

The university third mission and the European Structural Funds in peripheral regions: Insights from Finland

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Abstract

Current EU policies aim to support regional research, development, and innovation activities. The Cohesion Policy, implemented through Structural Funds (SFs) Operational Programmes, seeks to foster local level innovation. In parallel, universities have become important drivers of regional development through their ‘third mission’ driven by the different policy levels. This article investigates the tensions between the primary institutional logics of the university and the institutional logic of the SF programmes in peripheral regions as experienced by a multi-disciplinary university network from Finland. The findings from the case study reveal competing and co-evolving institutional logics of the two frameworks; university-led SF activities increase collaboration with local stakeholders, but the implementation of SF projects remains challenging (e.g. strict guidelines, higher education (HE) policies driving research excellence). Further investigation of these results in different regional contexts could provide new tools for managing the university third mission more efficiently, through SF programmes and beyond.

Key words: structural funds; third mission; regional development; higher education institutions; peripheral regions; institutional logics

1. Introduction

EU Cohesion Policy, implemented through national Structural Funds (SFs) Operational Programmes, plays an important role in supporting national and regional innovation systems (EC, 2010). Currently, based on the smart specialisation concept as a place-based policy (McCann and Ortega-Argiles 2015), the Cohesion Policy emphasises universities’ role not only in regional innovation strategy formulation and identifying regional priorities (Foray et al. 2011), but also in the implementation of these regional strategies (Santos and Caseiro 2015). It has been argued that Research and Innovation Strategy for Smart Specialisation (RIS3) strategies, an *ex ante* conditionality to access the European Regional Development Funds (ERDF), can facilitate aligning universities’ research with regional needs (Charles et al. 2014; Fonseca and Salomaa 2019), thus supporting the university ‘third mission’ focussed on engagement and external services in addition to the traditional core functions of teaching and research (Chatterton and Goddard 2000; Jongbloed et al. 2008). Furthermore, previous case studies indicated that SFs have contributed to creating the foundations of regional innovation systems and reinforced universities’ regional engagement (Charles

and Michie 2013), particularly through joint projects with local businesses (Vallance et al. 2017), which implies that the SF instruments may have an impact on the way in which the university undertakes the third mission.

Policymakers expect universities to facilitate entrepreneurship and technology transfer, binding the third mission to interact with regional industry and society (Arbo and Benneworth 2007). Policy discussions on university engagement have been influenced by the concept of the ‘entrepreneurial university’ (Clark 1998, 2004), which embeds economic and social development more closely into research, education, and technology transfer activities allowing all three academic missions to support one another (Etzkowitz 2013). This suggests that the third mission has moved from ‘the periphery’ of the university organisations towards ‘the academic core’ (Pinheiro et al. 2015a). However, the volume of entrepreneurial spillovers from academia falls short of expectations, even more so in peripheral regions with a limited innovation capacity. Thus, the focus of innovation policies should be on supporting the absorptive capacity of local SMEs, promoting networking and knowledge exchange (Brown 2016), which resonates well with the current ERDF priorities. But how can universities acknowledge better, how regional policy and institutional contexts steer their third-stream

activities on an institutional level (Salomaa 2019)? Although policymakers expect universities to facilitate entrepreneurship and technology transfer, binding the third mission to interaction with regional industry and society (Arbo and Benneworth 2007), further empirical studies on the institutionalisation of the third mission are needed to generate more information on the interplay between legal frameworks, policy instruments, and university institutional responses towards the third mission (Pinheiro et al. 2015a).

The policy push, supported by the idea of institutional isomorphism (DiMaggio and Powell 1983), promotes the adaptation of similar practices towards the third mission within different kinds of universities (Kitagawa et al. 2016). On a policy level, *the third mission has become strongly associated with regional development*. In Finland, *this has resulted in the legitimatisation of the position of the Finnish university consortia; university network organisations in peripheral regions, which aim to foster economic growth in areas lacking local access universities while coordinating and improving universities' collaboration building on local strengths* (FINHEEC 2013; MoEC 2015). While peripheral campuses may struggle to respond to regional expectations that are based on the capacity of full-range universities (Charles 2016), the unique structure of the Finnish university consortia combining the expertise of urban-based universities has potential to overcome this problem; responding to external needs can be easier at the unit level (Goddard et al. 2013) through 'entrepreneurial departments' (Pugh et al. 2018) and other specialised (regional) units.

The 'institutional logics' perspective, defined as 'the axial principles of organization and action based cultural discourses and material practices prevalent in different institutional or societal sectors' (Thornton 2004: 2), was employed to examine how Finnish universities deliver the third mission in peripheral regions within the SF programmes. This is done by investigating the interaction of two different institutional logics determining the appropriateness of the organisational practices in a given setting at a particular historical moment (Greenwood et al. 2010). A qualitative analysis based on the 'competing institutional logics' (Reay and Hinings 2009) of the university third mission and the SF activities carried out by the University Consortium of Pori (UC-Pori) illustrates the 'conditioning factors' of university-led SF activities from 'institutional bricolage' (Lok 2010) towards 'co-existing' (Durand et al. 2013). First, the third-mission literature is reviewed in relation to universities' engagement with SF, paying attention to the competing institutional logics of the third mission and the SF Operational Programmes. Then the case of UC-Pori is introduced, and their use of SF is analysed to identify how these two different institutional logics are aligned. The results highlight that universities deliver the third-mission activities within the SF projects mainly through individual academics' efforts to bridge the gap between engagement and academic core with subterfuge ('bricolage') instead of management level initiatives ('co-existence'). Finally, the interplay of the policy framework of the SF and university institutions is further discussed to enhance the institutionalisation of the third mission.

2. The university third mission and SF programmes: Introducing the institutional logics perspective

2.1. The third mission

The idea of the third mission, along with the conceptualisations of the university as entrepreneurial (Clark 1998), engaged (Breznitz and Feldman 2012), civic (Goddard and Vallance 2013), or part of a

triple helix system (Etzkowitz 2013) emerged in parallel with policymakers' increasingly high expectations of universities' contributions to regional development over 2 decades ago (Arbo and Benneworth 2007). Universities have become portrayed as flexible, integrated, and strategic actors in their regions (Uyarra 2010), though they can only partially respond to regional needs, especially through traditional academic infrastructure (Clark 1998). Thus, the expectations to embed a range of new tasks to the universities' core missions may be unrealistic (Uyarra 2010), but the policy push, aligned with the idea of institutional isomorphism (DiMaggio and Powell 1983), encourages similar institutional responses towards the third mission within different kinds of universities (Kitagawa et al. 2016).

