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New Directions in Regional Innovation Policy: A Network Model for Generating Entrepreneurship and Economic Development

Abstract

Lifting the economic performance of lagging regions continues to puzzle economic development practitioners and analysts. As a means of contributing some solutions to this puzzle, this paper examines a policy intervention that promotes regional development through a public-private sector initiative that utilises a network model to catalyse innovation-driven entrepreneurship. It focuses on a programme operated by the Alacrity Foundation in the region of Wales in the UK. The paper argues that the Foundation's model offers a novel means of attempting to facilitate regional development through a programme that intertwines elements relating to entrepreneurship, innovation and network policy and practice. It is novel in the sense that it seeks to de-risk the entrepreneurial and innovation process in a regional environment that is not traditionally strong in this respect. It is concluded that such programmes indicate that policy is beginning to embrace a number of ideas emerging from theoretical work on the drivers of regional innovation and growth.

Key words: regions; innovation; policy; networks; entrepreneurship; economic development; Wales.

JEL Codes: L26 O31

Introduction

Lifting the economic performance of lagging regions continues to puzzle economic development practitioners and analysts (McCann and Ortega-Argiles, 2013). Recognising entrenched and deepening divisions in sub-national performance within many nations, policymakers look to initiatives that even in small and modest ways may serve to change the economic bases of regional economies (Aranguren et al., 2017). Whilst path dependencies in various forms – from deindustrialisation to institutional inertia – remain as barriers, new public and private sector initiatives that mediate knowledge processes are seen to present opportunities that may, in gradual steps, support dynamic firm and labour market activities (Pike et al., 2007; Uyarra, 2007; Boschma and Martin, 2010; Fritsch and Slavtchev, 2011).

In particular, innovation is commonly acknowledged to be a principal means by which regions foster economic growth and competitiveness (Capello and Nijkamp 2009; Harris 2011; Pater and Lewandowska, 2015). At the same time, it is suggested that entrepreneurship is also a key source of such growth (Audretsch et al. 2006). Furthermore, alongside these perspectives there is a growing school of thought suggesting that the networks facilitating flows of knowledge within and across regions are a key source of innovation and growth (Crespo et al., 2014). However, even though the legacy and prevalence of Schumpeterian discourse has led to

‘entrepreneurship’ and ‘innovation’ more often than not being uttered in the same breath, especially in regional development policy circles, the connection between the two is usually implicitly, rather than explicitly, formulated (Huggins and Thompson, 2015).

Given this position, this paper seeks to examine a new policy intervention that is attempting to combine these factors in a manner that promotes economic growth and competitiveness in a relatively challenging regional economic environment. It focuses on a programme operated by the Alacrity Foundation in the region of Wales in the UK. This programme is a public-private sector endeavour that utilises a network model to catalyse innovation-driven entrepreneurship.

The paper proceeds with a critique of core and emerging regional innovation theories and concepts, before an outline of the case context and methods are given. The empirical case is then fleshed out, analysed and interpreted, with the findings suggesting that the Alacrity Foundation’s model offers a novel means of attempting to facilitate regional development through a policy programme that intertwines elements relating to entrepreneurship, innovation and network theory and practice. The concluding section suggests that further comparative work would provide broader insights into the likely effectiveness of particular policy interventions within specific regional contexts.

Regional Innovation Theory and Policy

Theoretical perspectives on regional innovation and growth predominantly come in two related forms. First, those that seek to understand the processes and organisational factors relating to how innovation actually occurs within regions, i.e. regional innovation theories (Asheim et al., 2011). Second, a theoretical strand focused on understanding the role of innovation in facilitating regional economic growth, i.e. innovation-based theories of regional growth (Cooke et al., 2011). As shown by Figure 1, the conceptual frameworks employed by both theoretical approaches broadly consist of either a resource-based view or an interaction-based view. The resource-based view largely concerns the assets and endowments within a region, and from the perspective of regional innovation theories this relates to the types of industries, industrial mix and the capacity of these industries to foster regional innovation (Camagni, 2009). From the innovation-based growth perspective, the focus is very much on the notion of endogenous growth and the accumulation of the forms of intangible capital associated with triggering and sustaining long-term economic growth.

Figure 1 About Here

The interaction-based view can be considered complementary to the resource-based view, focusing on the nature the relationships, linkages and networks that exist between regional actors engaged in innovation. Most prominently conceptualized as regional innovation systems, innovation milieu and clusters, the interaction-based view considers these modes of connectivity to provide diffusion channels allowing the knowledge required for innovation to flow within and across regions (Cooke et al., 2004). With regard to innovation-based growth theories, there is a growing discourse that conceptualises these channels and flow mechanisms as a form of capital – e.g. network capital and social capital – that are dimensions of the mix of ‘capitals’ that can be accumulated as part of endogenous growth processes (Huggins and Thompson, 2014). Similarly, these growth processes are a component of a wider theoretical canvass focused on the ‘success’ of regions, broadly considered to relate to their economic development trajectories.

One theoretical approach that seeks to mesh both resource-based and interaction-based conceptual models of innovation concerns that of network capital, whereby networks themselves are an asset permitting access to a wider suite of resources. Network capital is regarded as a product of the investments firms make in “calculative networks” (Huggins and Thompson, 2014; 2015), reflecting the importance of building and maintaining relationships beyond market transactions.

In this sense, entrepreneurs identify and mobilise the uniqueness of their knowledge base according to three underlying characteristics, namely: the superiority; excludability; and miscibility of knowledge, i.e. the capability to mix and combine different types of knowledge from different sources with their own knowledge stocks. Network capital may be particularly vital in the start-up phases as firms are able to learn through relationships, for example, with suppliers, customers and universities. These relationships are governed by a knowledge filter that seeks to identify potential economically beneficial knowledge, whilst filtering out redundant knowledge (Acs et al., 2013). How knowledge networks are brokered and mediated is crucial – particularly in a policy context - as beneficial outcomes from network integration, or the ability of entrepreneurs to participate in networks, are not automatic.

