

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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## Abstract

The discussion on the role of universities in regional development has been a focus of academic and political debate in recent years. The overwhelming consensus is that universities can bring a crucial advantage to regional innovation systems, as knowledge-producers, disseminators and agents in the definition of a forward-looking society. 'Entrepreneurial' and 'innovative' are now terms universities want to be associated with, and such is the case of the University of Aveiro (UA). Its location in the less-developed region of Centro, however, poses a challenge with the presence of a weak institutional landscape and an economic fabric of SMEs operating in traditional sectors. Nevertheless, a result of local aspirations and of a systemic political and educational reform in the country, UA has defined itself as a dynamic and innovative university, by embracing regional expectations, needs and partnerships, along with a conviction of the beneficial role of international knowledge exchange and collaboration.

This paper aims to shed light on the case of this young university, searching to assert itself on the national and international stage, while still fomenting local ties and tackling an adverse context. Using document analysis and in-depth interviews to academic staff, knowledge-transfer offices, incubators and local university partners, this study seeks to understand how the regional, institutional and organisational context has shaped the innovative and entrepreneurial image of UA. Through a comprehensive analysis, this research hopes to present a depiction of UA's practices toward regional development, engagement and innovation that can have transferrable implications for other universities and policy-makers.

**Keywords:** Universities, Innovation, Regional Development, Aveiro, Portugal.

**JEL:** I23; O20; O30; R10; R58

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# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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## Introduction

Traditionally, universities were established with the aim of concentrating on teaching and science, materialized in the form of the *first mission*. The second half of the 19<sup>th</sup> century witnessed the first academic revolution, with intensive scientific research being added to the university's roles, coined as *second mission* (Etzkowitz, 1990). Several incidents such as the end of the Cold War, diminishing militarism, the increasing significance of higher education, and the growing emphasis on knowledge-based economic growth have triggered the debate on the role of universities in society. Within the literature, it is widely agreed that universities can take an active role in innovation-led development in modern societies (Etzkowitz & Leydesdorff, 2000). Multiple models emerged to frame this conceptually, namely the triple helix model by Etzkowitz & Leydesdorff (1995, 2000), marking a cornerstone in the course of innovation studies. The new role of universities to contribute to innovation and regional development was thus incorporated under the *third mission*.

Several studies that have focused on place-based approaches in regional development have put substantial emphasis on geographical context, namely territory, culture, people and institutions (Barca, 2009). Studies focusing on economically successful regions indicate that *institutional thickness* accounts for a great deal of achievement (Amin & Thrift, 1995). Universities, as significant key players, rise to the occasion as institutions that can alter the development trajectory of their respective regions. On the other hand, there has been a growing pressure on universities to engage in their regions, contribute to regional development and to increase competitiveness and innovation capacity, thus also benefitting from the wider interaction (Pinheiro, Benneworth, & Jones, 2012), particularly in less-developed regions (LDRs).

Therefore, seeking to understand the particularities of a university's regional engagement mechanisms and channels when located in an LDR, this study will focus on the University of Aveiro (UA). It aims at unravelling its role in the region's development trajectory, especially relevant in a contested organisational atmosphere derived from the institutionalization of the third academic mission and the tension between acting locally but being recognised globally. Accordingly, the following chapter presents a literature review on the challenges in stimulating endogenous innovation in an LDR and how universities can emerge as leading

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

---

actors to circumvent them. The second section elaborates on the historical role of UA in the region where it is located, and reflects on the most prominent initiatives. This is followed by a presentation of the findings acquired via document analysis and semi-structured interviews, which will be discussed in the light of the broader scope of this study in the last chapter.

## Literature Review

### Stimulating Innovation in LDRs

Innovation has become inexorably intertwined to the fate of LDRs. Increasingly discussed in recent years, the possibility of turning a circumstantially 'weak' environment into a competitive region on a global stage has appealed to many. Despite the difficulty present in such an endeavour, innovation is widely agreed as being the triggering factor for socio-economic development (Rodrigues, da Rosa Pires, & de Castro, 2001), with its processes involving complex feedback and learning mechanisms enriched by a high degree of interactivity being formed between science, technology, production, policy and demand (Edquist, 1997). It is also argued as an inherently geographical process, with the effectiveness of its interactive learning being greatly influenced by a variety of spatial features (Feldman, 1994). Concomitantly, as a process based on (formal and informal) social relations among several actors, such as government, universities and industry, innovation can be equally determined by the region's institutional and cultural context (Cooke, Gomez Uranga, & Etxebarria, 1997; Morgan, 1996).