Although universities have embedded a regional focus more strongly in their missions (Charles et al. 2014), the concept of the third mission can be understood in many different ways, varying from technology transfer to a broader societal engagement of the universities in their respective regions (Goransson et al. 2009). This has a significant impact on the institutionalisation of the third mission, as most universities undertake a broad range of engagement activities (Schoen, Laredo, Bellon et al. 2006), from business collaboration and supporting entrepreneurship to wider civic engagement covering culture (Comunian et al. 2015), social development (Benneworth 2013), sustainability (Trencher et al. 2014), policy engagement (Breznitz and Feldman 2012), and a role in new regional governance systems (Goldstein and Glaser 2012). Many scholars have attempted to conceptualise the third mission and suggested indicators and new categorisations of the activities beyond the academic core (Trencher et al. 2014). Yet, its implications remain highly context-dependent, emphasising different institutional adaptations of the third mission (Laredo 2007) beyond isomorphic forces (Kitagawa et al. 2016).

However, national policies have a major role in creating the context enabling universities to transform towards entrepreneurial/engaged organisations (Stensaker and Benner 2013) and defining the conditions of funding for regional engagement (Tripl et al. 2015). Yet, universities should be cautious in their responses to regional needs: a broadened curriculum and pragmatically developed research portfolio to match local needs might steer organisational behaviour towards opportunism rather than intentionally entrepreneurial strategies (Stensaker and Benner 2013) to reinforce the third mission. This emphasises the importance of institutional capacity to address the different disciplinary, institutional, and individual academics' characteristics shaping the engagement (Pinheiro et al. 2015b) and draws attention to the successful institutionalisation of the third mission.

The Finnish HE policies define the third mission through a variety of activities: exploitation of research results outside of the academic community, contributing to innovation processes and establishing start-ups, graduates entering the job market, Open University education and providing complementary training, collaboration with local stakeholders, participation in public discussion, but also being part of a university consortium to deliver these activities in peripheral areas (FINHEEC 2013). In this study, the third mission is perceived broadly based on the range of tasks introduced by the policy context of the case study, which allows examination of the wide spectrum of the university third-mission activities within the SF projects.

2.2. Universities and SFs: From policy formulation to implementation

The SFs have evolved considerably from their origin as a form of resource transfer for economic infrastructure. Since the 1990s, the

dominance of the knowledge economy concept in EU policies and an emphasis on supporting economic competitiveness through innovation and knowledge has led to a general shift in EU programmes towards multi-sectoral and multi-disciplinary collaboration to address grand societal challenges beyond fostering economic growth (Benneworth and Cunha 2015). The SFs are one of the key policy instruments to support local level innovation and economic growth through multi-level collaboration. They are implemented through Operational Programmes (OPs) seeking to increase collaboration between higher education, businesses, and other local stakeholders. Hence, the SFs may play a significant role in universities' institutional adaptations of the third mission driven by 'economic forces' (DiMaggio 1994). Furthermore, the smart specialisation approach can bind universities more tightly to regional policy processes (Goddard et al. 2013), especially on the management level (Fonseca and Salomaa 2019). Although the diversified funding base increases institutional autonomy (Armbruster 2008), the monetary incentives alone are not sufficient for promoting collaborative actions (D'Este and Perkmann 2011) without a broader organisational commitment to regional engagement. The changes in the economic and social structures have impact on the 'executive power' and 'succession', which draws attention to 'organisational decision makers' (Thornton and Ocasio 1999). Thus, the role of the leadership is also emphasised in the institutional adaptations of different third-mission activities to the organisational practices within universities.

As Castellani et al. (2019) stated, the collaboration between universities and other regional actors in RIS3 processes is important in driving regional competitiveness and economic growth. Universities are considered to be key players in the design and implementation of these policies, especially in 'lagging' or peripheral regions where their contributions to regional capacity are crucial (Kempton 2015). Despite the proliferation of the literature on universities and RIS3 (Vallance et al. 2017), there is little evidence on universities' role in the implementation of these strategies. SF OPs are nationally differentiated and highly dependent on regional circumstances (Bachtler and Wren 2006); thus, previous studies remain heavily rooted in specific territorial contexts. Despite the rigorous monitoring and evaluation of SF, there is also a need for further programme and project-level studies for producing more insights on the effectiveness of the delivery mechanisms (Bachtler and Wren 2006). Thus, instead of attempting to assess the 'total' impact of SF programmes, there has been a shift towards studying 'conditioning factors' that may explain the effectiveness of policies. OP-level evaluations have also more potential to contribute to national and subnational policy formulation processes (Fratesi and Wishlade 2017).

Although the SF beneficiaries' perspective has not been studied much, some lessons can be learned from previous empirical studies and national reports. In Latvia, SF projects have contributed to academic outputs, for example, PhD degrees and publications (Muizniece and Peiseniece 2012), whereas in North East England SF programmes brought together industry and university representatives, especially in university-based projects focussed on engagement and building a culture of collaboration. A strong university sector, particularly in regions with little RDI infrastructure, can initiate industry-focussed innovation support services targeted to SMEs with SF (Charles and Michie 2013).

2.3. The competing institutional logics of the universities and SFs

According to Greenwood et al. (2010), the institutional logics determine 'the appropriateness of the organizational practices' in a

particular spatiotemporal context. The institutional logics perspective can foreground the principles of common organisations and actions, which are based on cultural discourses and material practices (Thornton 2004). One typical approach for empirical studies is to examine the 'competing logics' by having an impact on daily organisational life (Reay and Hinings 2009). This produces insights on the paradoxical situations in which the organisation needs to either choose or develop new practices steered by the other logic beyond the coercive and mimetic isomorphisms explaining organisations' compliance with external pressures (DiMaggio and Powell 1983). A recent shift towards 'co-existing' (Durand et al. 2013) or 'constellation of logics' (Smets and Jarzabkowski 2013) has expanded the perception of the relationships between logics as cooperative, which suggests that different institutional logics, for example, between political processes and (public) actors, can mutually influence organisational practices (Berg Johansen and Waldorff 2017). Finally, a more proactive approach for investigating multiple logics called 'institutional bricolage' (Lok 2010) identifies how actors can make deliberate choices by selecting and de-selecting certain elements within a given logic. This approach can produce insights on micro-organisational developments varying between individual actors by cross-analysing 'ideal-type-systems' and creating sub-characteristics for different logics (Berg Johansen and Waldorff 2017).

