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Abstract

The purpose of this paper is to address how universities contribute through a helix model of partnership to regional development in a peripheral but functionally connected area which finds itself outside major conurbations. In doing so, it shows how local universities may collaborate with each other and with other institutional actors, including the private sector, to gather data on how their graduates contribute to the regional economy. A case study of the North Wales Mersey Dee area (the 'NWMD'), a cross-border region within the UK, provides the evidence base.

There are gaps in international studies into how universities contribute to the development of their cities and regions, because these studies typically assume that the university is part of an urban concentration with the impact of their development and engagement radiating out into the hinterland. This study explores a scenario with a more dispersed picture, requiring even more effort from key stakeholders, along with the universities, to effect positive change through a policy agenda of 'place-based' strategies.

Recommendations are made for longitudinal studies in similarly peripheral and under-performing regions to gauge how universities can work within local partnerships, leveraging government-backed investment to drive improvements.

Key words

Universities, regional development, cross-border and peripheral regions, graduate employability.

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Introduction

Successive governments in the UK have attempted to address the seemingly intractable problem of deep economic disparities between various regions. Uneven patterns of economic development lead to lack of political and social cohesion, too; some parts of the country are 'overheating' due to rapid development, whereas other areas perceive themselves to be falling further and further behind in terms of prosperity and prospects for future generations. Universities are spread across all parts of the country, including those in peripheral, less successful regions. As knowledge institutions, they have the capability to contribute towards their surrounding areas through the supply of human capital and physical assets. The emerging 'place-based' strategies in UK government policies to help find local solutions, with key stakeholders across all sectors taking collective ownership, provides further context.

The paper is organised into six sections. Following a closer look at the emerging economic policy context in the UK of 'place-based strategies', the next section introduces the North Wales Mersey Dee area and its three universities, setting the context for taking a 'place-based' approach to uncover knowledge about the graduate labour market in order to contribute to local industrial strategy. We then present a literature review, covering international studies into the role of universities in regional development and some theoretical models. Two significant gaps in the literature will be identified that may hinder adequate analysis and policy development of regions such as the NWMD, and which the study itself attempts to address. These gaps relate, firstly, to an evidence base of how, in peripheral regions, classical models for regional development and the role of universities may or may not be applicable; and secondly, what role the output of graduates from local universities can play in driving such peripheral regions forward.

So, the key research questions we seek to answer are: (1) how can we ensure that helix models or frameworks for university engagement strategies are relevant and effective in scenarios of peripheral, less successful or lagging regions such as the NWMD which do not have large, expanding cities at the centre? As part of such frameworks, what further understanding can be gained about 'place-based leadership' with the local universities playing an active part? And (2), how do we address the paucity of studies into the contribution made by the supply of university graduates into their regional economies, as a distinct strand of university engagement alongside other strands typically put forward in helix models such as research, spin-offs and community outreach?

A case study developed by the three regional universities is presented next, setting out how their graduate destinations map against economic development in the NWMD. This project and its results is then linked to the dynamic policy environment in the area as well as nationally, and decisions being taken on government investment. The concluding section presents an enhanced triple helix framework in the context of place-based strategies and university involvement. We also identify recommendations for further studies, particularly in peripheral regions, which would help to refine research methodologies and theoretical models influencing university strategies and public policy, thereby addressing some of the gaps in the literature.

Policy context in the UK: place-based strategies

For several decades, efforts have been made to rebalance the UK economy and make it less skewed towards London and the South-East. In spite of these policies, the UK continues to have greater disparities in regional productivity than most other European countries, as measured by classical indicators such as GDP per capita, growth rates and employment (Fai, 2017: 2, McCann, 2016).

The UK Industrial Strategy (2017) has among its objectives to support 'local industrial strategies' involving collaboration between industry, tertiary education and local authorities. This stronger emphasis on 'place', with targeted investment in prioritised sectors supported by a degree of devolved government, may be interpreted and implemented differently across the UK. Prior to the launch of the new national strategy, a patchwork of 'Local Enterprise Partnerships' (LEPs) had already been set up across England. Even though these were arguably "based more on political geographies rather than sub-regional economic areas" (Jones, 2013: 85), they nonetheless had significant resources to allocate to member organisations to help drive regional development. Some of the LEPs were then subsumed into larger entities: six combined local authorities under the leadership of an elected mayor had evolved by 2017. They pioneered a new model of devolved government of an appropriate scale, with substantial investment under 'growth deals' allocated by UK government. However, these were concentrated in large metropolitan areas such as Birmingham and Manchester, thereby creating a new bias towards place-based development within "a city, city-region, or clearly identifiable sector-based cluster" (Hildreth, 2014 and 2018: 62). Clearly, not every 'place' contains such agglomerations and in many parts of the UK economic activity and population density are far more dispersed, so would be at risk of being overlooked in this new iteration of balanced economic development policy. Instead, the resulting picture would simply be a number of 'spikes' dwarfing their surrounding wider regions or peripheral regions, "which makes the pursuance of geographically balanced economic development counter-productive" (Hildreth and Bailey, 2013: 238).

There were two additional complicating factors potentially affecting the implementation of the new UK Industrial Strategy. First, devolution in Scotland and Wales led to deviating models of local government; for instance, there was no direct equivalent of either the LEPs or the combined local authorities model that had been developed in England, which then made it challenging to roll out 'growth deals' in the devolved nations. Morgan (2018: 6) questioned whether there was "enough devolved power to support a place-based industrial strategy". If the answer was no, the implications would be rather worrying for future economic prospects of the sub-regions in Scotland and Wales. Given the porous internal borders within the UK, with major companies straddling their operations across these borders, fragmentation of regulations and fiscal climates might not be helpful. Another issue was the lack of differentiation between so-called 'local' strategies; many different places were "claiming similar competitive advantages in the same sector, which is difficult to reconcile with a place-based approach" (Fai and Tomlinson, 2018: 55).