The multiple variables at play in the process of fostering innovation mean a panoply of barriers for peripheral, less-favoured economies to overcome. The regional innovation paradox, as conceptualised by Oughton, Landabaso, & Morgan (2002), illustrates this difficulty, as although they would need to receive and spend more public funds on innovation, lagging regions lack the capacity to effectively absorb them. According to Rodrigues et al. (2001), two challenges are usually more prevalent when attempting to promote innovation-based development in an LDR:

- 1) promoting a high-level of interaction between economic and institutional agents;
- 2) nurturing locally-based R&D activities.

In the first one, the characteristic weak ties of these regions hinder the spreading and reinforcement of learning dynamics, key to developing competitive capacity (Morgan, 1996). According to Landabaso (1997), structural factors related with the region's demand for innovation, like the productive sector and the institutional framework, can also help explain the technology gap in less-developed regions. These can include: the lack of ability for traditional industries to identify and

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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effectively assess opportunities and need for innovation; inadequacy of the financial system to adapt to the inherent risks of innovation; low level of interactivity and cooperation between the public and private sectors; lack of business support services; insufficient technological intermediaries; detachment of the academic system from the productive sector (Jongbloed, Enders, & Salerno, 2008; Landabaso, 1997; Rodrigues et al., 2001).

It is therefore not an easy task to imbue LDRs with the capacity to craft prosperous and sustainable interactive networks able of promoting endogenous learning, innovation and development (Morgan & Henderson, 2002). The inability to engage in effective collaborative collective action and networking characterises LDRs, suggesting institutional innovation as the most important to develop in this context (Amin & Thrift, 1995). According to Morgan & Nauwelaers (1999, p. 3) “[...] *the most significant innovation [in LDRs] might be to develop voice-based mechanisms through which firms and public agencies can begin to interact locally so as to explore joint solutions to common problems*”. This echoes Hirschman's (1958, p. 25) argument of human agency in development, stating that “[...] *the fundamental problem of development consists in generating and energising human action in a certain direction*”. He further adds that, aside from a scarcity of physical capital, education or entrepreneurship, alongside other conventional factors, the great problem in unbalanced development lies in “*the basic deficiency in organisation*” (Hirschman, 1958, p. 25). Hirschman (1958, p. 5) also posits that economic development depends on activating “*hidden, scattered or badly utilised*” resources, to which Morgan & Henderson (2002) agree as adequate, as it calls for the simple unlocking of institutional inertia in LDRs.

The second challenge, nonetheless, still presents an enormous difficulty, which is connecting the R&D needs of the productive sector to the scientific and technological system of the LDR. Effective R&D expenditure is key, as it is found to be positively correlated with GDP levels (Rodrigues et al., 2001). More developed regions in the EU generally demonstrate a higher concentration of R&D investment, and other technological innovation outputs such as patenting activities (CEC, 2004). Consequently, higher education assumes a major role in the socio-economic development of LDRs, presenting the main resource to fuel innovation – scientific and technological knowledge. Universities thus emerge as a crucial actor in regional innovation efforts.

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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## The Pervasive Role of Universities

Universities can be vital players in the regeneration of lagging regions, not just having a 'stake' in their development trajectory (Healey, 1998), but potentially assuming a leading role in what is a weak institutional landscape. Indeed, universities, especially in LDRs, may have what Rodrigues (2001) describes as a 'pervasive role', assuming their regular missions of teaching and research, but also actively engaging with other institutional actors and mobilising innovation capacity in what denotes an incorporation of a third academic mission (Etzkowitz, 1990; Gunasekara, 2006). A regionally engaged university holds a definite influence over the interactive and collaborative innovation networks, identifying key agents in the system, exploring development resources and creating linkages and enabling collective action, all particularly relevant for LDRs (Rodrigues, 2001). Overall, universities have the potential to contribute towards the competitiveness of their regions, which is in itself a mutual beneficial and interdependent relationship (Goddard & Chatterton, 1999). The possibility of commitment of a university to its local economy will increase with the degree of growth and development of its surroundings (Goddard & Chatterton, 1999). However, as stated by Arbo & Benneworth (2007), the absorptive capacity of university's local partners, that is, their ability to successfully integrate and utilise investment or knowledge, is relatively smaller in LDRs, representing a limiting factor on the effective impacts to be had from the university's engagement.