Previous studies have identified a range of internal and external barriers hampering universities from delivering the (expected) third-mission activities, for example, within the framework of RIS3 (Castellani et al. 2019) and its implementation (Fonseca and Salomaa 2019). Thus, a combination of the above-described approaches was selected to examine the different institutional logics of the university third mission and the policy framework of the SFs. The detected 'conditioning factors' (Fratesi and Wishlade 2017) hindering effective implementation of the SF policies among universities as the 'competing logics' are summarised in Table 1. These overlapping constraints vary from external (e.g. policies affecting the SF OPs and funding guidelines) to internal barriers (e.g. organisational culture). These elements of the competing institutional logics are next explained in detail. Then, the way in which universities can overcome these issues through 'co-existing' approaches, including individual choices to operate within the given frameworks related to 'institutional bricolage', are discussed in Section 4.

2.3.1 Collaboration

SF programmes operate through partnerships and often require some degree of collaboration to ensure if university activities contribute to regional economic development. However, regional policy frameworks tend to become closed circles of 'unorganised actors', who struggle to initiate collective actions, such as forming partnerships in SF-funded projects (De Rynck and McAleavey 2001). This complicated collaboration can lead to undesirable competition between regional actors (FINHEEC 2013). Strong regional and organisational coordinations are essential in ensuring that beneficiaries are not implementing identical or analogous SF activities (Muizniece and Peiseniece 2012).

As regional programmes, SF-funded projects are often restricted by regional boundaries, which can make collaboration difficult, particularly when desired partners are located in other regions (Uyarra et al. 2018). Policymakers should acknowledge better the geographical barriers affecting universities relationships with their respective regions. They should be understood as 'leaky' institutions not restricted by their operational environments in their efforts to

Table 1. Conditioning factors related to the university-led SF projects: A framework of competing institutional logics.

Conditioning factor	Estimated impact to the implementation of the SF projects within universities	References
Collaboration	Non-desirable competition Lack of regional coordination Lack of business partners (peripheral regions) Difficulties in cross-regional collaboration	De Rynck and McAleavey 2001; FINHEEC 2013; Muizniece and Peiseniece 2012; Uyarra et al. 2018; Kempton 2015; Charles 2016
SF administrative procedures	Unrealistic policy goals High bureaucracy High risk form of funding Match-funding rates 'economy democracy paradox'	Bachtler and Wishlade 2014; Spilanis et al. 2016; Percoco 2017; Gagliardi and Percoco 2017; Olsson 2003; De Rynck and McAleavey 2001; FINHEEC 2013
University organisational culture	Embedding engagement to academic core complicated; mismatch of academic profiles and regional needs Lack of resources Absence of institutional strategies Lack of academic outputs	Benneworth and Cunha 2015; Benneworth and Sanderson 2009; Vallance et al. 2017; Goddard and Vallance 2013; FINHEEC 2013; MoEC 2015
SF Project outputs	Over-estimated outputs Lack of academic outputs Low number of commercial results 'user inspired basic research'	Muizniece and Peiseniece 2012; Charles and Michie 2013; Goddard and Vallance 2013; Goddard et al. 2013

Source: Authors' own elaboration.

engage with their region, but accepting that the activities will, eventually, leak beyond the regional boundaries (Kempton 2015). It can also be difficult to engage with local businesses in the framework of SF projects (Muizniece and Peiseniece 2012): a general problem for universities based in peripheral regions lacking other knowledge institutions and potential business partners (Charles 2016).

2.3.2 SF administrative procedures

Evaluations of previous SF OPs have revealed a low demand for the SF because of the bureaucracy. The complexity of administration hinders the effective use of SF to promote competitiveness, and more innovative initiatives have been funded from national sources (Bachtler and Wishlade 2014). Also, universities can consider the SF instruments to be very bureaucratic and a high-risk form of funding (Spilanis et al. 2016). Olsson (2003) calls this as an 'economic democracy paradox', created in combination by strict co-financing rules and strong regional democratic controlling, which challenges the equity and democratic values of the policy. The time pressure to spend the SF during a specific timeframe favours more strongly organised groups within the region (De Rynck and McAleavey 2001). Universities tend to be among these groups, which can easily access to regionally granted SFs; the projects are often collaborative in nature; thus, universities could also act as a mediator in carrying the administrative (or financial) burden while introducing SF to less organised or disadvantaged groups to facilitate capacity building for future activities.

Despite the numerous evaluations, the overall impact of SF on sustainable economic growth and convergence of lagging regions remains difficult to assess (Percoco 2017), partly due to these administrative constraints (Rodriguez-Pose and Fratesi 2004), but also due to an insufficient territorial approach tailored for different areas (Gagliardi and Percoco 2017), for example, rural regions. SF diversifies universities' funding base, but they are considered 'risky' as they often require some percentage of the match funding from the beneficiaries, and the payment of the grant is linked to a successful implementation of the project. Finnish universities have had problems

with the high match-funding rates, which again make the SF less attractive (FINHEEC 2013).

2.3.3 University organisational culture

Universities have also internal barriers hindering participation in SF activities. The increasing pressure to prioritise institutional success over wider public benefits can create tensions (Benneworth and Cunha 2015); unless engagement activities are linked to a broader institutional strategy, they will remain peripheral (Benneworth and Sanderson 2009). Therefore, SF projects can also be considered as a distraction unless strongly aligned with the academic core. Furthermore, national HE systems can discourage universities' participation in RIS3 and its implementation (Vallance et al. 2017). On a practical level, the timetable demands of teaching restrict resources for such 'extra' work (FINHEEC 2013). A potential mismatch of academic profiles and regional assets and between 'borderless academic excellence as defined by international peer review and reflected in institutional league tables and generating and applying knowledge to meet specific regional specialisation opportunities' (Goddard and Vallance 2013: 96) require extensive strategic capacity to create synergies between different missions.

The regional role of the Finnish university consortia has diminished because of their parent universities' strategies focus on research excellence and producing traditional academic outputs (FINHEEC 2013). This indicates that linking SF projects and other engagement activities strategically to universities' traditional core functions is not straightforward, even in specialised units. Another HE policy challenge in Finland is the state's core funding model (MoEC 2017), which favours traditional academic outcomes, reducing the motivation to carry out third-mission activities even though universities' societal role has been formally acknowledged (e.g. Universities Act 558/2009). Thus, universities have funded their engagement activities with supplementary funds from the municipalities, regions, and SF programmes (MoEC 2015). The university consortia regard SF programmes as an important funding

instrument for regional development (FINHEEC 2013), though they cannot directly fund basic research.

