

Regional Science Association International : British and Irish Section**40th Annual Conference: Park Plaza Hotel, Cardiff 5th-8th September 2011****Economic Development Policy in Wales since Devolution: From Despair to Where?****David Pickernell****Abstract**

Wales was one of the first areas to utilise the resources made available after the UK was amongst the first European countries to adopt an official regional policy as a means of reducing disparities in unemployment rates, with the 1934 Special Areas Act. Whilst at that time Wales was faced with declines in its major industries of coal and steel, 80 years on regional economic development policy is still in place in Wales to address issues of uneven employment, but also increasing incomes and growth disparities with the rest of the UK and the EU. This paper examines the changes that have taken place, and the actors that determine both the policy itself and the implementation of it. This is of particular importance currently as economic conditions continue to impact unevenly across nations and regions globally. In addition, however, the resources available to tackle such regional inequalities are becoming increasingly squeezed by the current squeeze on government fiscal policy, a situation unlikely to ease in the medium term. This means that the foci of those economic development policy resources that are available are being altered to reflect both new economic but also political realities. It is important to ask, therefore, where these processes may lead to, and how this might affect the way in which economic development policy in Wales is viewed in the future.

Economic Development Policy in Wales since Devolution: From Despair to Where?

Introduction

Wales, over the last 80 years, has had to make the transition from an economy heavily dependent on large, often externally owned, coal and steel employers, to one that has become more diversified into manufacturing and (to a lesser extent until recently) services. This change has been partly facilitated by government regional policy intervention to try to alleviate transitional high unemployment (Morgan, 1997), Wales for many years having had access to schemes such as Regional Development Grants (RDGs) and Regional Selective Assistance (RSA) (Brooksbank et al 2001). Indeed, the UK was amongst the first European countries to adopt an official regional policy as a means of reducing disparities in unemployment rates, with the 1934 Special Areas Act, and Wales was one of the first areas to utilise such regional policy resources.

As Morgan (1997) also highlights, however, the lack of a strong indigenous entrepreneurial business base (not least because of the previous concentration in coal and steel) led, in some ways, to an over reliance on public sector sourced resources, first in the long declining (and at that time nationalised) coal and steel industries, and then in (government incentivised) attraction of manufacturing investment from foreign-owned multinationals. Indeed, during the 1980s Wales regularly gained three to four times the share of the inward investment and associated jobs coming to the UK that one would expect given its population, the attraction of FDI largely built on government regional aid and infrastructure spending, as well as relatively low wage levels (Hill and Munday, 1992).

As a result, by the early 1990s, foreign manufacturing accounted for a greater proportion (25%) of employment in Welsh manufacturing than both the North and North West of England and was on a par with Scotland (Driffield and Taylor, 2000). These policies,

however, also led to geographically disparate effects. In pre-devolution times (prior to 1997), the focus of economic development resources was on particular areas of “economic need” such as the South Wales valleys (Brooksbank et al, 1998).

From the late 1980s to early 1990s, new technology and knowledge transferred into the Welsh economy by inward investors was seen to increase the demand for skilled labour and wages in these areas, though with much less effect on structural unemployment (Driffield and Taylor, 2000). Pickernell (1999) also identified a variety of mechanisms by which knowledge and new working practices of use in raising productivity were also being transferred into these parts of the Welsh economy. Cooke et al (2003) also illustrate that FDI located in Wales up to the start of the new millennium was contributing disproportionately positively to an otherwise relatively (compared to the UK as a whole) weak Welsh innovation performance.

More recently, however, the environment for attracting large-scale investment has changed. Between 1998 and 2008 Wales lost nearly 31,000 jobs to China, South East Asia and Central and Eastern Europe, where companies are able to combine much lower labour costs with increasing education and skills levels and a growing market potential (Evans et al., 2008). This makes it increasingly difficult for Wales to compete for inward investment focused on production cost minimisation alone. FDI-based employment in manufacturing is likely, therefore, to have peaked, and future overall employment growth from FDI is unlikely. Additionally, whilst there have been increases in financial services, and more specifically distribution, these are generally in activities with lower value added than lower value added.

