursue.

Second, the case illuminates the way in which multilevel governance takes place in a sparsely populated and Northern regions. Decisions on cooperation between the innovation system actors takes place as informal cooperation. Therefore, these data and interviews indicate that the key areas of multilevel governance are the implementation and funding decisions of the program. Through these instruments, the preferences of the actors are prioritised through project activities. The formal institutional decision-making is a minor role in network cooperation, and very few actors emphasised decision-making to legitimise the broker's role. This angle brings dynamism to the region's clusters and enables industry to operate in multiple clusters. In this case, it was justified for a cluster to change its participants actively and the admission to be kept open. From this angle, the clusters are open and social networks, rather than closed consortiums. The consortiums take place in projects, and the clusters are a platform for closer cooperation between actors. [51,53].

Third, clustering should be organised in a way that the formal roles can identify their tasks and obligations. The funding guidelines and procedures have not guaranteed this. Finland does not have strong regional innovation systems, but the national innovation system is well established. The starting point of the smart specialisation funding instrument is different, as the key actors are the regional councils and the national-level actors have not been actors in the implementation in decision-making. Based on the data gathered for this paper, this financial instrument alone does not establish a regional innovation system. However, in this way, the smart specialisation program strengthens regional decision-making and creates the infrastructure for the regional innovation system. Knowledge broker roles in HEIs can be identified in building this infrastructure. What these knowledge brokers have in common is their focus on regional projects and regional level networks and partners.

Fourth, the obvious way for the knowledge brokers' mode of operation is to be aware of the tensions of the present actors as part of the Smart Specialisation Program. The overlapping roles and the movement of actors between clusters is a natural part of the operating model but should be based on a clearer governance model.

Author Contributions: Conceptualisation, R.K. and T.A.; methodology, T.A.; software, R.K.; validation, R.K. and T.A.; formal analysis, R.K.; investigation, R.K. and T.A.; resources, T.A.; data curation, R.K. and T.A.; writing—original draft preparation, R.K. and T.A.; writing—review and editing, R.K. and T.A.; visualisation, R.K.; supervision, T.A.; project administration, R.K. and T.A.; funding acquisition, T.A. All authors have read and agreed to the published version of the manuscript.

Funding: The authors acknowledged the financial support from the Arctic Smartness Excellence project (ASE) and University of Lapland, Professions in Arctic Societies- research group (ProSoc).

Acknowledgments: We give our acknowledgement to the actors in ASE project and those interviewed for the data of this paper.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Gianelle, C.; Guzzo, F.; Mieszkowski, K. Smart Specialisation: What gets lost in translation from concept to practice? *Reg. Stud.* **2019**. [[CrossRef](#)]
2. Uyarra, E.; Marzocchi, C.; Sorvik, J. How outward looking is smart specialisation? Rationales, drivers and barriers. *Eur. Plan. Stud.* **2018**, *26*, 2344–2363. [[CrossRef](#)]