2.3.4 SF project outputs

Finally, there are challenges in terms of the kinds of outputs needed from SF projects. There is a tendency to set unrealistic targets, sometimes just to ensure funding, resulting in over-claimed number of firms assisted and jobs created (Charles and Michie 2013). In Latvia, the SFs have been significant in developing the university's research capacity in the absence of other available external funding streams, but obtaining more commercial outcomes (e.g. patents) have been less successful (Muizniece and Peiseniece 2012). However, SF projects have facilitated entrepreneurial engagement activities within universities (Charles and Michie 2013). In areas without a strong R&D capacity, universities' potential regional contribution can be manifested through 'alternative' forms of innovation, knowledge, and societal engagement beyond technological interventions (Goddard and Vallance 2013). Researchers with multi-disciplinary orientation are more likely to engage with external partners through a range of engagement mechanisms, and to bridge scientific objectives with regional needs through 'user inspired basic research' (Goddard et al. 2013). Such projects can also facilitate regional policy objectives in rural regions: increasing the absorptive capacity of local SMEs and promoting networking and knowledge exchange (Brown 2016).

3. Methods and data

3.1. Methodology

This article examines how the Finnish universities deliver third mission in peripheral regions within the framework of SF programmes by investigating the interaction of competing institutional logics of the university third mission and the policy context of the SF programmes. The assumption is that the SF programmes support implementation of universities' third mission, but the number of conditioning factors (Table 1) hinders effective implementation of the SF policies among universities. These issues are examined with a single case study of the UC-Pori, a Finnish university network of three¹ universities located in the Satakunta region, by utilising the conceptual framework proposed in previous section.

A case study approach was chosen because it enables the investigation of the phenomenon in-depth. The case selection followed the logic of 'atypical cases' to obtain a richer dataset to create a deeper understanding on the phenomenon (Flyvbjerg 2006). In the Satakunta region >30 per cent of the regionally allocated SFs are granted to higher education institutions (HEIs) (Regional Council of Satakunta [RCS] 2017). At the time of the interviews, UC-Pori was involved with nineteen SF projects generating up to €9.5 million of external funding.² In 2018, 14% per cent of UC-Pori's funding originated from SF.³ In addition to being actively engaged with SF, the university consortia have a special focus on regional development. Their unique organisational structure enables the inclusion of many universities within a 'single' case study.

This article draws on twenty-five interviews conducted between December 2017 and December 2018 with UC-Pori units' and their parent universities' personnel working with SF projects: academics, professional staff, and management (rectorate, deans, research, and enterprise personnel). The choice of interviewees was based on public information on university beneficiaries of funded ERDF and European Social Funds (ESFs) projects in the Satakunta region.⁴ An

interview request was sent out to every project manager and/or contact person and the database was checked regularly in order to obtain up-to-date information on funded projects to secure a comprehensive dataset. Further interviewees were detected through the snow-ball approach (Saunders, Lewis and Thornhill 2016). The interviews were recorded, transcribed, and coded with NVivo 11 by the lead author to ease data management and categorising similar data chunks for further analysis. After categorising answers into four thematic groups following the logic of the conceptual framework, the thick description approach (Geertz 1973; Denzin 1989) was used for drawing conclusions for discussion.

3.2. The case study overview

The university consortia make an exception to the otherwise dualistic higher education landscape in Finland, divided into research universities (thirteen) and universities of applied sciences (twenty-two). In addition, there are two specialised vocational higher education institutions. All Finnish HEIs depend on the funding from the Finnish Ministry of Education and Culture. The university consortia are HE collaboration networks of the research universities. They provide education and research activities in areas otherwise lacking a local university through collaborative efforts of the 'parent' universities. Their position was legitimised in 2009 (Universities Act 558/2009), and in 2012, the additional regulations on to secure their state funding were approved. The establishment of these consortia was justified by the enhanced societal role of higher education to respond to local needs (FINHEEC 2013). Besides providing access to higher education and being a source of skilled workforce, these consortia are expected to play an enhanced role in regional development. The consortia have been especially active in SF projects.

The UC-Pori is located in the Satakunta region on the southwest coast of Finland. The population of the region is 220,398⁵ and it has two regional centres, the cities of Pori and Rauma. The regional economy is based on energy production, engineering, offshore process industry, ports and logistics, and the food industry.⁶ The former Tampere University of Technology (TUT) has provided degree education in engineering in Satakunta since 1980s. It has been the coordinating university of the UC-Pori, established in its current form in 2003. The other universities, all working under the same roof in a historic factory building in central Pori, are the former University of Tampere (UTA)—social sciences—University of Turku (UTU)—business and maritime studies—and Aalto University (Aalto)—arts and media. In 2019, the two Tampere universities merged into a single institution. Currently the UC-Pori universities form an umbrella organisation for 2500 students and 170 staff members.⁷ The personnel were directly recruited by their parent universities, but the staff members work permanently in Pori. The coordinating unit, the new Tampere University, nominates a director who is responsible for promoting collaboration between the UC-Pori units, parent universities, and regional stakeholders through an earmarked funding, approximately 600,000 EUR per year, from the state.

The RCS regards local higher education as one of the strategic factors that increases the region's general attractiveness and contributes to knowledge capital (Regional Strategic Plan of the Satakunta Region 2018–2021). UC-Pori has raised the local skills level as well as increased the inflow and rate of R&D activities (RCS 2017). In the early 2000s, the SF was a central element in developing university research capacity in the region. Bringing in new disciplines to the Pori campus to increase the local knowledge base demanded supplementary funding, but since then the importance of SF—and the

amount of available funding—has decreased. This is mostly due to the renewed University Act (558/2009), and the shift towards performance-based state funding indicators steering all research universities towards traditional academic outputs. However, all units of the UC-Pori participate actively in SF programmes, though TUT and UTU were granted more projects than Aalto and UTA, both of which have smaller and specialised units in Pori.

4. Findings and discussion

In this section, the findings from the case of UC-Pori are discussed to identify how the ‘conditioning factors’ (collaboration barriers, university organisational culture, SF administrative procedures, and expected outputs), related to the two competing institutional logics of the SF OP and the university third mission, affect the practical implementation of SF activities within universities. The observed impact of these barriers to university-led SF projects are summarised after which they are further discussed, reflecting potential pathways from ‘institutional bricolage’ to ‘co-existing’ strategies (Table 2).