Despite the success of government policy in attracting FDI, however, Wales's relative GVA per head (compared with the rest of the UK), however, has continued to fall during this period. As Morgan (1997) points out, when the foreign inward investment began to become

more difficult to attract, from mid 1990s onward, policy began to focus more heavily on business support, technology transfer, skills development, indigenous entrepreneurship, and cluster-focused policy (see Pickernell et al, 2007 for a discussion of how such clustering can be evaluated). It must also be remembered that because the changes occurred at the same time as devolution in Wales, a policy change compared with the past was seen as more politically important. Nevertheless, the worsening poor relative GVA record pre-1997, during the period of successful FDI attraction also encouraged a change in development policy, away from exogenous strategies, towards more endogenous and entrepreneurship-centred approaches.

Since 1997 there have therefore been a succession of government economic development strategy documents for Wales, from *A Winning Wales* (2002), to *Wales: A Vibrant Economy* (2005) to the most recent, *Economic Renewal Programme: A new direction* (2010). In addition, there have also been a number of new strategies articulated in specific areas such as innovation, science, and spatiality, amongst others. Throughout this period, however, relative GVA has continued to fall (see ONS, 2010)

Whilst to an extent this problem is nothing new, Crafts (2007) highlighting that Wales has suffered from a relative productivity problem compared with the UK as a whole since at least the latter part of the 19th century, this problem has worsened still further in the past 20 years. The question that this paper therefore seeks to explore is why, despite the use of regional policy resources in Wales over an extended period of time, has relative GVA continued to fall since devolution? In order to do this, the theoretical reasons for business productivity differences are explored next, followed by an analysis of the Welsh situation and comparisons with other regions and nations.

Reasons for Business Productivity Differences

The theoretical reasons for business productivity differences can be seen as having been generally focused around the amount and quality of factors of production (with a specific focus on physical and human capital), technological progress and the economic environment. Stiroh's (2001) analysis, for example, highlights an approach in which physical capital, human capital, public (infrastructure) capital and technological progress, embodied as Research and Development (R&D) and Information and Communications Technology (ICT) investment can all be seen as different types of capital investments that can impact upon productivity. Hall and Jones's (1999) examination splits the problem into just three key elements, namely physical capital, human capital (education and skills) and what they called "social infrastructure", made up of the institutions and government policies that determine the economic environment within which individuals accumulate skills, and firms accumulate capital and produce output.

Within the Hall and Jones (1999) analysis a social infrastructure favourable to high levels of output per worker is one that provides an environment that supports productive activities and encourages capital accumulation, skill acquisition, invention, and technology transfer. Etzkowitz and Leyesdorff (2000) see a particularly strong role for the government in this, via innovation, through the "triple helix" of government, industry and institutions' (such as universities) interaction, and emphasises the importance of network and collaborative activities between these three groups of stakeholders. Whilst these can be seen as highlighting a positive role for government and policy in raising productivity, Gwartney et al (1998) also highlight, however, the potential for excessively large government activity to have a negative impact on growth and productivity, if it goes beyond creating the legal and physical infrastructure and public good necessary for economic activity, if taxes are too high, government engages in activities to which it is not suited or substitutes for market activities more efficient in allocating resources.

The knowledge spillover theory of entrepreneurship is also of potential relevance here (Acs et al 2004), according to which levels of knowledge-based entrepreneurship relate to two factors: the extent to which private firms and public institutions generate new knowledge; but also the extent to which individuals exploit that new knowledge. The absence of domestic knowledge-creating institutions, such as public research institutes, and/or the absence of a sufficiently scaled indigenous industry base might therefore reduce knowledge-based entrepreneurship, Audretsch and Keilbach (2007) demonstrating lower levels of knowledge-based entrepreneurship in German regions characterised by a lower percentage of the work force accounted for by scientists and engineers. Second, individuals with new knowledge might under invest in commercialization activity as they do not see the benefits, or fail in their attempts to commercialize, due to a lack of market knowledge. Third, those individuals or organizations with market knowledge or other resources may not be aware of the new knowledge, and therefore fail to invest, or under-invest, in the knowledge or in new firms (Acs, Audretsch, Braunerhjelm and Carlsson, 2004).

In the absence of sufficient domestic knowledge-creating capacity, policy makers in open economies, for example, might therefore seek to access spillovers from across their geographical borders either indirectly or via the attraction of inward foreign direct investment (FDI). However, for many policy makers, accessing knowledge spillovers from inward FDI has proved to be an elusive policy objective. Blomstrom and Kokko (2003), for example, argue that investment incentives that attract inward FDI do not necessarily promote spillovers of foreign technology and skills to local industry, with such benefits only actually occurring if local firms also have the ability and motivation to invest in absorbing foreign technologies and skills. This suggests that for such spillover benefits to accrue to the local economy, policies aimed at attracting FDI need to be accompanied by policies which also support learning and investment by local firms, as well as broader entrepreneurship

policies to create an entrepreneurial base. Overall, therefore, this suggests that the components of policy, but also the timing of its introduction, its coordination, and longevity, can all be important. It is against these factors, therefore, that Wales's economic development policy record can then be analysed, an activity that is now undertaken using available secondary literature.