Within Wales itself, the Economic Action Plan (2017), published soon after the UK-wide Industrial Strategy, identified three national thematic sectors: advanced manufacturing, traded services and digital infrastructure. This represented a shift from earlier thinking, when there had been variation between priority sectors chosen by the three sub-regions within Wales which are at some considerable geographic distance from each other. For instance, the North Wales Skills and Employment Plan 2017 naturally gravitated more towards economic ties with the North West of England, whereas the Welsh capital, Cardiff, is oriented towards South Wales and parts of the South

West of England. A uniform national economic plan for Wales, with specific sectors of industry earmarked for promotion regardless of place, would ostensibly leave little room for local ownership of economic strategy any longer.

These challenges and complications were highly relevant for the North Wales and Mersey Dee area.

Profile of the North Wales and Mersey Dee area (the NWMD)

This section provides background context to how and why NWMD universities collaborated to uncover knowledge about graduates in the local labour market through a helix-based cooperation model. It presents some key facts and figures about the NWMD and evolving economic strategies and policies, and why it was particularly important for local universities to contribute to this process. Potential tensions between regional development policies developed at national level, and the peculiar characteristics of the NWMD, are also explored.

The NWMD area comprising North Wales, West Cheshire and the Wirral is unique in the UK in being an integrated, functional economy divided by a national boundary. It has a population of 1.7m people, made up of 695,000 in North Wales, 712,000 in Cheshire and 321,000 in Wirral (North Wales Mersey Dee Business Council, 2018). Of particular significance are aerospace, the automotive and chemical industries, energy, financial services and other advanced manufacturing. Complementing these sectors is a large rural hinterland and areas of outstanding scenic beauty, attracting international visitors. The economy is highly diverse and includes a number of global companies such as Airbus, Siemens, Unilever and Toyota, as well as a large proportion of micro-businesses. Economic productivity as measured by gross value added (GVA) per capita varies widely across the region. Overall at £23.8K it was £2.5K per capita lower than for the whole of the UK in 2016, but for Cheshire on its own it was significantly higher at £32K whereas for North Wales on its own it was only £19.6K. This represents a sizable gap between North Wales and the rest of the UK at £7K per capita, or nearly 26%. The key measures of labour productivity and research and development expenditure, likewise, show that the region is somewhat behind (Haldane, 2016). Outward migration of talent was seen as a challenge, particularly in North Wales, where the average growth in 'high-value' employment to improve productivity and competitiveness was also below national averages (North Wales Economic Ambition Board, 2018: 7-8).

The area is atypical, with a distributed and interconnected pattern; the urban centres such as Bangor, Wrexham and Chester are of a modest size at populations of around 18,000, 61,000 and 116,000 respectively, whereas significant economic activity is also clustered around non-urban industrial estates (Özkul and Hildreth, 2016) and the remainder is thinly spread across more sparsely populated areas. This is also reflected in employment density data across the region. Juxtaposing this against the large metropolitan centres within a 75-mile radius, i.e. Liverpool and Manchester with populations of 0.5m and 2.5m respectively, it is apparent that employment is far more concentrated there and the NWMD area is dwarfed by them.

A great deal of work has been undertaken by regional platforms such as the North Wales Economic Ambition Board, Cheshire and Warrington Local Enterprise Partnership and the Mersey Dee Alliance to map economic activity and skills needs. Sectors deemed to have scale and future growth potential

were identified in various policy documents and reports, to help inform investment decisions once the first wave of UK government growth deals for large metropolitan centres was progressed to the regions. However, there were discrepancies between some of the sectors prioritised in these regional policies, and their actual performance relative to the wider economy. For instance, manufacturing (including aerospace), which already made up a larger slice of the economy in the area than in the UK overall, also outstripped the entire country in its rate of growth over a five-year period (27.9% versus 19.4%). The categories of ICT and services, however, lagged significantly behind even though they had also been selected as priorities (North Wales Mersey Dee Business Council, 2018). This begs the question to what extent regional aspirations to develop competitive advantage are typically grounded in reality.

Given the dispersed nature of the region's geography, economy and population, as well as the fact that it straddles the border between Wales and England, there was a challenge to defining a coherent narrative for the NWMD area that would help to coordinate parties, shape policies and unlock new funding pots such as the growth deals. After all, the region did not entirely conform to the emerging 'place-based development' agenda emerging elsewhere. Governance structures and policy contexts differed between England and Wales. The region also lacked the unitary command model of an elected mayor (on either side of the border), so different mechanisms and platforms needed to be found to drive investment bids. North Wales was in the process of creating a 'joint committee', comprising the six local authority leaders and chief executives, university and further education college leaders and private sector representatives, working together to sign off a proposition to UK government for a growth deal by consensus. In 2018, project proposals were submitted to government for £330m investment in digital connectivity, new sites and premises for business development and housing, and R&D facilities co-located with universities and colleges which would support key sectors of the regional economy in North Wales such as advanced manufacturing, energy and tourism (North Wales Economic Ambition Board, 2018). The Cheshire and Warrington Local Enterprise Partnership in England (2018) proposed new investment in digital skills and a 'science corridor' to service the pharmaceuticals and chemical engineering sectors. There were iterative processes involving private sector scrutiny and reviews by UK and Welsh Government officials, continuously adjusting business cases for specific projects. At the same time, work was being done with counterpart agencies on both sides of the border to align infrastructure projects, not least because of the significant commuter flows in both directions.