Institutional contexts shape innovation outcomes, and firms in weaker regions are likely to require help to develop network-based relationships. Low innovation regions tend to be organisationally and institutionally ‘thin’, with a lack of innovation-driven public or private sector entities, coupled with a high dependence on small and medium enterprises exhibiting low growth trajectories (Rodríguez-Pose, 2013; Aranguren et al., 2017). Accordingly, the least

competitive and most peripheral regions are usually less well-endowed with high-quality knowledge providers, which suggests the need for efficient institutions in mediating network capital, and for public policy intervention more generally.

In this respect, there is an ongoing search for effective innovation policy, which sits at the core of concerns for regional economic development (Asheim et al., 2011). Rejecting the idea of a silver bullet for regional innovation policy, Flanagan et al (2011) point to the interactions and interdependencies between a range of innovation system mechanisms as an important areas for policy-oriented research to grapple with. Policy impacts are similarly varied, with physical infrastructure, institutional settings, education and training, business support, and regulation reflecting notable domains that innovation is either embedded in or responsive to (Pugh, 2014). Elder and Georghiou (2007) group such factors into the supply and the demand side of the innovation system. As reflected in such plurality, innovation policy is perhaps usefully regarded as a messy and complex, multi-level, multi-actor reality (Flanagan et al., 2011).

Inflecting the multi-faceted nature of innovation systems, the economic peripherality of Wales - the backdrop for this paper's case study - creates the need for context specific interventions (Fratesi, 2015). The shortcomings of transferring policies and approaches from leading innovation regions to those with weaker capabilities have been highlighted by a number of authors. Tödting and Tripl (2005: 1216), for example, refer to the undifferentiated use of innovation policy and conclude by noting: "The reflections on the weak innovative capacity of different types of problem regions and on possible policy responses ... may be an important contribution to avoid the pitfalls of an innovation policy approach drawing its inspiration from ideal type regional innovation systems.". Other authors, such as Uyarra (2007: 256), dismiss the "naïve emphasis on benchmarking and imitating from other successful regions", while Piccaluga (2006) notes the need to account for unique institutional and path dependent contexts and move beyond "copy and paste" approaches to policy development. The need to shape policy based on actual systems, rather than the idealised, is also of concern for Mason and Brown (2013).

Morgan's (2016) work on the Basque country, which outlines the prevailing regional innovation model – an attempt to transition away from an old industrial economy through the adoption of a smart specialisation strategy - is instructive and ties much of the above together. Of relevance to wider regional innovation policy debates, Morgan (2016) suggests that a balance needs to be struck between the key dimensions of novelty and continuity, intra and extra-regional learning, and state versus network-centric approaches, whilst being cognisant of

policy complexity (and the varying roles played by different actors). This requires an analytical shift from fetishizing perfect design and laying out stylised policy toolkits, to recognising trade-offs and the need for continual adaptation, coupled with an understanding of the limits of policy action (also see Flanagan et al., 2016).

Within innovation systems research, there is wide debate concerning the appropriate policy mix to support entrepreneurs and high growth firms as key actors. Lee and Rodriguez-Pose (2013) and Mason and Brown (2013) explore policy arrangements to support small firms and point to the importance of differentiation and context sensitivity in policy design (also see Baumgartner et al., 2013). Focusing on spatial contexts, Lee and Rodriguez-Pose (2013) highlight the different tendencies of urban and rural based small firms to develop product and/or process innovations, and the extent to which ‘new’ ideas are entirely original or simply novel to particular firms (the latter suggesting learning mechanisms).

At both the actor and systems level, one problem with policy development is the timing constraint typical of much evaluation work. For McCann and Ortega-Argiles (2011) the long timeframes required to assess effects working through the economy are problematic, with a focus on “short-term outcomes” tending to trump “long-term nurturing” (Huggins and Thompson, 2016). For policymakers, therefore, a balance needs to be found between undertaking rigorous evaluation and following recommendations, and giving sufficient time for outcomes of programmes to be realised.

An emerging theoretical position within regional innovation and growth theories concerns the role of human behaviour, and of institutions in shaping and moderating this behaviour (Huggins and Thompson, 2016; Lee, 2016; Rentfrow and Jokela; 2016). Principally, the focus is on entrepreneurial human behaviour and the means by which such behaviour drives innovation (Audretsch et al., 2017). As suggested by Figure 2, behavioural-based frameworks incorporating cultural and psychological aspects help us understand why particular agents within a region, especially entrepreneurial agents, may possess a proclivity towards fostering innovation, as well as how the interaction between cultural and psychological factors result in regional behavioural systems with a higher or lower tendency to sustain long-term economic growth (Huggins and Thompson, 2017).

Figure 2 About Here

Institutional-based frameworks allow us to consider how both informal and formal institutions are likely to moderate the behaviour of regional actors through the underlying rules of the

game, especially the constraints and incentives relating to innovation. Similarly, institutions form part of the broader growth systems and growth dynamics that ultimately determine regional economic growth (Rodriguez-Pose, 2013; Huggins, 2016). Fundamentally, through the prevailing forms of culture, personality psychology and institutions, it can be suggested that regions themselves produce a spatially bounded rationality that determines the forms and types of human agency apparent in a region, and subsequently the nature of, and rate of, innovation and growth (Koellinger, 2008; Audretsch et al., 2017; Huggins and Thompson, 2017).