3. Gianelle, C.; Kleibrink, A. Monitoring mechanisms for smart specialisation strategies. *Policy Brief Ser.* 2015. Available online: https://www.researchgate.net/profile/Carlo_Gianelle/publication/274891121_Monitoring_Mechanisms_for_Smart_Specialisation_Strategies/links/552ba909cf2e089a3aa54b3.pdf (accessed on 27 February 2020).
4. Marques, P.; Morgan, K.J. The Heroic Assumptions of Smart Specialisation: A Sympathetic Critique of Regional Innovation Policy. In *New Avenues for Regional Innovation Systems-Theoretical Advances, Empirical Cases and Policy Lessons*; Arne, I., Martin, R., Trippel, M., Eds.; Springer: New York, NY, USA, 2018; pp. 275–293. ISBN 978-3-319-71661-9.
5. Kempton, L.; Goddard, J.; Edwards, J.; Hegyi, F.B.; Elena-Peréz, S. *Universities and Smart Specialisation. S3 Policy Brief Serie*; 2013; ISBN 978-92-79-34717-7.
6. Rodríguez-Pose, A.; Di Cataldo, M. Quality of government and innovative performance in the regions of Europe. *J. Econ. Geogr.* **2015**, *15*, 673–706. [CrossRef]
7. Asheim, B.; Gertler, M.S. The Geography of Innovation. In Regional Innovation Systems. In *The Oxford Handbook of Innovation*; Fagerberg, J., Mowery, D.C., Nelson, R.R., Eds.; Oxford University Press: New York, NY, USA, 2006; pp. 291–317. ISBN 0-19-926455-4.
8. Cooke, P. Life Sciences Clusters and Regional Science Policy. *Urban Stud.* **2004**, *41*, 1113–1131. [CrossRef]
9. Mazzarol, T.; Battisti, M.; Clark, D. The role of universities as catalysts within entrepreneurial ecosystems. In *Rhetoric and Reality: Building Vibrant and Sustainable Entrepreneurial Ecosystems*; Clark, D., McKeown, T., Battisti, M., Eds.; Tilde University Press: Mornington, Australia, 2016; ISBN 978-0734612571.
10. Edwards, J.; Marinelli, E.; Arregui-Pabollet, E.; Kempton, L. Higher Education for Smart Specialisation: Towards Strategic Partnerships for Innovation. *S3 Policy Brief Ser.* 2017. Available online: <https://core.ac.uk/download/pdf/146996739.pdf> (accessed on 27 February 2020).
11. Gunasekara, C. Reframing the Role of Universities in the Development of Regional Innovation System. *J. Technol. Transf.* **2006**, *31*, 101–113. [CrossRef]
12. Schmitt, A.; Klarner, P. From snapshot to continuity: A dynamic model of organizational adaptation to environmental changes. *Scand. J. Manag.* **2015**, *31*, 3–13. [CrossRef]
13. Kislov, R.; Wilson, P.; Boaden, R. The ‘dark side’ of knowledge brokering. *J. Health Serv. Res. Policy* **2017**, *22*, 107–112. [CrossRef]
14. Goddar, J.; Kempton, L. The Civic University. Universities in Leadership and Management of Place. *Cent. Urban Reg. Dev. Stud. Newctle. Univ.* 2016. Available online: <https://www.ncl.ac.uk/media/wwwnclacuk/curds/files/university-leadership.pdf> (accessed on 3 April 2020).
15. Knight, C.; Lightowler, C. Reflections of ‘knowledge exchange professionals’ in the social sciences: Emerging opportunities and challenges for university-based knowledge brokers. *Evid. Policy* **2010**, *6*, 543–556. [CrossRef]
16. Meyer, M. The Rise of the Knowledge Broker. *Sci. Commun.* **2010**, *32*, 118–127. [CrossRef]
17. Oldham, G.; McLean, R. Approaches to Knowledge-Brokering. 1997. Available online: http://www.iisd.org/pdf/2001/networks_knowledge_brokering.pdf (accessed on 18 February 2020).
18. Gieryn, T.F. Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists. *Am. Sociol. Rev.* **1983**, *48*, 781–795. [CrossRef]
19. Van Enst, W.I.; Driessen, P.P.J.; Runhaar, H.A.C. Working at the Boundary: An Empirical Study into the Goals and Strategies of Knowledge Brokers in the Field of Environmental Governance in the Netherlands. *Sustainability* **2017**, *9*, 1962. [CrossRef]
20. Crespo, J.; Vicente, J. Proximity and Distance in Knowledge Relationships: From Micro to Structural Considerations based on Territorial Knowledge Dynamics (TKDs). *Reg. Stud.* **2012**, *50*, 202–219. [CrossRef]
21. Drew, H.; Richie, F.; King, A. How do knowledge brokers work? Implications for policy and practice in the case of WERS. In Proceedings of the ‘Innovation Systems and the new role of Universities’ COSINUS Conference, Oran, Algeria, 14–16 December 2013; Available online: <https://uwe-repository.worktribe.com/preview/925373/23455.pdf>. (accessed on 27 March 2020).
22. Jami, A.A.; Walsh, P.R. Wind Power Deployment: The Role of Public Participation in the Decision-Making Process in Ontario, Canada. *Sustainability* **2016**, *8*, 713. [CrossRef]
23. Burt, R.S. The Network Structure of Social Capital. *Res. Organ. Behav.* **2002**, *22*, 345–423. [CrossRef]
24. Kauffeld-Monz, M.; Fritsch, M. Who are the knowledge brokers in regional systems of innovation? A multiactor network analysis. *Reg. Stud.* **2010**, *47*, 669–685. [CrossRef]