On the other hand, an integration of a third mission of regional engagement presupposes organisational and managerial challenges for the university itself. This is particularly the case in a global higher education landscape, in which the quest for world class universities raises competitiveness dynamics and academics' behaviour accordingly (Deem, Mok, & Lucas, 2008). Within LDRs, the low demand for advanced technical and scientific knowledge and the lack of overall funding obtainable from regional engagement activities, diminishes the likelihood the region will be under focus (Rodrigues, 2001), particularly by technology-related fields (Arbo & Benneworth, 2007). Generally, LDRs "*lack a supportive policy framework for the reinforcement of cooperative activities between academia and society*" (Rodrigues, 2001, p. 253), which hinders a more effective relationship between university and society, and between public and private agents as well. Universities thus appear as playing the leading role of 'animateurs' in the region

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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because the task of devising an adequate strategy to foster links and an innovation network is mostly left to them. According to (Rodrigues et al. (2001), universities in LFRs are taking on this role, developing policies and strategies to promote engagement with their communities, adapting their organisational structure and encouraging behavioural changes accordingly.



### The Case-Study – The University of Aveiro

Historically, Aveiro was a region overwhelmingly dependent on agriculture, forestry, clay extraction, fisheries and animal farming until the first half of the 1970s (Rodrigues & Teles, 2017). Two major actions, namely the establishment of UA and the Innovation Centre of Portugal Telecom have substantially changed its economic trajectory (Rodrigues & Teles, 2017). Since then, the economy and industrial sectors have been relatively diversified with new activities such as information and communication technologies (ICT), petroleum derivatives, advanced forestry, ceramics, chemicals, cork products, and tourism.

Located between the two major Portuguese metropolitan areas, UA has been placed in charge of a less-favoured, agro-industrial SME region in what is a highly bipolarized country. Because of this, since its creation in 1973, the university has been intrinsically tied to the development of the region, specializing in the scientific areas that would match its economic landscape. UA's history of collaboration with the region is therefore rich and diverse and consistently promoted by the university, with such initiatives following a near-experimental approach (Rodrigues et al., 2001). Both the university in general and its academic and non-academic staff have shaped UA's current regional engagement structures and mechanisms, which display a growing synergy between it and its surroundings.

Therefore, it is especially interesting to assess the university's regional engagement mechanisms in what is considered a less-developed region. This case-study addresses the typical constraints universities face in activating regional engagement mechanisms in a less developed region – *weak institutional landscape with low levels of interaction between agents, lack of a supportive policy framework and differing motivational and organisational views within the university* – and to explore how these have been or can be tackled. The research data is a combination of policy documents, reports assessing UA's regional role in the economic development of the region, and other key documents of the university. Additionally, seven semi-structured interviews were conducted, six with academics and one with a representative and policy-maker of the Intermunicipal Community of the Region of Aveiro. The website of the university was reviewed to complement the analysis, enabling the retrieval of detailed information on curricula and the mechanisms and structures through which the university engages.

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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The qualitative analysis of the documents and transcribed interviews seeks to explore:

- a) what specific challenges in the less-favoured region are hindering UA's engagement in innovation activities;
- b) what are the regional economic development and innovation needs UA is trying to respond to;
- c) how can UA overcome the constraints typical of an LDR.

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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## Findings

A review of websites, policy and planning documents of the region (CIRA, 2014, n.d.) as well as reports of the university (UA, 2012, 2016) clearly sustains the claim that UA has been seeking to respond to local needs since its creation. As a coastal, river valley area, rich in minerals like clay, it is no surprise that it would first demand of its university more specialised, scientific knowledge in environment and marine sciences and in ceramics and materials. Other earlier departments of UA included also pedagogical training and electronics and telecommunications, influenced by the location of the Innovation Centre of Portugal Telecom in Aveiro. Currently, while its curriculum encompasses more varied disciplines, it is still very much defined by regional economic trends, with the paradigmatic examples being agro-food, industrial engineering and tourism. Due to the character of these specialisations and because of this sought-out synergy with the region, UA has not limited itself to an urban influence but has expanded its efforts throughout the rest of Centro, evidenced by its multiple polytechnics that are present outside of the city, and the multiple regional engagement projects it has participated in (CIRA, n.d.; UA, 2016).