In a competitive environment, entrepreneurs will be alert to opportunities and contribute to regional economic growth. However, changes in levels of entrepreneurship and contributions to regional economic development will take time to emerge, and as such any effects may only be seen in the long term. Alternatively, regions can be uncompetitive and lack entrepreneurial dynamism because they are deficient in the key strengths which make leading regions prosper and develop (Audretsch and Keilbach, 2004).

Regional entrepreneurship is particularly associated with the effective or failing nature of regional innovation systems, with the flow of knowledge across organisations considered to be a crucial factor for effective innovation (Hayter, 2013). Successful economies are usually associated with efficient innovation systems resulting from high levels of entrepreneurship, while weaker economies are often those with failing innovation systems and low levels of entrepreneurship (Asheim et al., 2011).

From the entrepreneurial behaviour perspective, policymaking is deemed necessary when entrepreneurial firms are considered to be vulnerable to ‘market failures’, and when such market failures are likely to be permanent unless steps are taken to address them. Despite this traditional emphasis on entrepreneurial firms and market failure, contemporary entrepreneurship policies have become less focused on imperfections in the market, less interested in specific firms and ‘picking winners’, and more interested in individual agents, which emphasises the propositions suggested by behavioural and institutional theories of regional innovation and growth (Huggins and Thompson, 2016; 2017; Lee, 2016).

Mason and Brown (2013) point to the need for policy to be open to supporting entrepreneurs in sectoral areas that are not currently fashionable, to encourage internationalisation at an early point, and to instil policy that supports sharpening and challenging leadership skills. At a more generic level, a study for the Kauffman Foundation, a US-based entrepreneurship policy think tank, points to four stylised principles that entrepreneurship policy should take into account: avoiding public sector venture funds; steering

clear of traditional incubators; fostering connections and learning; and facilitating catalytic events (Motoyama and Weins, 2015).

Context

The parlous state of the economy of Wales is well documented (IWA, 2015). Indeed, the Welsh economy persistently performs below UK-wide GVA per capita levels, whilst low average GVA per job (labour productivity) and low wage employment have been associated with industrial restructuring (as low value services replaced traditional resource and manufacturing jobs). The general business culture is seen to be weak, and across the Welsh SME base there is a lack of a culture of entrepreneurship and innovation. An over emphasis on branch plants and foreign direct investment (FDI) in the past - rather than building up the capabilities of indigenous firms - is pointed to by some as a contributing factor (Huggins and Pugh, 2015)

A fundamental issue in Wales has been the lack of an innovation system that provides entrepreneurs with the nurturing environment they require (Morgan, 2012). Whilst leading locations are able to create a virtuous cycle of entrepreneurship and innovation, regions such as Wales become trapped in a more vicious downward cycle. In general, locational context plays an important role in shaping the nature of entrepreneurship pursued (Koellinger, 2008). Supporting increased levels of entrepreneurship is of central importance to economic development in Wales. However, previous initiatives such as the Technium incubator programme have found it difficult to generate success (Morgan, 2012; Murphy et al., 2016).

A multi-faceted and arguably somewhat chaotic innovation policy backcloth is in place in Wales, reflecting, in part, an innovation agenda that has waxed and waned. Prior to, and shortly after, the introduction of a devolved regional Welsh Government in 1999, innovation was a key policy sphere, resulting in three strategies – the Regional Technology Plan (RTP), the Innovation Action Plan (IAP) and the Entrepreneurship Action Plan (EAP). These took an explicitly systems and entrepreneurship-based approach to innovation. In a second period - principally between 2003 and 2009 - the innovation agenda weakened somewhat (Huggins and Pugh, 2015). However, there has been a resurgent interest in innovation since 2010, with it featuring centrally in economic strategies, and with a more recent innovation strategy – *Innovation Wales* - in place, which seeks to attach itself to “smart specialisation” principles (Welsh Government, 2014). Improving collaboration, promoting a culture of innovation, providing flexible support and finance for innovation, innovation in government, and prioritising and creating critical mass are key threads of the strategy. Poor representation in some key innovation-led areas; a weak external perception of Wales as a base for knowledge

based companies; improvement in the quality of engagement between academia and industry; and poor graduate retention arising from a lack of suitable employment opportunities are seen as key priorities for improving the Welsh innovation landscape.

With respect to entrepreneurship policy, the Welsh Government has also signalled a move away from previous business support mechanisms, where support was provided to any and all businesses, stating that “we should not try to second-guess the action of markets at the level of individual businesses and therefore we will reduce substantially our direct business support” (Welsh Government, 2010: 7). Alternatively, the Welsh Government states that it will focus resources on where the most value can be added, “acting as an enabler for the economy as a whole rather than a significant direct deliverer of services to individual businesses” (Welsh Government, 2010: 36).

Methods

As part of the analysis, the research team had access to a series of documents relating to the development, set-up and operation of the Alacrity programme. This included initial feasibility documents (including the project proposal), legal documents covering the set-up of the Alacrity Foundation and the agreed responsibilities of the different parties and budgets involved, and a full set of Trustee Board Reports. The latter reports chart the progress of the Foundation in terms of spending, student recruitment, strategic linkages, mentoring delivered to students, and progress in new companies being developed from graduate teams.