One initiative to help shape the narrative underpinning funding bids from the region was led by its three HEIs, Wrexham Glyndŵr University, Bangor University and the University of Chester, in a close dialogue with the private sector and with local agencies. A good fit between the high-level skills agenda set out in ambitious economic plans for the region, and the capability of universities to respond, can never be taken for granted even if their academic portfolios are ostensibly relevant. The case study of how the three medium-sized universities gathered and analysed data on the flow of their graduates into the regional economy will be outlined in later sections. Wrexham Glyndŵr and Bangor Universities are situated in North Wales, approximately 70 miles apart. Chester University is only 17 miles from Wrexham, just across the Wales-England border. Bangor University was created in the late 19th century as one of the founding institutions of the federal University of Wales and gained independence in 2007, whereas Chester and Wrexham Glyndŵr Universities are both new universities with roots in various training colleges dating back to the 1880s, gaining university status in 2005 and 2008 respectively. Given their local histories, all three universities offer professional courses in healthcare and education. There is a degree of overlap in other fields typically offered by broad-based universities too, such as business and the creative arts. However, each university also has distinctive areas of critical mass and strengths which do not exist in either of

the other two, and which are typically linked to the local industry base. For instance, Bangor offers provision through the medium of the Welsh language and has a research centres in nuclear energy; Wrexham offers degrees in aerospace engineering and has R&D capability in optics; Chester runs programmes in financial services and has a research centre in psychology. All three universities participated actively in regional agencies and business platforms, i.e. the North Wales Economic Ambition Board (in the case of Bangor and Wrexham) and the Cheshire and Warrington Local Enterprise Partnership (in the case of Chester). They sat side by side in cross-border fora such as the Mersey-Dee Alliance and the North Wales/Mersey-Dee Business Council.

A review of literature on the role of universities in regional development

This section provides a review of the role of universities in regional development. It sets out the context for why particular choices were made in the research. It shows that there is a gap in the present literature that tends to focus on urban environments, or city regions, where the ‘civically engaged’ university is at the heart of an agglomeration. As outlined in the introduction, this framework needs adapting for the case of the NWMD, as an economy with a more peripheral and dispersed character but which is functionally connected.

There is a considerable body of international research on the role of universities in the development of their national and regional economies. The concept of the ‘engaged’ university (GUNI, 2013), and related descriptors such as ‘civic’ (Goddard and Vallance, 2012; Goddard and Kempton, 2013; Goddard, 2016; ‘entrepreneurial’ (Gibb, 2005), ‘innovative’ (Christensen and Eyring, 2011) all tend to focus on reconciling the so-called ‘third mission’ of socio-economic and cultural interaction between the university and its environment with the traditional core missions of education and research. Goddard and Vallance (2012: 5) state that higher education institutions “cannot simply be reduced to that of catalyst for knowledge-based economic growth, or lean too much towards isolated excellence in an academic hierarchy”. Grau (2016) argues that the dual responsibilities of universities to be locally relevant and engaged, while also competing globally with their academic peers, need not be in conflict with each other because it is possible to address major societal and industrial challenges on both fronts simultaneously.

Perspectives differ on the extent to which university civic engagement can have mutual benefits. Hazelkorn (2010: 39) discusses social innovation models which are reciprocal: “learning beyond the campus walls, discovery which is useful beyond the academic community and service that directly benefits the public”. Nelles and Vorley (2010: 346), however, state that positive feedback of outputs and outcomes from third mission work into the core research and teaching missions requires significant effort. Goddard and Kempton (2013: 12) position the university as a provider of “stewardship of place” with a range of co-creation mechanisms such as secondments, exchanges, research and joint projects. Collinge and Gibney (2010), similarly, advocate an approach where heads of university also act as leaders of their places rather than just their organisations. This approach is apparent in helix models which bring together the private sector, tertiary education and government institutions, e.g. reported in Grau (2016: 4): “at a regional level, the triple helix – university, administration and business – is of particular relevance, since all three agents identify

more closely with the immediate, shared geographical environment and its population, thus creating what is known as the quadruple helix”.

Benneworth et al. (2017) explained the concept of “place-based leadership” as a way to construct new collective territorial innovation assets, networks and social capital. Place-based leadership is defined as (1) shared: no single actor can compel others; (2) collective: requiring collaboration between interdependent actors; (3) steering: influencing other organisations towards change; and (4) creating long-term leadership (Benneworth et al. 2017: 237). Crisis perceptions may be the key driver for regional partners, including universities, to participate. Sotarauta (2014), Sotarauta et al. (2017) and Beer et al. (2019) also explore ‘place leadership’, concluding that this can be found not so much in “the attributes of individuals or government structures, but in the relationships connecting actors in specific places and development processes... boundary spanning is central to place leadership, with the process of reaching out to others critical in drawing in support” (De Beer et al: 173-174). In a study of the role of academic institutions in regional development coalition building in Norway, however, Pinheiro and Normann (2017) find that some of the highly complex projects involving “coalitions” of multiple partnerships were reconfigured or discontinued within a few years, whereas projects deemed to be of lower complexity such as straightforward graduate training or coupling individual researchers with individual firms continued successfully (pp 77-78). Over time, there had been a gradual move from high towards lower levels of case complexity.