4.1. Collaboration

All university units located in the Pori campus typically collaborate with local businesses, public organisations especially in the health-care sector, and the city of Pori. Also, many SF projects have resulted from long-term collaboration with these regional actors. The majority of the UC-Pori personnel have worked with SF projects for a long period of time. One of the most reported advantages of SF projects was that they encourage collaboration with other HEIs and businesses, which facilitates knowledge transfer and capacity building. The projects were seen as ‘a natural way for us to approach businesses’ (TUT, Researcher 4) and collaboration was described to be meaningful for both academics themselves and the region of Satakunta:

I find it interesting to combine business collaboration with more applied approach and academic research. (UTU, Researcher 3).

The regional policies were one of the key factors affecting UC-Pori’s motivation to engage with the SF. An increased demand from the Satakunta region for UC-Pori’s contributions to regional development was clearly articulated in the regional development policies. Also, personnel working in the Pori campus admitted that they actively seek ways to engage with local stakeholders through SF programmes. UC-Pori’s knowledge base is considered as an advantage in the Satakunta RIS3 strategy (2014) and it was represented in the design process of the regional strategic plan for 2018–21 through a series of future workshops. Some of the UC-Pori units were also involved in developing success indicators for regional goals. However, the management of the parent universities did not recognise how the regional programmes are built, or how UC-Pori is involved with these processes. Overall, the parent universities’ top management was not very active in regional networks, and only visited the Pori campus once or twice a year. In contrast, the local researchers brought up the importance of following the regional strategic plan as ‘it defines the key areas, so we have to do our homework before starting to build new ideas and project consortia’ (TUT, Researcher 4).

Finding common angles was easy as the RIS3 strategy and the SF calls both echo UC-Pori’s units’ key disciplines, for example, circular economy, wellbeing technology, automation, and robotics. As RIS3 strategy focuses largely on technology transfer and supporting

entrepreneurship, the different units of UC-Pori were in an unequal position when applying for SF. These disciplinary issues are evident also when examining the funded SF projects: social science and arts and culture were marginal compared with technology and business projects. Even if all the SF activities are not aligned with regional priorities, UC-Pori has been able to bring in much needed knowledge and initiate SF projects in the health sector and robotics for example (KAMPUS-SOTE⁸ and AutoRobo⁹). Most of the projects are multidisciplinary in nature as big changes in the business environment require multidisciplinary responses. The proximity of UC-Pori member universities increases internal collaboration, also with parent universities. The UC-Pori units are highly specialised, so it might be challenging to find common interfaces, though it was also considered as an advantage:

There is an added value in having four universities together—it is easy to step out of your own scientific field and establish projects with researchers from different fields, which enables examining the research problem from different aspects and finding new solutions (UC-Pori, Management 2).

Although UC-Pori aims to fill the local skills gaps identified in the development strategies, the parent universities admitted that UC-Pori’s curricula were not developed as a response to local needs but it was rather based on individual academics’ interests to work in the Satakunta region.

In the absence of a tradition of cooperation between academics and other stakeholders in the Satakunta region, the SF project activities have contributed to creating a culture of collaboration. Yet, it can still be challenging to find suitable business partners from the region: ‘In the beginning they were suspicious and thought that we are in some ivory tower’ (UTU, Researcher 3). Thus, the SF projects allow researchers to work ‘in the field’ (Aalto, Researcher 1), get in touch and discuss with different actors. The interviewees also thought that regional engagement through SF projects may have an impact on local authorities and policymaking: ‘this is what I hope from the SF projects: to increase the regional impact and mission’ (UTU, Admin 1).

4.2. SF administrative procedures

Despite the recent national efforts to simplify administrative procedures, many researchers working at UC-Pori still struggled with the bureaucracy, especially in ESF projects. They thought that the managing authorities do not provide consistent guidelines, which can cause extra work or even drawbacks. Also, there were big differences in the administrative support offered by the parent universities, some of which had signalled, that SF is ‘unwanted money’ also in remote units such as UC-Pori. Even though the city of Pori has provided generous support for match funding, which is typically complicated to draw from external sources, universities’ internal administration mechanism, the so called ‘full cost model’, is more compatible with national research funding schemes. However, as one of the interviewees stated, ‘we have learned how to use SF instruments here in Pori’ (Aalto, Researcher 1).

One of the appeals of SF is the high success rates; in some cases, research groups’ success rates were as high as 100 per cent. However, this strong tradition of carrying out SF projects at UC-Pori raised concerns about rooting research too much in the local needs at the expense of academic excellence:

...the competition is not so tough because of its regional limitations. In the long term, it can lead to the dominance of SF

Table 2. The observed impact of the ‘conditioning factors’ of competitive institutional logics to university-led SF projects

Conditioning factors	Estimated impact to the implementation of the SF projects within universities	Observed key elements (UC-Pori)	‘Institutional bricolage’	‘Co-existing’ institutional logics
Collaboration	Non-desirable competition Lack of regional coordination Lack of business partners (peripheral regions) Difficulties in cross-regional collaboration	Contribute to creating long-term collaboration with other HEIs, businesses and public organisations More complicated in remote regions with less potential (business) partners	Individual efforts can have an impact on policy-making (RIS3 and implementation)	Facilitate knowledge transfer and capacity building to support regional innovation processes Foster creating a culture of collaboration with academia and regional stakeholders
SF administrative procedures	Unrealistic policy goals High bureaucracy High risk form of funding Match-funding rates ‘Economy democracy paradox’	Do not fund basic research or degree education High success rates Regional policies favour STEM Bureaucratic, non-transparent and complicated to manage (e.g. clawbacks) Guidelines complicates business collaboration	Low competition may lead to opportunistic behaviour (‘projects for the sake of external funds’) Lower quality of implemented projects (regional engagement considered to be an ‘add-on’) Forces to build research agendas too much on local needs Forces academics to camouflage research activities	Unused potential to support universities’ entrepreneurial activities
University organisational culture	Embedding engagement to academic core complicated (mismatch of academic profiles and regional needs) Lack of resources Absence of institutional strategies Lack of academic outputs	Enable finding new ways to work (e.g. capacity building, networking) Lack of strategic planning and top management’s involvement with regional engagement activities Internal competition on SF at the Pori units Focus widely on generating traditional academic outputs	Individual researchers focussing on engagement work as ‘entrepreneurs’ SF less attractive funding source for universities in the national HE policy framework Overall engagement depends on individual academics and research groups	A relevant funding source for delivering third mission activities, especially in remote campuses
SF Project outputs	Over-estimated outputs Lack of academic outputs Low number of commercial results ‘User inspired basic research’	Strong applied approach Allow researchers to ‘work in the field’ Enable small-scale regional pilots	SF projects based on transferring existing results instead of cutting edge technology Results unexploited by the regional companies (e.g. strict SF guidelines, regional SME landscape)	Offers rich datasets for further research (e.g. user-driven research in health sector) Publishing initial results can be ‘steppingstones’ towards large-scale research projects

projects, which makes their role distorted and decreases research ambition as people will finally mix it up with research funding instruments. (TUT, Researcher 2).