In addition to the documentary material, the research team undertook a series of consultations with Trustees of the Alacrity Foundation, officials from Welsh Government, as well as a selection of students who were involved in, or who have graduated or exited from, the scheme. Such an approach ensured that a range of perspectives could be taken into account. A sample of 10 students was generated in consultation with the Welsh Government and the Alacrity Foundation, and allowed insights from the Foundation’s inception to its more evolved state to be revealed. Each interview took a semi-structured form to allow follow-up discussion and particular issues to be explored in depth, and was partially transcribed to permit key themes to be drawn out (King and Horrocks, 2010: 143). Interviewees were asked about their entry into the scheme, how they work or worked with mentors and strategic partners, and how the programme operates more generally. Interviewee responses were anonymised in order to encourage frank and open discussions, and the multiple methods approach adopted allows for triangulation – particularly the verification of testimony - to take place. The material gathered reflected that necessary to conduct a preliminary evaluation, and served to provide the basis

for an analysis of the multiple relationships that stitch the Alacrity programme together. The material does not provide for a firm judgement on project success or failure, however, which requires longer-term horizons.

The Alacrity Foundation's Graduate Entrepreneurship Programme

The Alacrity Foundation's Graduate Entrepreneurship Programme aims to create firms in new technology sectors. Preparing graduates for entrepreneurship, providing mentoring in applied R&D, aligning graduates with global opportunities, ensuring funding support, and helping to support a suite of new and sustainable Welsh-based technology companies are underpinning principles. Key to how the programme functions are groups of student teams that generate legally incorporated firms, develop business plans (demonstrating a route to commercial viability), and then, supported by partner working, secure an order for a software product or service. The new companies aim to develop their own intellectual property (IP) and be positioned for first mover advantage.

At the time of the review, a total of 37 graduates had been hired by the programme. Of these, 15 were involved in start-ups, 5 had graduated but left programme for other employment, and 7 had left the programme prior to graduation. All companies that have graduated have achieved sales revenue and also developed their own unique IP. Where students have left the programme, there is some evidence that they have gone onto pursue valuable opportunities.

Alacrity operates as a company limited by guarantee – and registered as a charity in the United Kingdom – and is governed by a Board of Trustees that has responsibility for governance and management. Support for the Foundation is given by the Waterloo Foundation (a Cardiff based charity), Wesley Clover (Wesley Clover is a holding company which owns assets in the technology, networking, real estate and leisure industries), and the Welsh Government. The Foundation has benefited from an annual cash grant from the Welsh Government of £316,500 per annum (£1.58m over first five years). This was matched by two sources. The Waterloo Foundation contributes £100,000 per annum and Wesley Clover contributes £216,500 per annum, with this being made up of a cash contribution of around £109,000 with the remainder being an in-kind contribution.

Associated with the programme, but distinct from the Foundation, is an equity seed capital fund of £2,500,000, based on contributions by a number of collaborators intended to be used to invest in the start-ups generated by the programme. Upon graduation, each team has the opportunity to pitch for 'seed-funding' with a value of up to £250,000 (50% provided by the Welsh Government).

The Alacrity programme is based on a graduate training methodology developed by the Wesley Clover Corporation in conjunction with a number of universities in Canada, the USA, the UK, France and India. The programme is broadly structured around two key stages of activity. The first and most substantive stage involves a process whereby successful applicants are mentored and supervised in ‘company teams’. During this period, graduates undertake an educational process that aims to equip them for the requirements of starting up a technology company. Graduate teams develop projects through engagement with a strategic partner.

In terms of the graduate recruitment criteria, students are primarily graduates from computing sciences, with a business lead from the social sciences (economics in particular). However, through time the programme has taken graduates from a range of engineering and science disciplines, and with the programme of activity developing so that students from disciplines outside computing science gain practical experience of coding through an intensive programme. The main focus of projects are enterprise communications, mobile technologies and digital media content, and the Foundation has recruited graduates from a range of high quality institutions from Wales, the rest of the UK and overseas.

Mentoring is provided by senior managers who have experience in sales and marketing, communications, software and product development, and general and financial management (such persons are typically deemed to be of a high calibre by programme participants). External mentors are also drawn from diverse professional backgrounds. The time of such persons is provided without remuneration. Finally, the strategic partners with whom students interact and develop live projects are seen to play a central role in determining the success or otherwise of individual projects. Strategic partners may act as future suppliers, collaborators or buyers for a start-up’s products and services. The programme has engaged a roster of partners that includes more than twenty organisations including large blue-chip multinationals.

In order to successfully graduate from the first phase of the programme, the following needs to be demonstrated: one, a clearly identifiable product or service is in place; two, an identifiable customer is in place; and, three, they need to be incorporated and provide evidence that a clear pathway to revenue is in place. The second stage - the incorporation of a new start-up company to be headquartered in Wales – is targeted to emerge 12 months after the teams have commenced the programme.

Financing reflects a key facet of stage two. Decisions to invest finance from the seed fund are based on a number of key processes that form part of due diligence procedures. These processes are: one, identification of the opportunity, by assessing specific concepts with potential customers and strategic partners that may represent a credible market opportunity;

two, shaping the opportunity by working with the investee team to develop the opportunity and establish its viability; and three, following external advice and formal review, present a formal plan to the seed fund's investment committee for consideration and potential funding approval. In the event that an investment proposal is deemed unacceptable, the plan and investment proposal may be revised, or the graduate teams may be directed to other opportunities. If proposals are accepted, experienced non-executive directors are appointed to the newly financed company (see Figure 3)

Figure 3 About Here

Analysis of the Programme

Alacrity can be viewed as attempting to provide capacity for entrepreneurs to participate in strategic networks. Such a capacity development role is clearly important in a context where innovation and entrepreneurial bases are limited (Crespo et al., 2011). The capacity provided is unique from incubator and accelerator initiatives in that it shields actors from market pressures from the outset by providing time to prepare for market entry. In other words, it seeks to promote innovation efficiency by providing an institutional environment that helps nurture entrepreneurial behaviour and to manage the risk necessarily involved with such behaviour (Fritsch and Slavtchev, 2011; Rodriguez-Pose, 2013; Huggins, 2016).