Despite such reported challenges, there is evidence that ‘helix’ thinking involving shared leadership has gained significant traction with policy-makers across various parts of the world including Canada, Latin America, Malaysia (Leydesdorff, 2016; Sarpong et al. 2015) and the Nordic countries (Solesvik, 2017), helping to incentivise top-down national strategies and priorities. For example, in Scandinavian countries, the triple helix model is explicitly used in regional development policy and has had a measurable impact on a number of metropolitan areas labelled ‘innovation leaders’: Copenhagen, Helsinki and Stockholm (Solesvik, 2017: 15). Other studies propose a more organic, bottom-up approach in order to yield results: NESTA’s open innovation model is based on quadruple helix co-production, incorporating user-generated ideas coming up through local communities (GUNI, 2016: 120).

Much of the literature focuses on urban environments or city-regions, where the ‘civically engaged’ university at the heart of a big city is presumed to have an impact that radiates out and will ultimately also help the hinterland. For instance, Goddard (2012: 3) defines the problem as: “Is the University in the city or part of the city?” Goddard (2016: 125) then goes on to differentiate between ‘civic’ and ‘uncivic’ universities, depending on whether teaching, research and engagement are integrated and whether there are ‘soft’ external boundaries. It is also noted that city governance has an important role to play: if this is ‘disconnected’ and characterised by a lack of cohesion and the absence of a coordinated private sector ‘voice’, then no amount of goodwill from higher education institutions will fix this. UPP Foundation (2019), marking the signing of a Civic University Agreement by a number of universities across the UK, sets out how universities have the capability, opportunity and responsibility to “further support the places where they are based to solve some of their most pressing and major problems”. Specifically in Wales, some modest funding was allocated by the Higher Education Funding Council Wales (HEFCW, 2018) to universities to help them further develop their civic engagement strategies and actions.

There is an important caveat to theories putting forward universities as the anchor for regional development. Several case studies have explored how academic institutions in less successful or peripheral regions can support economic and social progress, and the results are not always encouraging. Huggins and Johnston (2009: 1098) found that, paradoxically, “it is largely the UK’s

least competitive regions that are most reliant on universities as a source of new business formation”, but that does not necessarily translate into such regions becoming economically successful. In later studies covering Scotland and Wales, Huggins (2012: 24) describes how sub-regions in “economic catch-up positions.... tend to pin their hopes (perhaps unrealistically) on their universities as anchor tenants to attract others”. Pugh (2017) looks specifically at the impact of ten science parks named ‘Techniums’ funded by Welsh government in the first fifteen years of devolution, and found that these had been based on a model of pushing out innovation from the universities rather than building up the absorptive capabilities of businesses. Many of the Techniums were left with unoccupied incubation space and, merely one decade after they had been opened, only four were still in operation due to a good fit with local high-tech industry. The UK-wide knowledge transfer partnership scheme (KTPs), funding specific smaller-scale R&D projects harnessing university know-how to support nearby companies proved more successful.

Bonaccorsi (2017: 295) echoes the disenchantment felt about the impact of public R&D expenditure in some regions across Europe that are “in the strongest need of innovation and growth, and that receive large additional resources from Structural Funds, but lack absorptive capacity (defined as internal factors such as firm size and their own R&D expenditure, Bonaccorsi 2017: 297)”. However, this study acknowledges that newer universities are naturally more focused on their regions and policies should support such differentiation. Benneworth and Hospers (2007) describe the case study of the University of Twente in the East of The Netherlands, which was given special status and government subsidies as the ‘Entrepreneurial University’. Local innovation networks were set up to help regenerate an area blighted by industrial decline. As early as 1982, the University of Twente developed incubator units on a large knowledge park of “national strategic significance”. This knowledge park supported the region in its transition from the old industry of textiles, towards excellence in materials science and healthcare innovations. However, early enthusiasm that these initiatives could lead to a ‘Twente Silicon Valley’ or ‘Little Stanford’ replica proved overstated; “the anticipated rush of companies investing to co-locate never materialised” (Benneworth and Hospers: 794) although the regional economy undoubtedly picked up. Similarly, a study conducted in a remote part of Norway (Pinheiro et al. (2016: 789) concludes that “the presence of universities, even when they are of high quality and/or research-intensive in nature, in ‘thin regions’ (i.e. low in absorptive capacity, inadequate technological infrastructure etc.) is likely to be sub-optimal, leading to the premise that the university is a necessary but not sufficient condition for regional development to occur”. In a study of six Norwegian and Czech universities in peripheral regions with their own peculiar dynamics, Kohoutek et al. (2017) conclude that “the larger the difference in development between the peripheral regions and the [more successful] centre, the more difficult it is for the regions to catch up, a phenomenon known as negative lock-in” (p. 409). The study found that, regardless of the university type and intensity of its research capabilities, the potential to overcome socio-economic lagging behind of the peripheral region was limited.

Some examples of modern universities financially incentivised by government to support their recovering or emerging local economies are Newcastle University in the UK (Benneworth and Charles, 2005), the University of Limerick in Ireland (Charles, 2006) and the University of Waterloo in Canada (Bramwell and Wolfe, 2008). Kempton (2015) describes the case of Karlstad University and the Swedish region of Värmland collaborating in a “smart specialisation” strategy, looking to strengthen capabilities in high-tech engineering and bio-science.