The interviewees agreed that SF projects were occasionally applied for safeguarding jobs. This was more often the case for project researchers (e.g. PhD students working on their research projects ‘on the side’) than for professional staffs (e.g. personnel working on continuing education services, who had permanent contracts). However, the latter were also expected to generate funding ‘from somewhere’.

Previously, SF projects had generated new content for continuous education, for example, in maritime studies, or even piloted

degree study programmes, but the current OP guidelines are stricter concerning education activities. The interviewees described that the funding has become more targeted to businesses and thus less applicable for developing degree programmes or study modules.

Another challenge was that the SF managing authorities were scattered across Finland, being government bodies and four Finnish Centres for Economic Development, Transport, and the Environment (ELY Centres) having a specific task to coordinate SF programmes. The interviewees thought that this might affect the allocation of SF funds as the decision-making authorities may lack the local knowledge on priority areas. Therefore, the bidding processes were not always considered to be transparent or fair. In addition, some of the interviewees thought that there is not enough regional

coordination for creating synergies or optimising the benefits from on-going SF projects. All these aspects combined may threaten the volume and quality of SF projects within universities.

4.3. University organisation culture

The SF projects were typically initiated by individual researchers or research groups without coordination of UC-Pori or parent universities. The parent university of one of the Pori units had tightened monitoring also on a project level due to large-scale organisational changes. The other units could still work somewhat independently, though they needed a formal authorisation to bid for SF: 'When we win a project, the university do not care very much, someone just takes care of it' (TUT, Admin 1). The interviewees from UC-Pori described that researchers currently work 'as entrepreneurs' within the university, without a strong strategic guidance from their home organisations. Failure to win external funding would have a drastic effect for individual researchers, and without long-term planning the activities end together with the funding: 'you get sacked when there is no more funding. No one intervenes to our activities as long as we can generate funds' (UTU, Researcher 2).

Instead of traditional measurements of academic success (e.g. the performance indicators of the state funding model), the researchers thought it is 'a relief' to focus on the regional priorities through SF projects. In contrast, the management of parent universities either worried that these projects do not advance scientific research because of their more applied approach, or were not sufficiently aware of the SF activities to respond. Overall, the management expressed their concern on the amount of granted SF, also within the university consortia: the parent universities need to 'compensate' for this by generating more funds from sources that are applicable with universities' internal mechanisms to secure sufficient funding from the state: 'If it would be the other way around, things would go financially wrong' (TUT, Management 1). The management also estimated, that the amount of available SF is too small to be truly attractive for universities: 'We aim to win long-term funding and bigger amounts' (TUT, Management 2).

The lack of internal coordination in UC-Pori has sometimes led to situations where different units compete with themselves for SF funds. This was not seen as a problem, because 'it is the funding authority's task to choose which bids are granted funding' (TUT, Researcher 5), and UC-Pori has striven to tighten internal collaboration in the recent years. The interviewees emphasised, that SF projects should be taken into account when designing long-term research agendas, partly driven by regional priorities, and there should be more critical discussion on role of the SF projects—particularly at the remote units:

I agree that also here in remote campus we should have other sources of funding, so in that sense it is important to think how SF projects fits in the unit's strategy. (TUT, Researcher 5)

Some challenges were linked to the logics of the SF instruments: the guidelines can even be counter-productive, especially in schemes targeted to supporting local SMEs. However, the researchers felt that 'it is not just about the (SF) instrument, it is also about the internal chain. To be frank, they have wanted us to be more part of the main campus, and not a separate unit' (TUT, Researcher 1). This centralised coordination was mentioned as one of the issues that complicates implementation of the SF projects, but the researchers were still highly motivated to apply for these funds: 'If we want to do regional development, we need ERDF funding' (TUT, Researcher

4). The Pori interviewees widely believed that SF projects are essential in delivering the third mission in practice:

SF funding gives possibility to truly implement projects that are aimed for societal impact in universities: It allows us to concentrate more on the actual content of the projects rather than on academic results that measure 'success' (Aalto, Researcher 1).

Although the national HE policies underline the importance of universities' societal impact, the overall absence of proper indicators for the third mission and difficulties to access information (e.g. collaboration projects with firms may be classified) make the issue complicated.

SF has their own aims, and maybe university tries to combine those to its own objectives, but they do not go hand in hand. Universities don't have a need for the regional engagement, it cannot be measured and it is unimportant in the funding model (UTU, Researcher 2).

The management largely agreed that external research funding and publications are suitable also for measuring impact as such. As an exception, UTU was currently working on internal performance indicators for societal impact, in which the amount of granted SF was one of the measurements of success.

4.4. SF project outputs

The SF projects are not usually based on cutting-edge technology but on transferring existing results. Thus, the focus is more on capacity building, which does not necessarily foster research excellence or publishing results in highly ranked journals. However, the local researchers had increasingly thought about maximising the benefits from SF activities and finding ways to combine regional engagement activities with other academic missions: 'We think about these links for every project, I think there has to be a synergy there' (TUT, Researcher 1). All researchers had faced pressures to deliver more academic outputs from their parent universities but it is challenging in SF projects because of the national adaptation of the SF guidelines do not allow allocating time for basic research.

The longer the researchers had been working with SF projects, the clearer they described the change after the renewed University Act (558/2009), which led to performance-based state funding. The interviewees with less experience did not recognise other research funding instruments being more desirable, while the senior staff members had received a clear signal from their parent universities to focus on other calls. Most of the senior researchers were generally concerned about the rise of managerialism in the university: after the new state funding model, the researchers implementing SF projects have become forced to work on 'some sort of publications' on the side. The interviewees agreed that the SF projects can result in conference papers, facilitate PhD studies and provide rich datasets for further research as well as facilitate achieving individual researcher's or research groups' goals. Only the purely networking-based activities do not typically lead to academic outputs.