Both the physical presence of UA in the territory as its tailored curricula are believed by interviewees to represent a distinguishing advantage of the university in acting upon the region. They believe UA acts not only as a central point of contact for other local agents, an intermediary between the public and private sector, but also as a symbol of progress and entrepreneurialism, with its multiple projects making its action recognisable in the territory. While limitations in the interaction with SMEs are referred to as by the academic interviewees, these are believed to profit from the university's presence, if not from its research, by integrating the many highly qualified workers that it trains and by utilizing its laboratories and other resources. Also, the commitment of the university in entrepreneurialism, materialized in the creation of a technology transfer office and an incubator on campus, has led to the emergence of multiple high-tech SMEs in the region, which inevitably absorb more of the university's available knowledge and resources.

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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In the realm of governance, especially since the formal creation of CIRA<sup>1</sup> in 2008, UA has been viewed as a central partner (CIRA, 2014), with both collaborating in innovation-related initiatives. Among these are included the Urban Network for Competitiveness and Innovation, a Triple Helix experiment based on Etzkowitz's model (Rodrigues & Melo, 2013), the Science and Innovation Park, and more recently the Smart Specialisation Strategy (S3) for the region of Aveiro. Within these joint projects, and as stated by the representative of CIRA and one of the heads of the departments, UA was seen, if not as playing a leading role, as at least the core partner, activating or intermediating relations between various institutional agents towards more effective collective action. Thus, if not completely solving this first challenge of a *weak institutional landscape* in the LDR, at least playing a major role towards its solution.

Concomitantly to the above-mentioned commitments, a stronger *policy framework*, both regional and internal to the university, was built-up in support of this collective network of action in innovation. The main aim was to effectively and smoothly link the regional economy to scientific and technological knowledge, so that an interactive process of information-exchange could emerge and make UA understand the productive sector better, and firms, e.g., become more resilient and innovative. An example on the regional level, emphasised by both in policy documents and interviewees' accounts, was that of the participation of the university in the design of the S3<sup>2</sup>. Given EU's guidelines, universities should actively engage in the process, namely in the Entrepreneurial Process of Discovery, to provide a better assessment of future development tendencies in the region. The network that emerged between CIRA, UA and the industry cemented a regional, collaborative action and the importance of R&D input, and was described as an opportunity for the university to directly contribute to the planning and policy sphere.

In regards to the *institutional and organisational management and policies* of the university, several mechanisms and channels were created to promote and monitor technology and knowledge-transfer activities, as well as other forms of entrepreneurialism and regional engagement. In 1998 the role of Vice-Rector of

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<sup>1</sup> Acronym for the Intermunicipal Community of the Region of Aveiro.

<sup>2</sup> For more information on the co-design of the S3 in the region of Aveiro, please refer to Rodrigues & Melo (2013).

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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University-Society linkages was created, meaning a definitive institutionalisation of the third academic mission within UA, but a recognition within the action plan developed that not all members of staff may want to be involved in such activities (Rodrigues et al., 2001). More recently, the position of Pro-Rector for Cooperation and Regional Development was also established, functioning as a privileged contact point between governmental bodies in the region and the UA.

Other formal channels created include the Business Incubator of UA (IEUA), dating back to 1996 and UATEC, UA's technology-transfer office, created in 2006. Both of them function as typical incubation offices that allow for the conversion of knowledge and ideas into economic value, providing support and workshops to both entrepreneurs, established companies and connecting them with investors. IEUA collaborates with other regional entrepreneurial organisations, namely IERA (Business Incubator of the Region of Aveiro) and RIERC (Network of Business Incubators of the Centro Region). UATEC is relatively smaller in comparison and focuses more on intellectual property issues and in creating links between the university and firms.

Despite the growing efforts made by UA in establishing a formal strategy in matters of regional engagement, interviews indicated that "*such a strategy does not exist*". Goal-setting, a crucial mechanism for promoting growth and the effective implementation of strategies, is referred to as non-existent in regards to regional engagement. The accounts of the academic staff suggest there is a lack of a unified approach, explained by universities being 'loosely coupled' institutions with a multitude of actors, each with their own degree of autonomy and *modus operandi*. A recurrently mentioned example is the evaluation for academic career progression. Interviewees recognised the importance of UA's recent decision to include in the assessment a regional engagement dimension, alongside teaching and research, showing a commitment to its entrepreneurial and place-based mission. In practical terms, however, interviewees consensually agreed that factoring this third dimension in the evaluation was detrimental to the overall score of academics. This because the allocation of time and productivity into three categories effectively diminishes the general performance percentage, meaning they would not be able to achieve an 'excellent' in either one. The staff acknowledges the system of evaluation is, in a way, experimental, allowing progressive revisions. But while this does not occur, they are forced to omit

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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recording their involvement in regional engagement activities in the evaluation, over hindering the assessment of their mandatory commitment to teaching and research.