Several studies examining the regional roles of universities share a perspective that civic engagement models which focus solely on academia-industry partnerships involving knowledge transfer and research, or ‘soft’ interventions such as working with community groups and civic

organisations, sometimes overlook the key contribution which regionally engaged HEIs can make: skilled graduates. Charles (2006: 121) notes that “comparatively little is known about the flow of students through HE into local labour markets in many EU countries and how this relates to the overall performance of regions”. The most comprehensive study to date on the regional geography of graduate labour in the UK was conducted by Hoare and Corver (2010). They designed a framework for analysis distinguishing between four pathways: ‘locals’ (home students who also studied in the same place before taking a job in the area), ‘returners’ who studied elsewhere before returning to their original domicile to work; ‘stayers’ who decided to remain in the area where they have studied but were not originally from there, and ‘outsiders’ who neither originated from nor studied in the part of the country where they worked. The longitudinal study was based on datasets from the First Destinations Survey (FDS) which ran in the UK from 1999 to 2004 and was the forerunner of the annual Destinations of Leavers of Higher Education survey (DLHE), supporting the methodology for our study. The data showed that the London area was the only region in surplus, while most of the other regions lost out in graduate recruitment, i.e. measured as positive or negative ‘gain rates’ between the four categories of young graduates. Furthermore, Wales and the North-West of England showed relatively high conversion rates into graduate recruitment within the ‘locals’ category (at 90% and 89.5% respectively), but Wales was the second lowest region for both the ‘returners’ and the ‘outsiders’ categories, resulting in a net loss of highly qualified people. The authors conclude that, in order to address the economic disadvantage suffered by peripheral regions, increasing participation in HE would be the most effective measure since these regions strongly depend on their local markets and are less able to compete for graduate in-flows.

Faggian and McCann (2009) had previously noted that UK students and graduates are highly mobile and that “the ability of a region to maintain its competitiveness relies heavily on its capability to retain its university graduates and attract graduates from other regions” (p. 212). Such regional innovation systems may be better served by ‘second tier’ universities which are less focused on their national and international profiles (Arbo and Benneworth, 2007: 30) and are prepared to make regional development part of their core mission. Faggian and McCann (p. 221) also report that, against the familiar backdrop of graduate leakage from most of the regions, younger universities with a more local orientation and mission were the exception, with the strongest local labour market effects. However, Penheiro and Benneworth (2018) observe that in analysing the human capital creation by universities, studies continue to ignore migration effects and brain-drain, thereby substantially overestimating the local impact of graduates.

In summary, two key questions which remain from this overview of studies into the role of universities in regional development are the following. Firstly, how can we ensure that helix models or frameworks for university engagement strategies are relevant and effective in scenarios of peripheral, less successful or lagging regions such as the NWMD which do not have large, expanding cities at the centre? As part of such frameworks, what further understanding can be gained about successful ‘place-based leadership’ with the local universities playing an active part? And secondly, how do we address the paucity of studies into the positive contribution made by the supply of university graduates into their regional economies, as a distinct strand of university engagement alongside other strands typically put forward in helix models such as research, spin-offs and community outreach?

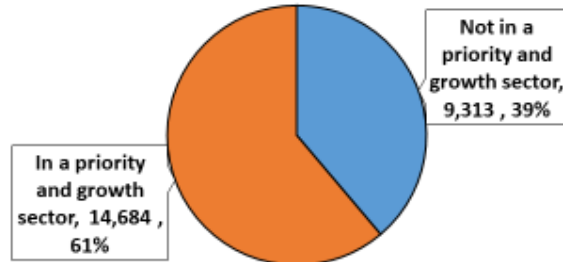
Case study: Mapping graduate destinations in the NWMD area

As discussed in the literature review above, little is known about the impact of university graduates on their local economies, even in studies examining civic engagement and triple helix models which attempt to bring together industry, academia and government. In the NWMD area, partners felt that it would be essential to harness insights into how graduate outputs might match current and projected industry demand as put forward in regional strategies and policies. This would help to ensure that government investment such as through 'growth deals', specifically investment in high-level skills training and R&D facilities, would actually yield positive results for the local economy because of the existing absorption capacity within industry; having learnt from previous failures such as the 'Techniums' in Wales which had seemingly operated in a vacuum, the willingness of academia and industry to fine-tune their efforts was being welcomed.

A mapping exercise was conducted of graduate destinations over a five-year period from the three universities based in the region against the agreed priority industry sectors in the cross border area. Destination of Leavers from Higher Education (DLHE) data gathered annually by the Higher Education Statistics Agency (HESA) provided the evidence base. The DLHE survey focuses on publicly funded HE providers and is conducted six months after graduation, typically attracting healthy response rates from graduates of over 75%. Our dataset was confined to UK-domiciled respondents who graduated from the three universities, and any presence of employment was reported so this included jobs not deemed to be at graduate level. HESA uses Standard Industrial Classification (SIC) codes for the purpose of identifying which sectors graduates are working in. SIC codes are far more granular than the sector descriptors used in regional development plans, so several SIC codes had to be combined into broader fields to align them with the priority sectors under the regional strategy. For instance, the category 'ICT, Creative and Digital' comprises six SIC fields including 'programming and broadcasting activities' (SIC 60), 'telecommunications' (SIC 61) and 'information service activities' (SIC 62) (HESA website, 2019). Our study aimed to identify how many of the graduates from Wrexham Glyndŵr University, Bangor University and the University of Chester stayed in the NWMD region and what proportion of them were employed in the key sectors, whilst also comparing this with the picture outside the region. This was a unique venture which involved sharing of independently verified data between organisations that had not previously worked together in this way; a longitudinal picture was built up that can help to inform policy. The project was recognised as a best practice case study by the National Centre for Universities and Businesses UK (2017).

**Wrexham Glyndwr, Chester and Bangor
University Graduates in employment in priority
and growth sectors**

5 year aggregate data 2012/13 to 2016/17
23,997 graduates in employment



The data showed that, of those graduates who stayed in the region, 61% had found work within sectors deemed to be the priority sectors for future economic growth, both sides of the border (Fig. 1).