...we require two publications per year; it is possible to link these three (missions). We require that all our project researchers are PhD students. PhD students that work in SF projects make more progress than those who teach (TUT, Researcher 4).

There is a limited number of potential partners in the region and businesses have not exploited SF and project results as much as they could have—partly because of the strict limitations of SF instruments. However, the collaboration has brought people together and

some researchers have ended up working in the local firms. In addition, SF projects can be seen as ‘seed money’, so that they generate academic outputs indirectly: ‘They (SF projects) enable small-scale pilots and publishing preliminary results, which makes it easier to apply for larger projects in the same area’ (UC-Pori, Management 2). Despite the limitations of SF schemes and the lack of internal co-ordination and strategic management, there are successful examples of building on the SF activities and creating research projects together with the parent university:

I mean the (ERDF) project finished, I guess a year and a half ago or something—there has been a lot of continuation of things from it. So, for example we just got a grant confirmed yesterday from Business Finland—that’s something like 5.2 million EUR (Aalto, Researcher 2).

4.5. From bricolage to co-existing mechanisms? Interaction between institutional logics of the university third mission and SF

The interviewees from UC-Pori described different agendas, individual motivations, and benefits from SF projects. On individual level, the SF schemes were seen as a very important source of funding in the absence of other suitable funding streams for the third mission, especially for remote units with a stronger regional focus. According to Finnish HE policies, universities can deliver the third mission simply by being a part of a university consortia and bringing university activities (e.g. generating graduates to the job market) to locations otherwise lacking access to a university, which was also highlighted in the case of Pori. Beyond that, the third mission is broadly defined as knowledge transfer, contributing to innovation processes, providing complementary training, collaborative actions, and participation to public discussion (FINHEEC 2013). The findings from Pori suggest that all these tasks can be aligned with SF projects carried out by universities, but a number of conditioning factors, representing competitive institutional logics, hinder optimising benefits from these activities and the overall role of the third mission within universities.

However, the local researchers working at UC-Pori referred largely to the third mission in their SF activities. They saw added value in bringing university activities to a heavily industry-based region with little academic traditions, which can be further reinforced through SF activities—in particular with local businesses permitting ‘user inspired basic research’ (Goddard et al. 2013), ideally leading to large-scale research projects. Fostering a culture of collaboration between academia and regional stakeholders as well as building larger RDI cooperation based on regional pilots are potential pathways towards developing towards cooperative ‘co-existing’ logics, in which the political steering has a positive impact on organisational practices (Berg Johansen and Waldorff 2017)—in this case, the overall institutionalisation of the third mission through SF activities. Furthermore, the universities’ participation in policy processes shape the regional policies (e.g. RIS3), which is a concrete example of universities’ engagement role outside of academia. Thus, building ‘win-win scenarios’ with regional partners (e.g. identification of relevant priority areas for universities and local businesses) and feeding into policy processes can lead towards co-existing institutional logics, although the case of UC-Pori demonstrated a lack of broader organisational engagement within the parent universities. In the absence of ‘executive power’ of the organisational decisions-makers (Thornton and Ocasio 1999), the role of the university in the policy

formulation remained vague and the individual efforts towards policy-making can be interpreted as ‘institutional bricolage’ (Lok 2010), in which the academics strive to balance between different logics between the university organisational culture and the third mission. As previous studies indicate, universities’ role in regional policy processes can be restricted by the national HE system (Vallance et al. 2017); this was evident in the case study, as UC-Pori’s parent universities’ management widely overlooked the importance of these processes within the overall university organisation, whereas the remote units were considered as key players in the design phase of RIS3 by the local authorities. Thus, universities’ capacity to be involved with the RIS3 and its implementation is also constricted by the opposing goals of Cohesion policy—regional specialisation opportunities—and ‘borderless academic excellence’ (Goddard and Vallance 2013). This distinction makes SF less appealing and overlooked in universities’ strategic planning. However, findings from UC-Pori indicated, that if SF collaboration is based on long-term partnerships and strategically planned as part of research group’s agenda, different university missions come together naturally (e.g. larger research projects based on regional SF pilots, contribution to continuing education).

In the case of Pori, the SF projects allowed individual researchers and research groups to increase their skills base (e.g. AI, Maritime studies), which also contributes to knowledge transfer activities and general capacity building of the region. Yet, the management of these activities at the institutional level was considered to be complicated and required a certain degree of institutional bricolage through workarounds and camouflaging research activities, which hinders obtaining maximum benefits from the projects. Another more practical challenge of the SF is that they do not usually allow cross-regional collaboration (Uyarra et al. 2018), which restricts achieving ambitious policy goals set at the regional level. In the case of UC-Pori, this had led to lower competition and somewhat opportunistic bidding processes, which again portrays ‘institutional bricolage’ between different logics instead of aiming towards successful ‘co-existing’ logics. Universities might be keener to implement SF activities if they were less restricted by the limitations of administrative guidelines (Spilanis et al. 2016) and the geographic borders of the region, and acknowledged as ‘leaky’ knowledge institutions (Kempton 2015) creating spillovers eventually having a wider impact.

As the case of UC-Pori demonstrated, the national and regional policies determine the conditions in which universities can transform towards entrepreneurial organisations (Stensaker and Benner 2013) and what kind of funding is available for these activities (Trippel et al. 2015). The results also highlight the competing logics of universities, HE policies and regional development (third mission); The SF activities do not automatically form a channel to deliver third mission successfully. Unless the organisation has the capacity to combine these externally funded tasks related to regional priorities with institutional goals through developing successful co-existing logics between these frameworks. In the case of Pori, the SF projects were widely considered to be mere ‘add-ons’—institutional bricolage driven by individuals’ effort to deliver the third mission without organisation’s commitment. Besides the organisational culture, additional constraints were detected in the internal mechanisms of the parent universities, which made SF projects unprofitable even when the match funding was covered by a third party. This illustrates the impact of the external pressures of national HE policies, but also the inflexibility of the internal procedures within universities aligned

with coercive and mimetic isomorphisms (DiMaggio and Powell 1983).