25. Goddard, J.; Kempton, L. Connecting Universities to Regional Growth: A Practical Guide. *Smart Spec. Platf.* 2011. Available online: https://ec.europa.eu/regional_policy/sources/docgener/presenta/universities2011/universities2011_en.pdf (accessed on 27 February 2020).
26. Jessani, N.S.; Boulay, M.G.; Bennett, S.C. Do academic knowledge brokers exist? Using social network analysis to explore academic research-to-policy networks from six schools of public health in Kenya. *Health Policy Plan.* **2015**, *31*, 600–611. [[CrossRef](#)]
27. Trippel, M.; Sinozic, T.; Lawton, S.H. The Role of Universities in Regional Development: Conceptual Models and Policy Institutions in the UK, Sweden and Austria. *Eur. Plan. Stud.* **2015**, *23*, 1722–1740. [[CrossRef](#)]
28. Pinheiro, R. Strategic Change in the Periphery: The Case of Oulu. In *Higher Education and Research in Academy—Who should pay?* Aarrevaara, T., Berg, E., Eds.; Luleå Tekniska Universitet: Luleå, Sweden, 2014; ISBN 978-91-7439-974-5.
29. Phipps, D.; Morton, S. Qualities of knowledge brokers: Reflections from practice. *Policy Press* **2013**, *9*, 255–265. [[CrossRef](#)]
30. De Wit, H.; Deca, L.; Hunter, F. Internationalization of Higher Education—What Can Research Add to the Policy Debate. In *The European Higher Education Area*; Curaj, A., Matei, L., Pricopie, R., Salmi, J., Scott, P., Eds.; Springer: Berlin/Heidelberg, Germany, 2018; pp. 3–12. ISBN 978-3-319-77407-7.
31. Curaj, A.; Deca, L.; Pricopie, R. *The European Higher Education Area: The Impact of Past and Future Policies*; Springer International Publishing: Cham, Switzerland, 2018; pp. 1–14. ISBN 978-3-319-77407-7.
32. Van den Broek, J.; Bennenworth, P.; Rutten, R. Institutionalization of cross-border regional innovation systems: The role of university institutional entrepreneurs. *Reg. Stud. Reg. Sci.* **2019**, *6*, 55–69. [[CrossRef](#)]
33. Cai, Y.; Liu, C. The roles of universities in fostering knowledge-intensive clusters in Chinese regional innovation systems. *Sci. Public Policy* **2015**, *42*, 15–29. [[CrossRef](#)]
34. Charles, D.R. Universities as Key Knowledge Infrastructures in Regional Innovation Systems. *Innovation* **2006**, *19*, 117–130. [[CrossRef](#)]
35. Aarrevaara, T.; Wahlfors, L.; Dobson, I.R. Higher education systems and institutions, Finland. In *Encyclopedia of Higher Education Systems and Institutions*; Teixeira, P.N., Jung, C.S., Eds.; Springer: Dordrecht, The Netherlands, 2018; ISBN 978-94-017-8904-2.
36. Pinheiro, R.; Geschwind, L.; Aarrevaara, T. Mergers in Higher Education—The Experience from Northern Europe. *High. Educ. Dyn.* **2016**, *46*. [[CrossRef](#)]
37. Sadlak, J. Seeking Excellence, Practicing Rankings, and Aiming at Diversification of Higher Education Institutions’ Mission in the European Higher Education Area [Overview Paper]. In *The European Higher Education Area. Between Critical Reflections and Future Policies*; Curaj, A., Matei, L., Pricopie, R., Salmi, J., Scott, P., Eds.; Springer: Berlin/Heidelberg, Germany, 2015; pp. 241–248. ISBN 978-3-319-77407-7.
38. Van Vught, F. Responding to the EU Innovation Strategy: The Need for Institutional Profiling in European Higher Education and Research. In *Reform of Higher Education in Europe*; Enders, J., de Boer, H.F., Westerheijden, D.F., Eds.; Sense Publishers: Rotterdam, The Netherlands, 2011; pp. 63–80. ISBN 672978-94-6091-555-0.
39. Mensah, M.S.B.; Enu-Kwesi, F. Research collaboration for a knowledge-based economy: Towards a conceptual framework. *Triple Helix-A J. Univ.-Ind.-Gov. Innov. Entrep.* **2018**, *5*. [[CrossRef](#)]
40. Reichert, S. The Role of Universities in Regional Innovation Ecosystems. *Eur. Univ. Assoc.* 2019. Available online: https://www.eua.eu/downloads/publications/eua%20innovation%20ecosystem%20report_final_digital.pdf (accessed on 27 February 2020).
41. Heikka, K.; Jokelainen, K.; Teräs, J. Lapland’s Arctic Specialisation Programme. 2013. Available online: http://www.lappi.fi/lapinliitto/c/document_library/get_file?folderId=53982&name=DLFE-21455.pdf (accessed on 27 February 2020).
42. Krippendorff, K. Content Analysis. In *An Introduction to Its Methodology*, 2nd ed.; Sage publications: London, UK, 2004; pp. 105–106. ISBN 0-7619-1544-3.
43. Schreier, M. Qualitative Content Analysis. In *The SAGE Handbook of Qualitative Data Analysis*; Flick, U., Ed.; Sage Publishing: London, UK, 2014; pp. 170–173. ISBN 978-1-4462-0898-4.
44. Clark, B.R. The Entrepreneurial University. *New Foundations for Collegiality, Autonomy, and Achievement. High. Educ. Manag.* **2002**, *13*, 9–24.
45. Ward, V.; House, A.; Hamer, S. Knowledge Brokering: The missing link in the evidence to action chain? *Evid. Policy* **2009**, *5*, 267–279. [[CrossRef](#)]