Furthermore, it was found that 54% of the graduates remained in the region, but if we narrow the data to those originally domiciled within the region on entering university this percentage increased to 80%. When benchmarked against large metropolitan areas in the North of England, which have far larger outflows of graduates, it was clear that the region performed relatively well in graduate retention. For instance, graduate retention within Liverpool during the same period was reported to be at 37% and in Sheffield it was 45%, which is considered high (Universities UK conferences, 2017, 2018). Comparative data about graduate destinations at a granular level are difficult to obtain since they would require clusters of individual universities to share information, which is not common practice due to competition concerns. However, aggregate data not broken down by SIC codes published by HESA (2018) showed significant variation between regions. For example, graduate retention was reported at around 44% both in the East Midlands and in the South-East, but far higher in London and in Scotland at 58% and 65% respectively. Overall, therefore, the picture for the NWMD region was positive and this was seen as an opportunity which it could harness.

WGU, Bangor and Chester graduates employed in priority and growth sectors within the region (7,920 graduates in total)
5 year aggregate data 2012/13 to 2016/17

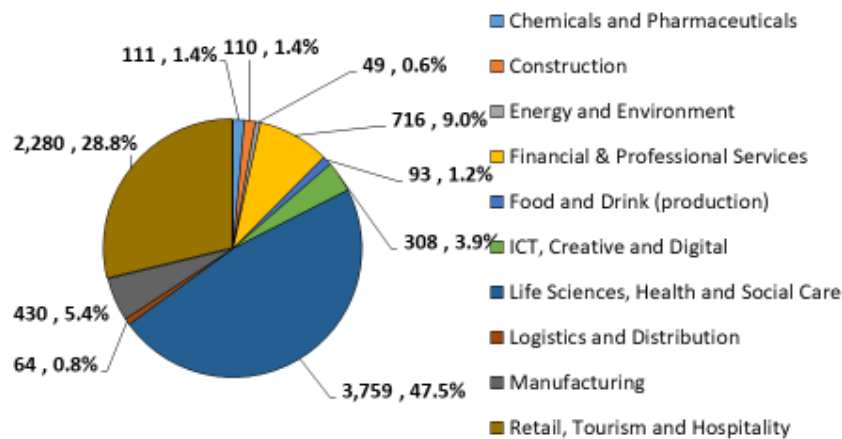


Figure 2: Graduates working in priority sectors within the NWMD region

Zooming in on the data and mapping where graduates from the three universities went if they stayed in the region, and if they worked in ‘priority’ sectors, it emerged that the distribution of graduates across the identified sectors was far from even (Fig. 2). The top three sectors were Life Sciences, Health and Social Care; Retail, Tourism and Hospitality; Financial and Professional Services. The latter sector has grown in recent years. It must be noted that Education and Public Services, although not classed as priority sectors so not shown in the graph, do underpin the wider economy and are typically large graduate-level employing sectors – although such job opportunities had diminished somewhat due to ‘austerity’ measures affecting public sector expenditure under recent UK government policies.

There appeared to be some differences between the graduate employment breakdown by sector within or outside the region. Figure 3 shows the graduate employment destinations for the 46% who were reported as having left the NWMD area. The top three sectors were the same, but Life Sciences, Health and Social Care only made up one third of the total, whereas Tourism and Hospitality was an even more significant graduate employer outside the region than within. Manufacturing was somewhat stronger in the region than elsewhere in the UK (5.4% versus 3% of the graduates), while Financial and Professional Services were somewhat weaker but increasing. The same applied to ICT, Creative and Digital sectors, which are growing in importance throughout the UK economy. Some of the key sectors, such as Construction and Energy/Environment, employ very few university graduates but usually recruit through further education colleges and apprenticeships.

What might be of concern is that longitudinal data showed that graduate employment in the so-called priority sectors had remained static at around 60%. This could indicate that regional strategies had not yet had a significant impact on provision and demand, or were possibly not always a reflection of the real economy. A limitation of the study was that it did not capture graduate employment details from other universities as an ‘in-flow’ into the region, since such data were not readily available. Anecdotally, however, major employers in the region indicated that they frequently recruited graduates from universities based in the larger population centres in the North-

West of England, such as Liverpool and Manchester. Also, it was not possible to differentiate between higher education qualification levels (bachelor's, master's or PhD degrees) of those in employment in any region, since official data record these combined levels as a single category labelled 'NVQ4 and above' (ONS, 2019). This also includes higher level apprenticeships. ONS data showed that the percentage of working age adults with tertiary or higher education as their highest qualification stood at 36.3% in North Wales, and at 39.7% in Cheshire and Warrington (2015/16 labour market data, NWEAB/LEP 2017), against a UK average of 36%. This represented an increase of roughly 10% over a period of eight years.