The network channels supported and provided by Alacrity exhibit hybridity, which is reflected by the links that can be observed not only to the private sector but also to the academic and public sectors, and provide varying degrees of knowledge and financial capital. It is useful to decompose three key sources of network capital in appraising the Alacrity programme: mentors; strategic partners; and owners/founders. Each source provides or mediates network capital in a different way. Mentors provide a source of network capital mediation, and interventions may include support with technical coding matters to connecting Alacrity-based entrepreneurs with their own contacts, so as to support the branding and marketing required to generate a market proposition. Mentors, therefore, are key agents in the programme's role of mediating network capital for entrepreneurs (Huggins and Thompson, 2016). Interviewees remarked that the timing at which mentors come in to a project can be critical for success, as external knowledge has different value at different stages of firm formation. A key feature of the mentoring aspect is that the knowledge filtered through to entrepreneurs reflects changing market and technological realities (Acs et al. 2013), which means that the suitability of particular mentors is regularly revisited.

Strategic partners may feature in the calculative relations of entrepreneurs at multiple points across the programme. Interviews revealed that strategic partners may act as buyers or suppliers of the product and services of the start-up firm, or as collaborators. This has a critical role in the knowledge filter, with numerous interviewees reporting that having access to such support provides significant insights concerning market readiness (Mason and Brown, 2013; Brown et al., 2016). However, relationships with strategic partners have not always been seamless, with, for example, some entrepreneurs pointing to challenges in accessing personnel within large firms. In other situations, there are challenges in maintaining the same frequency of engagement with strategic partners, while others point to problems in terms of timing with regard to concept development.

The structure of the Foundation's programme is such that the strategic partners with whom student entrepreneurs interact and develop live projects are likely to play a central role in determining the success or otherwise of individual projects. In this sense, the Foundation has prepared a roster of partners that includes more than twenty organisations including large blue-chip multinationals, such as Vodafone, Sony, Accenture, Admiral Insurance, BT, and HP, as well public sector organisations such as the UK's National Health Service.

As indicated above, the Foundation has proactively sought to develop links with other organisations as a means of providing access to both knowledge and financial capital. For example, the relationship the Foundation is seeking to formalise with Alcatel Lucent represents an opportunity to access a range of potentially innovative and commercialisable IP. This has grown into an arrangement whereby Alcatel is willing to provide Alacrity with IP emanating from Bell Labs in New Jersey, USA. Forming links with these prominent global players is an important outcome of the programme. The Foundation has also signed a Memorandum of Understanding with Qinetiq based on an open innovation partnership approach. These examples show the various ways by which the programme plugs into, or "strategically couples", with global production networks (Mackinnon, 2011).

Owners and founders provide network capital in the form of access to their own contact books as well as the leveraging of symbolic capital. In terms of the former, the owners and founders have wide reaching networks that entrepreneurs can plug into (Crespo et al, 2014). Regarding the latter, the names of the founders and owners serve to open doors to relevant business communities. Interviewees remarked, for example, that attendance at events and conferences were, in some instances, granted on the basis of the entrepreneur's affiliation to the founders.

Framing the Programme in the Context of Theory

Network capital may work in tandem with other capital processes influencing relational geographies (Camagni, 2009). For instance, founders and mentors may have a role in pointing entrepreneurs within the programme to sources of financial capital, especially during stage 2 of the programme. Furthermore, as illustrated by Figure 4, knowledge takes multiple sources: one, embodied in the student entrepreneurs that enter into the programme (many have extensive technical and tertiary education backgrounds), and, two, the network capital that supplements the entrepreneurs' own knowledge and assists with generating a market proposition (Acs et al., 2013). Within Figure 4, the lines labelled *A* and *B* reflect knowledge filters; in the first instance, *A*, between knowledge sources and network capital, and then, for *B*, between human capital and entrepreneurs. *A* reflects the role of Alacrity in sorting the beneficial network capital for entrepreneurs. In this sense, Alacrity provides the capacity to distinguish effective from redundant knowledge (Fratesi, 2015). For entrepreneurs without such support it is possible that more resources may be required to make such a determination.

Figure 4 About Here

B reflects another sorting process; the role of Alacrity in identifying individuals to recruit to the programme. Interviewees pointed to the recruitment of students as markedly improved from when Alacrity was first established. *B* further reflects the pull that Alacrity may offer to skilled and experienced individuals, who may not otherwise seek to set-up a business in Wales. Alacrity takes a range of approaches to attract students, including giving presentations at universities to facilitating an application online. Interviewees commented on the multiple stages making up the recruitment process and recalled the informal introduction and inception process as means of identifying individuals with the potential for expressing entrepreneurially innovative behaviour (Koellinger, 2008; Huggins and Thompson, 2017)

Reflecting the box bounding entrepreneurs and network capital in Figure 4, the Alacrity programme attempts to mediate and mesh the innovation system together (Asheim et al, 2011). In the absence of Alacrity, the links between each constituent may be weaker and less durable. Moreover, it can be argued that given the information asymmetries facing small start-up firms, Alacrity offers filters that improve the quality of the network capital available to entrepreneurs. In essence, Alacrity provides the capacity to generate entrepreneurial network capital, as well as to filter financial and human capital more effectively. It also helps to reduce the search costs and selection hazards that an entrepreneur may otherwise be faced with (Hayter, 2013).

The operational model of the Alacrity Foundation is novel in the sense that it seeks to de-risk the entrepreneurial and innovation process in a regional environment that is not traditionally strong in this respect (Baumgartner et al., 2013). Overall, the model appears strategically innovative in its formulation and has a number of the hallmarks of good practice. It is clearly not a traditional incubator initiative, but rather a quite unique hybrid that links elements of ‘incubation’, ‘acceleration’, and ‘entrepreneurial boot camping’ (Motoyama and Weins, 2015). It has a focus centred on connectivity and innovative learning practices, and although there is an element of public sector finance, in the form of the government’s contribution to the programme’s seed fund, it is an integrated rather than a standalone component of the programme as a whole.