The findings reinforce that the university third mission is steered by national and regional policies towards heterogeneous adaptations of the university engagement (Kitagawa et al. 2016) instead of institutional strategies, and that its successful implementation and alignment with teaching and research remains complicated (Chatterton and Goddard 2000), even when there are additional resources from external sources, such as SF. Instead of mere monetary incentives, more tailored, strategic and transparent approaches are needed for initiating successful university–industry collaboration to ensure synergies between different missions (Etzkowitz 2013). The existence of university consortia is linked to the external resources from the state, municipalities, SF, and other sources, which demonstrates that universities are more inclined to opportunistic than strategically entrepreneurial behaviour (Stensaker and Benner 2013). This is demonstrated through ‘institutional bricolage’ of individual academics, even in dedicated units with a mission to engage with the surrounding region, in which, according to previous studies, the third mission could be more easily managed (Goddard et al. 2013). In the case of Pori, the burden to find ways to combine all the three missions fell mostly on the shoulders of individual researchers, implying that UC-Pori and its parent universities have not managed to design a successful strategy for managing the third mission that would take individual, disciplinary and institutional issues into account (Pinheiro et al. 2015b) in a remote unit with a specifically articulated task to serve their region, nor assessed the engagement on a unit level beyond the concept of entrepreneurial universities (Pugh et al. 2018).

To conclude, the case study suggests that there is yet unused potential to deliver third mission activities through SF more efficiently. The SF projects supported by the involvement of the university management representing the ‘organisational decision makers’ (Thornton and Ocasio 1999) can reinforce the institutionalisation of the third mission. This requires further examination of the interplay between different logics of policy frameworks (HE and regional) and the university third mission (Pinheiro et al. 2015a) in different regional contexts for developing effective co-existing logics.

5. Conclusion

This study sought to contribute to the current discussion on universities’ third mission through examining the interaction between ‘competing institutional logics’ (Reay and Hinings 2009) of the university third mission and the SF programmes. Qualitative analysis on the ‘conditioning factors’ explaining the effectiveness or ineffectiveness of regional policies (Fratesi and Wishlade 2017) was employed for the single case study of the UC-Pori. The results reveal characteristic and challenges related to universities SF activities from ‘institutional bricolage’ (Lok 2010) towards developing successful co-existing logics (Durand et al. 2013) in the case of a regionally focussed HEI. This article also provides insights on the shortcomings of implementation of regional policies following the emergence of the smart specialisation approach. The findings reinforce that the SF projects can strengthen universities regional engagement, foster university–industry collaboration and RDI capacity, but the implementation of the SF projects within a Finnish university framework remains challenging because of a number of conditioning factors, including organisational issues, HE policies,

and strict guidelines of SF lacking regionally tailored solutions. However, these findings may not be extended to different types of university institutions (e.g. research-oriented universities located in more central areas) without further research.

SF programmes may enable universities to respond to regional needs through collaborative projects (Fonseca and Salomaa 2019), ideally leading to long-term research collaboration when SF are considered as ‘seed money’ or ‘user inspired basic research’ (Goddard et al. 2013). This approach can help to create pathways towards successful co-existing institutional logics between different policy frameworks (HE and regional) and the university third mission. Currently, the administrative burden of the SF OP (Spilanis et al. 2016) as well as overly ambitious policy goals stimulated by the smart specialisation approach limits the potential of these activities. Also, national (and international) HE policies steer universities towards traditional academic outputs, which are not easily aligned with SF projects’ deliverables as they tend to be less quantifiable manifestations of the third mission (e.g. capacity building and knowledge transfer beyond codified knowledge). This reinforces that universities’ third mission is heavily steered by national and regional policies towards heterogeneous adaptations of the university engagement (Kitagawa et al. 2016) instead of institutional strategies. The successful implementation of the third mission and alignment with teaching and research remains complicated (Chatterton and Goddard 2000), even when there are additional resources from external sources, such as SF.

Another mismatch hindering delivering third mission through SF was between UC-Pori’s strong regional orientation and their parent universities: whereas UC-Pori’s personnel found that SF instruments are one of the key tools in delivering their regional mission, the top management regarded such activities as irrelevant. Through enhanced strategic planning (Muizniece and Peiseniece 2012), more active engagement of the university management as ‘organisational decision makers’ (Thornton and Ocasio 1999) and carefully planned project portfolio, universities could strengthen their regional engagement activities through SF projects (Charles and Michie 2013). Instead of the current ‘institutional bricolage’ as rather ad hoc approach based on individual academics’, efforts to support their regions and generate external funding while safeguarding their jobs, a shift towards a more cooperative perception on the relationships between different institutional logics could be mutually beneficial in developing organisational practices (Berg Johansen and Waldorff 2017) within peripheral and satellite campuses. Thus, the universities could set and achieve more realistic regional goals through the implementation of the regional development policies, for example, supporting local SMEs, networking and knowledge transfer in peripheral areas (Brown 2016), and thus release unused potential of the SF OP.

As universities’ institutional approach to third mission is also shaped by their regional context (Salomaa 2019), and formulation and implementation of SF OP are also nationally differentiated and very dependent on regional circumstances (Bachtler and Wren 2006), further comparative studies on university-led SF projects could provide more insight on the ways in which third mission activities are delivered in different regional contexts. This could also facilitate designing institutional strategies for managing the third mission more efficiently so that each mission enhances one another (Etzkowitz 2013), taking different individual, disciplinary and institutional issues into account (Pinheiro et al. 2015b).

Funding

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Marie Skłodowska-Curie Grant agreement No. 722295.

Conflict of interest statement. The authors declare that there is no conflict of interest.

Notes

1. Previously four universities, but UTA and TUT merged together in January 2019. The new university became the main shareholder of Tampere University of Applied Sciences (<https://www.tuni.fi/en/about-us> 20 February 2019). Also, Aalto University has no longer units in the Pori campus. All the parent universities presented in the empirical section had operations at UC-Pori at the time of the interviews.
2. <http://delta.ucpori.fi/?lang=en> 30 August 2017.
3. <https://ucpori.fi/fi-fi/yliopistokeskus/yliopistokeskus-lukuina/31/4> February 2020.
4. Structural Fund information service, <https://www.eura2014.fi/rrtiapa/?lang=en> 1 September 2017.
5. https://www.tilastokeskus.fi/tup/suoluk/suoluk_vaesto_en.html#demographicdependencyratiobymunicipality 20 February 2019.
6. <http://www.satakuntaliitto.fi/english> 12 November 2018.
7. <http://www.ucpori.fi/> 12 November 2018.
8. <https://sites.tuni.fi/kampusote/in-english/> 2 August 2019.
9. <https://www.tuni.fi/en/research/autonomous-robot-ecosystem> 2 August 2019.

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