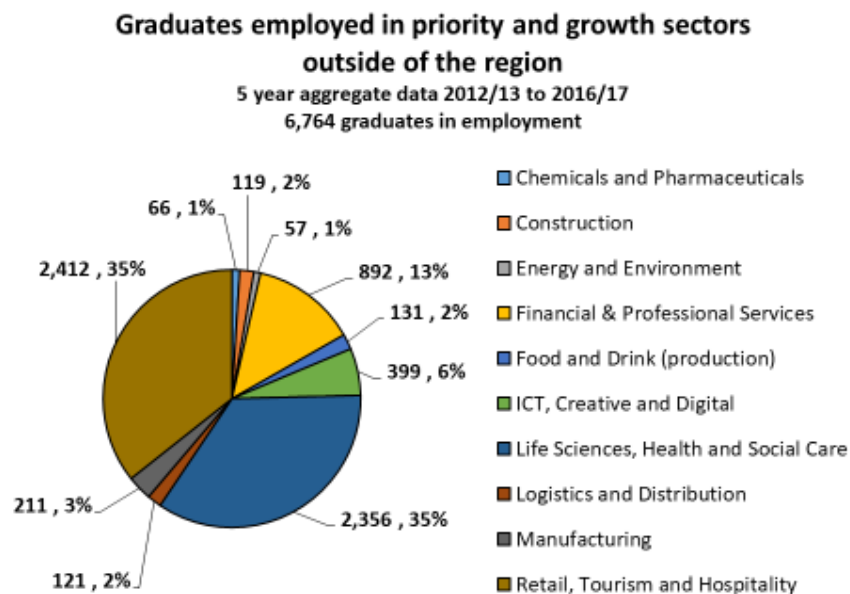


Figure 3: Graduates working in priority sectors outside the NMWD region

Key messages from NWMD regional stakeholders in response to the case study

The combined graduate destinations data from the three regional universities, mapped against the regional strategies, were presented at a cross-border regional symposium bringing together educators, the private sector and government. There was significant political interest, with contributions from a Member of Parliament as Chair of the North Wales and Mersey Dee All-Party Parliamentary Group, and the Welsh Minister for the Economy and Infrastructure. This made it a high-profile event which was seen to have the support all the way from Cardiff to Westminster; the seats of devolved Welsh government and overall UK government respectively. The collaborative nature of the work carried out had not been lost on people, and several contributors emphasised that willingness to work together was already a strength in the region but should be deepened. Specifically, it was argued that universities and businesses could work more closely on knowledge exchange, whereas the two governments could do more to improve practical alignment of regulations and transport connectivity. In spite of the reasonably strong alignment between the careers embarked on by local graduates and prominent sectors of industry in the region, there was deep concern among private sector speakers about looming skills gaps. This was partly driven by the ageing demographic profile, creating a time bomb of up to one quarter of the total workforce in the

region retiring within five years and simply not enough young people to fill the resulting vacancies, never mind finding an additional workforce for sectors of anticipated growth. Another major barrier cited by several participants, perhaps surprisingly, was the lack of an attractive housing offer for university graduates and degree apprentices, for instance in the case of Airbus, which was perceived to be a motivating factor for not staying in the area.

On the question whether ‘place-based strategies’ coupled with investment from schemes such as government-backed growth deals could help to overcome barriers, there was seen to be a good fit because the region had included proposals for quality housing as well as investment in innovative technology on university premises, which would have to be accessible to local industry in relevant fields. However, senior politicians emphasised that “a single clear voice for true transformational change” (speech by Skates, Welsh Minister for the Economy and Infrastructure, 2018) would be needed from the region so that investment would have impact. Given the dispersed nature of the geography and economy described above, as well as the multiple loci of leadership as opposed to a single authoritative model, it would always be challenging to find that single voice. As a result, the North Wales Growth Deal proposition consisted of up to twenty different projects following an organic process, which would somehow collectively deliver the vision for the region to become more resilient, better connected and smarter.

Another opportunity that was identified was the new ‘Strength in Places Fund’, also part of the UK Industrial Strategy, encouraging bids from self-defined geographical areas to harness existing clusters of research that could put projects together that would uplift their GVA. Such academia-industry bids would be more flexible than growth deals and have the potential to avoid obstacles posed by administrative boundaries and regulatory differences which exist in the NWMD area. The concept of ‘place’ would need to be defined as where the functioning economic actually is, regardless of the fact that it straddles across the border between two nations of the UK. However, the ‘Strength in Places’ projects were likely to be highly selective as this scheme was about picking winners rather than the wide-ranging, inclusive approach across multiple sectors and projects adopted in the North Wales Growth Deal proposition and the Cheshire and Warrington economic partnership.

Discussion and conclusions

At the outset of our study, we asked how we can ensure that ‘triple helix’ theory is applicable in peripheral regions, whether ‘place-based’ leadership approaches have a part to play in such contexts, and how we can incorporate insights into the contribution made by the supply of university graduates into their regions.

The NWMD case, with the three universities coming together to share sensitive data about the employment outcomes of their graduates, marks an important step in furthering a collaborative approach in a cross-border region that is economically challenged, and gives expression to new government rhetoric about ‘place-based’ development policies. As an example of how civic engagement and triple helix models (e.g. Sarpong et al. 2015, Goddard 2016, Leydesdorff and Ivanova 2016, Todeva 2017) could work in practice, the case study provides evidence that such a focus within universities on regional development can help to bring other actors together, such as local government and the private sector. The debate generated by the exercise certainly contributed to fine-tuning of investment propositions under competitive government schemes, and created a

better awareness of how the region would need to work hard at coordinating effort. Qualitative data gathered through the study confirmed findings elsewhere (e.g. Huggins 2012, Bonaccorsi 2017, Pinheiro et al. 2016, Kohoutek et al. 2017), showing that peripheral or 'lagging' regions without a major urban centre, albeit with some promising areas of strength which they can build on, face additional challenges. Some of these are purely practical – adequate public transport for instance, and attractive, affordable housing for people starting their careers.