Alacrity is keenly aware of the benefits of embedding a network orientation across the programme, both internally through the social capital established between students and other members of the programme, as well as externally through the networks established with the commercial strategic partners and mentors (Huggins and Thompson, 2015; Murphy et al., 2016). The programme is positively seeking to support students and their start-ups in putting these networks and connections in place, with collaboration and greater market knowledge having potential benefits such as joint product development and the integration of technologies. However, one should recognise that entrepreneurial programmes across the globe are continually evolving and adapting to changing economic conditions, new technologies, and new business models (Stross, 2012), and there is a on-going and continuing need to maintain a competitive advantage in terms of regional policy.

Framing The Programme in the Context of Regional Policy

From the perspective of regional policy as a whole, the Alacrity model provides a very strong fit with the Welsh Government’s ambition to provide quality support to facilitate accelerated business growth, and its activities strongly complement the support structure offered by other regional innovation and entrepreneurship programmes (Huggins and Pugh, 2015). In general, there are strong connections between the objectives of Alacrity and the vision espoused in regional economic strategy documents at the time the Foundation idea was floated (Welsh Assembly Government, 2010). The activities of Alacrity can be linked to efforts to improve the regional situation with respect to identified weaknesses such as providing better quality pathways for local employment for graduates. Such initiatives are likely to be greatly enhanced if there is real and significant connectivity and interaction across each, so that synergies can be explored, developed and exploited (Flanagan et al., 2011). Evidence from around the world

suggests that where such synergies are cultivated to create ‘ecosystems’ of interdependent actors, the likely rewards are much greater (Cooke et al., 2011). Given this, it can be suggested that the Alacrity Foundation and other comparator policy interventions should intensify efforts to improve communications and identify the scope for cross-programme strategic actions, which would help foster a greater critical mass of talent and ideas (Uyarra and Flanagan, 2010).

The programme’s overall strategy means that it is able to address the key determinants of success in terms of ensuring that individuals with entrepreneurially-oriented behavioural personality traits also have the relevant human capital required to actualise their intention and are steered in a direction whereby such an intention is focused on market expansion and sustainable growth (Audretsch et al., 2017). However, there is clearly one factor that the programme may be less able to address, i.e. locational conditions. Evidence suggests that there is a clear relationship between being located in a vibrant economic location and the propensity toward entrepreneurial success (Huggins et al., 2017). Indeed, locational conditions are one of the key reasons for the persistence in economic divides across regions, cities and localities.

Whilst leading locations are able to create a virtuous cycle of entrepreneurship, innovation and economic development, other regions, such as Wales, become trapped in a more vicious downward cycle. It is for this reason, perhaps, that previous initiatives in Wales have found it difficult to facilitate success (Morgan, 2012). Mindful of the need for context sensitive approaches (Piccaluga, 2006; Uyarra, 2007), the question this leads to is: how does the Alacrity model differ, and what does this mean for its future prospects? Clearly, a fundamental issue in Wales has been the lack of an entrepreneurial and innovation ecosystem that provides entrepreneurs with the nurturing environment they require. In a very direct way, we suggest that the Alacrity programme is a positive step toward cultivating such an ecosystem, albeit a system that is still relatively skeletal. However, ecosystems are necessarily dynamic rather than static entities (Fratesi, 2015), and some state-of-the-art traits can be observed in Alacrity’s processes and strategies. In particular, it is clear that the programme is seeking to establish an open innovation ecosystem than promotes contemporary forms of economic development in Wales (McCann and Ortega-Argiles, 2013).

Although a considerable distance from Wales both spatially and cognitively, the Silicon Valley phenomenon indicates that targeted strategic partnerships between Valley-based start-ups and large non-Valley firms are an increasingly important feature of its ecosystem, and one that ‘properly executed’ can provide huge value for both parties (Kazaks et al., 2015). In essence, Silicon Valley start-ups pilot leading-edge ideas and technologies, while the big-branded partner helps refine and scale the product. It is of note, therefore, that Alacrity’s open

innovation approach is based on a similar model. Indeed, perhaps the world's most successful entrepreneurial initiative, Silicon Valley's Y Combinator (Stross, 2012), which is responsible for spinning-out companies such as Dropbox and Airbnb, is founded on a mentoring model integrated within a wider package of support that has entrepreneurial network development at its centre.

In summary, entrepreneurial success in generating innovation is likely to be partly governed by the regional environment in which entrepreneurial firms are located (Boschma and Martin, 2010). In less innovative and developed regions, entrepreneurial firms are likely to require support to generate the most appropriate and effective networks, and in order to access the highest quality knowledge, entrepreneurs should seek to invest in a balanced portfolio of networks encompassing both local and more global geographic connections (Hayter, 2013; Crespo et al., 2014). The Alacrity programme is positively seeking to support students and their start-ups in putting these networks and connections in place, with collaboration and greater market knowledge having potential benefits such as joint product development and the integration of technologies.