This is especially aggravated by the fact local involvement in LDRs and international recognition still sometimes divide academics' attention rather than being complementary. Equally influential is the fact that the profit (if any) obtained from such activities is, in its majority, sifted through the university's main administration offices, with little reaching the involved departments and academics. It is therefore no surprise that interviewees recognise individual beliefs and values as the main motivating factors for partaking in regional engagement activities. The statements indicate that, even though there is no great financial or career progression benefit in engaging, there is a sense of accomplishment in contributing towards the advancement of the society around them.

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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## Conclusions

The present paper has sought to shed light on the typical constraints universities face in activating regional engagement mechanisms in a less developed region and to explore how these have been and can be tackled. An overview of the literature has shown that innovation is a complex, multifaceted issue that is not easily stimulated in any territory, much less in an LDR that must still build the structures needed to support it. Two of the common challenges LDRs face in this quest are promoting a high-level of interaction between economic and institutional agents; and nurturing locally-based R&D activities. Not simple tasks to undertake, the region may benefit from the presence and commitment of an institutional actor widely believed in the innovation literature to promote socio-economic development – a university. Able to nurture endogenous R&D activities and collaborative, collective action between both the public and the private sector, universities have the potential to assume a leading role in the development of lagging regions. However, they face certain common limitations: a weak institutional landscape with low levels of interaction between agents; a lack of a supportive policy framework; and, challenges in adapting their institutional and organisational approaches when integrating the third academic mission.

According to the findings extracted from an analysis of policy documents, interviews and other official statements, it was possible to conclude that UA and the region of Aveiro benefit from a special connection, as since the university has sought from its creation to closely respond to the needs of the society surrounding it. Consequently, given the early push for the implantation of the university in the region and the circumstances of its birth, the connection between UA and the region was inherently strong. Links were quickly formed with local industry and the productive sector and collaboration was made frequent and consistent with regional governmental bodies. So, in collaborative, institutional terms, UA did not meet much resistance in its 'pervasive role' in regional engagement. The main needs of the region it has tried to respond to were not just in terms of scientific and technological knowledge or in training of highly qualified workers, was in terms of the establishment and promotion of this network of innovation.

Nonetheless, while external constraints are balanced among several actors, internal ones are more difficult to manage. UA has created several mechanisms and channels in order to sustain a more effective university-society link and to promote

# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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and monitor technology and knowledge-transfer activities, as well as other forms of entrepreneurialism and regional engagement. Even though these have permitted the institutionalisation of the third academic mission more generally, it has not succeeded making this participation recurrent by individuals. A lack of overall strategy and goal-setting regarding regional engagement, and the inability to effectually incorporate it in academic evaluation for career progression, means that tensions arise with how the staff chooses to spend its time considering the pressure involved. The questions of financial gains and local engagement/international recognition, while important factors to take into account in LDRs, are here more a matter of internal organisation of the university and individual motivation.

In a world where universities have been undergoing several changes to respond to external pressures, both literature and interview findings indicate that mechanisms and indicators of regional engagement efforts have not yet adapted to the trends. An indicator based on commercialisation and technology transfer output does not suffice. There is an urgent need for indicators that take into account social concerns shown by academics and universities, as well as collaborative and collective action for stimulating innovation. This suggests there are ways academics exercise their third mission without generating any financial revenue, but instead other equally valuable outcomes. Nevertheless, above all, there is an absolute need to reach a consensus on what the third mission means, as there are diverse opinions between academics and within disciplinary fields, and then design and implement policies accordingly.

Finally, in consideration of the topic here presented, it is possible to conclude that, even though LDRs may present a challenging environment for the presence of a university, the opportunities presented are of great value. The possibility of the university developing closer relationships with local actors and between them, not always available in a more advanced, highly technological urban setting, is of crucial importance when considering the highly interactive process that is innovation. And it is through this gradual process that the appropriate structures can be built-up to create a self-sustaining innovation system.



# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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# Engaged and Innovative Universities in Less-Developed Regions

The Case of the University of Aveiro

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The Case of the University of Aveiro

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