46. McCann, P.; Ortega-Argilés, R. Smart specialisation in European regions: Issues of strategy, institutions and implementation. *Eur. J. Innov. Manag.* **2014**, *17*, 409–427. [[CrossRef](#)]
47. Fotakis, C.; Rosenmölle, M.; Bremman, J.; Matei, L.; Nokolov, R.; Petiot, C.; Puukka, J. *The role of Universities and Research Organisations as Drivers for Smart Specialisation at Regional Level*; European Union Publications: Luxembourg, 2014. [[CrossRef](#)]
48. Sapsed, J.; Grantham, A.; DeFillippi, R. A bridge over troubled waters: Bridging organisations and entrepreneurial opportunities in emerging sectors. *ScienceDirect* **2007**, *36*, 1314–1334. [[CrossRef](#)]
49. Holm-Nielsen, L.B.; Thorn, K.; Olesen, J.D.; Huey, T. Talent development as a university mission: The Quadruple Helix. *High. Educ. Manag. Policy* **2013**, *23*, 99–113. [[CrossRef](#)]
50. EUA. *Coherent Policies for Europe beyond 2020. Maximising the Effectiveness of Smart Specialisation Strategies for Regional Development*; European University Association: Brussels, Belgium, 2018; Available online: <https://eua.eu/downloads/publications/coherent%20policies%20for%20europe%20beyond%202020%20maximising%20the%20effectiveness%20of%20smart%20specialisation%20strategies.pdf> (accessed on 27 February 2020).
51. Dąbrowski, M.; Bachtler, J.; Bafoil, F. Challenges of multi-level governance and partnership: Drawing lessons from European Union cohesion policy. *Eur. Urban Reg. Stud.* **2014**, *21*, 355–363. [[CrossRef](#)]
52. Obstfeld, D.; Borgatti, S.P.; Davis, J. Brokerage as a Process: Decoupling Third Party Action from Social Network Structure. *Res. Sociol. Organ.* **2014**, *40*, 135–158.
53. Uyarra, E.; Flanagan, K.; Magro, E.; Wilson, J.R.; Sotarauta, M. Understanding regional innovation policy dynamics: Actors, agency and learning. *Environ. Plan. C Politics Space* **2017**, *35*, 559–568. [[CrossRef](#)]



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).