New collaborative approaches in the NWMD region were exemplified by the study into graduate outputs from Wrexham Glyndŵr, Bangor and Chester Universities and the quality of stakeholder engagement which was generated. It was too soon to say whether this project, coupled with government-backed investment programmes as part of a 'place-based' strategy, would have the desired impact on economic performance and contribute towards closing the gap with other, more successful parts of the UK on key indicators such as GVA and higher level employment. Emerging insights from other recent studies (e.g. Benneworth et al. 2017, Sotarauta et al. 2014, 2017 and Beer et al, 2019) would suggest that regions characterised by multi-nodal economic development and demographics, a wide diversity of industries and the absence of a unitary authority to govern it, will have a better chance of success if the key actors explicitly subscribe to a collaborative approach. The NWMD found itself in such a position, unlike other UK city-regions led by combined local authorities under an elected mayor which therefore had a head-start in the race for funding for the development and implementation of localised industrial strategies in the UK. Place-based economic strategies were being actively pursued through regional fora, but there was no awareness of place-based leadership models that could present an alternative to the straightforward unitary governance that existed in other parts of the country. Notwithstanding this, the willingness to collaborate in the NWMD was genuine.

A place-based strategy will also require place-based leadership, building on relationships and networks which transcend positions of authority. It would be helpful to develop an awareness of collective leadership approaches amongst partners, in tandem with the regional strategy coming to fruition rather than leaving this to post-hoc analysis. From a university perspective, such awareness definitely includes strategies to nurture their graduates and to ensure that there is a fit with the local labour market, to augment the classical 'triple helix' focus on research and knowledge exchange. The question also arises whether collaborating universities, such as in the NWMD, might be willing to go a step further and align their civic missions and strategies. A simple framework is presented here juxtaposing place-based strategy and place-based leadership, with an adjusted triple helix at the centre. The model foregrounds the university functions of R&D, external engagement and graduate outputs interacting with the other triple helix components, i.e. the private sector and government in the context of peripheral regions. Place-based strategy is defined by having a national policy 'fit', distinctive strengths and purposeful investment to address 'lagging' region disadvantage. Place-based leadership is defined by the presence of key actors and influencers, interdependency through collective approaches and information-sharing.

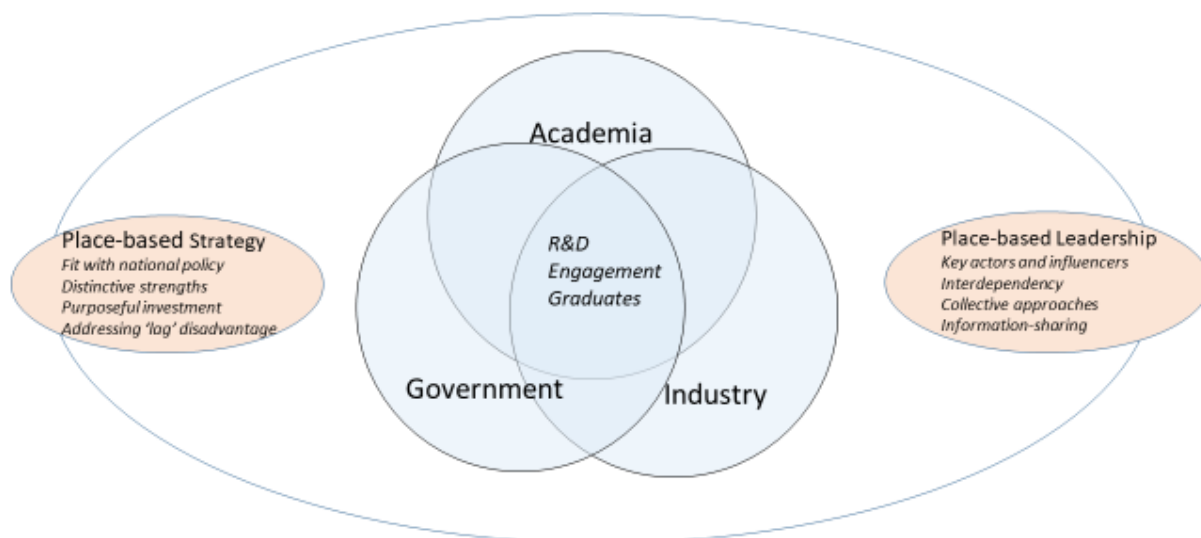


Figure 4: Framework for triple helix working in peripheral regions

Figure 4: Framework for triple helix working in peripheral regions

Linking our findings back to our research questions, two recommendations are made for further research. Firstly, theoretical models mapping civic engagement of universities and the ‘triple helix’ of academia, industry and local government should be enhanced by the inclusion of graduate destinations within their region as a key component. If desired, the model could easily be extended further into a ‘quadruple’ helix, incorporating co-creation with the local community. In the UK, as in many other countries, data are available that would help to track the ‘fit’ between graduate outputs and outcomes on the one hand, and the development trajectory of the wider economy on the other hand. Whilst we did come across other studies into graduate mobility (Hoare and Corver 2010, Faggian and McCann 2009), these did not delve into the granular sector-by-sector data which we explored in our study. After all, educating students with a view to their future active roles in the economy and wider society is a critical part of the core business and the *raison d’être* of universities. Secondly, further longitudinal studies on the impact of funding interventions in peripheral regions are recommended, specifically where such government-backed investments support university endeavours in the context of the local economy and specific societal objectives. Applying the simple framework which we have proposed, it would be particularly interesting to explore what local leadership models exist to bring forward these investments, and to what extent there is a conscious alignment with strategy.

The NWMD case study presented here, and the proposed framework, should help to add to the body of international studies addressing these key questions. Replication of this study in similar regions elsewhere would contribute even more, for the benefit of people living and working there, and for policy-makers and for researchers alike.

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