Concluding Remarks

The 'policy mix' approach to regional innovation policy suggests the *interaction* of relevant programmes and instruments within a particular region (Flanagan et al., 2011). Whilst acknowledging this approach, the analysis presented here indicates that within a region considered to be a relatively innovation hostile environment, a new policy direction has emerged that promotes the *integration* of the fundamental practices, processes and mechanisms determining effective regional innovation outcomes. In part, the Alacrity programme has avoided the problems of seeking to create interaction across policy silos by embracing some of the key components of contemporary regional innovation theory and integrating these into an overarching policy intervention that itself can be considered innovative, especially in the context of a region such as Wales. In particular, it has been shown that through the intertwining of resource-based and interaction-based - especially network capital - conceptualisations of innovation, an integrated innovation policy direction is emerging. Furthermore, the role and identification of entrepreneurially-oriented human behaviour, and its enhancement and mobilisation through bespoke institutions such as the Alacrity Foundation, both incentivises and de-risks innovation-driven entrepreneurship, and goes beyond the more piecemeal approaches to support that are often manifest within 'traditional' regional innovation policy.

In conclusion, this paper has sought to engage with the policy dynamics of regional innovation, entrepreneurship and networks, and presents an interesting and potentially encouraging case study. The case exhibits a responsiveness to contextual weaknesses within a regional innovation system, and suggests that attracting talent and, contemporaneously, co-opting ongoing support from mentors and external partners are central to ensuring the generation of network capital-entrepreneurial connections. The facilitation of these connections is vital if regions with low innovation capabilities are to improve their economic development trajectories. The study also hints at the interdependencies between different forms of capital in the innovation system, such as human and financial capital, and brokering and organising such interdependency through their integration is likely to be an important determinant of policy ‘success’. Success, however, should be measured across relatively long time horizons, and given uncertain macro-economic environments across the globe, innovation policy – including the regional variety – may face strong headwinds. In particular, from a UK and European perspective the spectre of uncertainty stemming from Brexit is likely to play more than a passing role in shaping the economic and innovation performance and policy reactions at the regional level.

Finally, the analysis underpinning this paper stems from a relatively early stage policy assessment, and further research and comparative work looking at other innovation programmes operating in different regions over longer time frames are likely to prove instructive in moving forward. For example, institutional contexts, as McCann and Ortega-Argiles (2013) point out, cannot be assumed to be progressive, and the role of individual and collective agency in creating the dynamic regional environments within which innovation policies can achieve real traction and positive change offers considerable scope for further exploration (Huggins and Thompson, 2017; Wink et al., 2017).

References

Acs, Z. J., Audretsch, D. B., and Lehmann, E. E. (2013). The knowledge spillover theory of entrepreneurship. *Small Business Economics*, 41(4), 757–774.

Aranguren, M.J., E. Magro and J.R. Wilson (2016), ‘Regional competitiveness policy in an era of smart specialization strategies’, in R. Huggins and P. Thompson (eds), *Handbook of Regions and Competitiveness: Contemporary Theories and Perspectives on Economic Development*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Asheim BT, Smith HL & Oughton C (2011) Regional Innovation Systems: Theory, Empirics and Policy, *Regional Studies*, 45:7, 875-891

Audretsch, D. B., and Keilbach, M. (2004). Entrepreneurship capital and economic performance. *Regional Studies*, 38(8), 949–959.

Audretsch, D. B., Keilbach, M., and Lehmann, E. E. (2006). *Entrepreneurship and Economic Growth*. Oxford: Oxford University Press.

Audretsch, D.B., Obschonka, M., Gosling, S.D., and Potter, J. (2017). A new perspective on entrepreneurial regions: linking cultural identity with latent and manifest entrepreneurship. *Small Business Economics* 48, 681-697.

Baumgartner D, Pütz M and Seidl M (2013) What Kind of Entrepreneurship Drives Regional Development in European Non-core Regions? A Literature Review on Empirical Entrepreneurship Research, *European Planning Studies*, 21:8, 1095-1127.

Boschma, R. and R. Martin (2010), ‘The aims and scope of evolutionary economic geography’, in R. Boschma and R. Martin (eds), *Handbook of Evolutionary Economic Geography*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Brown R and Mason C (2012) Raising the batting average: Re-orienting regional industrial policy to generate more high growth firms. *Local Economy*, 27,1: 33-49.

Brown R, Gregson G and Mason C (2016) A Post-Mortem of Regional Innovation Policy Failure: Scotland's Intermediate Technology Initiative (ITI), *Regional Studies*, 50:7, 1260-1272.

Camagni, R. (2009), ‘Territorial capital and regional development’, in R. Capello and P. Nijkamp (eds), *Handbook of Regional Growth and Development Theories*, Cheltenham, UK and Northampton, MA, USA.

Capello, R. and P. Nijkamp (eds) (2009), *Handbook of Regional Growth and Development Theories Cheltenham*, UK and Northampton, MA, USA.

Cooke, P., B. Asheim, R. Boschma, R. Martin, D. Schwartz and F. Tödting (eds) (2011), *Handbook of Regional Innovation and Growth*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Cooke, P., Heidenreich, and H. Braczyk (eds) (2004), *Regional Innovation Systems: The Role of Governance in a Globalised World*. London: Routledge.

Crespo J, Suire R and Vicente J (2014) Lock-in or lock-out? How structural properties of knowledge networks affect regional resilience. *Journal of Economic Geography* 14: 199–219.

Edler J and Georghiou L (2007) Public procurement and innovation – Resurrecting the demand side. *Research Policy*, 36,7: 949–963.

Flanagan K, Uyarra E and Laranja M (2011) Reconceptualising the ‘policy mix’ for innovation. *Research Policy*, 40: 702-713.

Flanagan K and Uyarra E (2016) Four dangers in innovation policy studies – and how to avoid them, *Industry and Innovation*, 23:2, 177-188

Fratesi U (2015) Regional Knowledge Flows and Innovation Policy: A Dynamic Representation, *Regional Studies*, 49:11, 1859-1872.

Fritsch, M. and Slavtchev, V. (2011) Determinants of the Efficiency of Regional Innovation Systems, *Regional Studies* 45(7), 905-918.

Harris, R. G. (2011). Models of regional growth: Past, present and future. *Journal of Economic Surveys*, 25(5), 913–951.

Hayter, C. (2013). Conceptualizing knowledge-based entrepreneurship networks: Perspectives from the literature. *Small Business Economics*, 41(4), 899–911.

Huggins, R. (2016), 'Capital, institutions and urban growth systems', *Cambridge Journal of Regions, Economy and Society*, 9 (2), 443–63.

Huggins, R., and Pugh, R. (2015), Regional competitiveness and Schumpeterian development, in Valdaliso, J. M., and Wilson, J. R. (Eds.). *Strategies for Shaping Territorial Competitiveness*, London: Routledge.

Huggins, R., and Thompson, P. (2014). A Network-based view of regional growth. *Journal of Economic Geography*, 14(3), 511–545.

Huggins R and Thompson P (2015) Entrepreneurship, innovation and regional growth: a network theory. *Small Business Economics*, 45:103-128.

Huggins, R., and Thompson, P. (2017). The behavioural foundations of urban and regional development: culture, psychology and agency. *Journal of Economic Geography*, doi:10.1093/jeg/lbx040.

Huggins R and Williams N (2011) Entrepreneurship and regional competitiveness: The role and progression of policy. *Entrepreneurship & Regional Development*, 23,9-10: 907-932.

Huggins, R., Prokop, D., and Thompson, P. (2017). Entrepreneurship and the determinants of firm survival within regions: human capital, growth motivation and locational conditions. *Entrepreneurship & Regional Development*, DOI: 10.1080/08985626.2016.1271830.

Kazaks, A., Kutcher, E. and Uhl, M. (2015). How should you tap into Silicon Valley? *McKinsey Quarterly*, September Edition.

King, N., and Horrocks, C. (2010). *Interviews in Qualitative Research*. London: Sage.

Koellinger, P. (2008). Why are some entrepreneurs more innovative than others? *Small Business Economics* 31, 21-37.

Lee N and Rodriguez-Pose A (2013) Original innovation, Learnt Innovation and Cities: Evidence from UK SMEs. *Urban Studies*, 50,9: 1742-1759.

Lee, N. (2016). Psychology and the Geography of Innovation. *Economic Geography*, 1-25.

- Mackinnon D (2011a) Beyond strategic coupling: reassessing the firm-region nexus in global production networks. *Journal of Economic Geography*, 12(1): 227-245.
- Mason C and Brown R (2013) Creating good public policy to support high growth firms. *Small Business Economics*, 40: 211-225.
- McCann P and Ortega-Argiles (2013) Modern regional innovation policy. *Cambridge Journal of Regions, Economy and Society*, 6: 187-216.
- Morgan, K. (2012). Path dependence and the state: the politics of novelty in old industrial regions, in Cooke, P. (ed) *Re-framing Regional Development Evolution, innovation and transition*. London: Routledge.
- Morgan K (2016) Collective entrepreneurship: the Basque model of innovation. *European Planning Studies*, 24,8: 1544-1560.
- Motoyama, Y. and Weins, J. (2015). *Guidelines for Local and State Governments to Promote Entrepreneurship*, Kansas City: Ewing Marion Kauffman Foundation.
- Murphy, L., Huggins, R., and Thompson, P. (2016). Social capital and innovation: A comparative analysis of regional policies. *Environment and Planning C: Government and Policy*, 34(6), 1025-1057.
- Pater, R. and Lewandowska, A. (2015). Human Capital and Innovativeness of the European Union Regions. *Innovation: The European Journal of Social Science Research* 28(1), 31-51.
- Piccaluga A (2006) Variety and miracles for successful regional innovation policies: From 'copy and paste' to 'copy and paste special'. In P. Cooke, & A. Piccaluga (Eds.), *Regional development in the knowledge economy* (pp. 272–277). London: Routledge.
- Pike, A., A. Rodríguez-Pose and J. Tomaney (2007), 'What kind of local and regional development and for whom?', *Regional Studies*, 41 (9), 1253-69.
- Pugh R (2016): Universities and economic development in lagging regions: 'triple helix' policy in Wales, *Regional Studies*, online first.
- Rentfrow, P. J., and Jokela, M. (2016). Geographical Psychology: The Spatial Organization of Psychological Phenomena. *Current Directions in Psychological Science*, 25(6), 393-398.
- Rodríguez-Pose, A. (2013), 'Do institutions matter for regional development?', *Regional Studies*, 47 (7), 1034-47.
- Stross, R. (2012). *The Launch Pad: Inside Y Combinator, Silicon Valley's Most Exclusive School for Startups*. London: Penguin.
- Tödttling F and Trippel M (2005) One size fits all? *Research Policy*, 34(8), 1203–1219
- Uyarra, E. (2007) Key Dilemmas of Regional Innovation Policies, *Innovation*, 20 (3) pp. 243-261.

Uyarra E and Flanagan K (2010) From regional systems of innovation to regions as innovation policy spaces. *Environment and Planning C: Government and Policy* 2010, 28: 681-695.

Welsh Assembly Government (2010). *Economic Renewal: a new direction*. Welsh Assembly, Cardiff. <http://wales.gov.uk/docs/det/report/100705anewdirectionen.pdf>

Wink, R., Kirchner, L., Koch, F. and Speda, D. (2017) Agency and forms of path development along transformation processes in German cities, *Cambridge Journal of Regions, Economy and Society*, doi:10.1093/cjres/rsx008.

Youtie J and Shapira P (2008) Building an innovation hub: A case study of the transformation of university roles in regional technological and economic development. *Research Policy*, 37: 1188-1204.