Wales's Relative Business productivity Problem

Boddy's (2006) decomposed the then Welsh 42% output per employee (GDP/E) productivity gap relative to London. In addition to Full time- Part Time mix (HW/E) employment differences public: private sector ownership mix, and relative population density, they found that lower capital levels per worker; public infrastructure (as indicated by transport times to the main UK cities), and a less advantageous industrial sectoral composition (which can be seen as an outcome from technological progress and the economic environment) each accounted for around 1/5 of the difference between Wales and London. This, however, still left around fifth of the difference initially unexplained.

Table 1 Explanations of the 40% GVA per employee gap between Wales and London

Explanation	Proportion of Gap "Explained"
Capital Stock Levels	8/40
Travel time to London and Main Cities	8/40
Industry Structure	6/40
Qualifications	6/40
Population Density	3/40
Full Time : Part Time Mix	1/40
Public:Private Ownership, Multinational Ownership, No web	1/40

site for external use	
Unexplained	7/40

Source : Boddy (2006)

Highlighting these causes of the productivity gap in Wales, of course, does not explain why they exist in the first place, Crafts (2007), for example, argues that the differences for Wales, to the extent that they are linked predominantly to very poor economic performance in a concentrated part of Wales, may represent outcomes from equilibrium regional disparities (see Rice and Venables, 2003). Specifically, London, with its great agglomerations in key sectors such as financial and businesses services, enjoys relatively high money wages, and in-migration of skilled workers, as well as high relative house and untraded goods prices. According to Crafts (2007), therefore, the fact that Wales's real Gross Disposable Household Income per income in 2005, which accounts for cost of living differences and is a measure of living standards, was 95.9% of the UK average (and only 12.1% below London, indicates that the relative GVA differences are largely the consequence of market equilibrium rather than market failure.

In terms of policy, the explicit policy of attracting FDI can be seen to have been beneficial, to the extent that inward investors in Wales are much more likely to be employed in high technology production activities than their indigenous counterparts. There has also been a strong increase in the proportion of inward investors undertaking R&D activities over the past decade (Evans et al, 2008), though this may also at least partly indicate the exiting from Wales to lower cost locations of the FDI that did not undertake R&D activity in Wales, as well as merger / acquisition activity (e.g. Broughton) where previously UK owned companies with R&D activities have been acquired by foreign owners.

The knowledge spillover theory also suggests, however, that it is necessary to integrate individual and firm-level entrepreneurial processes with such knowledge and processes at a range of spatial levels, in order to maximise the utilisation of knowledge and innovation (Acs et al., 2007). This can also be seen as fitting within the Regional Innovation Systems literature Cooke (2003), as well as being supported by work such as Senyard et al (2007), who found that specific internal, firm-level processes of relevance to knowledge spillovers (from university spinout activities in their example) were related to entrepreneurial orientation, knowledge and relationship management and knowledge asymmetry. Such entrepreneurship and innovation-related issues can be seen as potentially falling within the realms of the “unexplained” element of table 1. This can also be seen as fitting into Hall and Jones’s (1999) definition of social infrastructure.

Economic Development Policy in Wales

This highlights a crucial need to understand the extent to which government policy can actually affect this part of the equation. Cooke (2003) highlights, for example, that successful, faster growing “core” regions are more likely to have ‘entrepreneurial’ innovation systems, whilst more economically slow growing and geographically peripheral areas (such as Wales) tend to have ‘institutional’ ones, with a stronger role played by government.

As an illustration to assist the examination of the range of Welsh productivity-related policies, table 2 identifies against each of the broad causal factors, a basic proportion of the gap (with London) that can be attributed to them (derived from the Boddy, 2006 analysis above), the Welsh policy strategies identified as being focused on these areas from WAG (2005) “Wales: A Vibrant Economy, and the resources targeted at these areas from the WAG budget between 2007 and 2011.

Table 2: Identified Business Productivity Issues, Estimated Importance and WAG Based Resources Spending 2007-11

Business Productivity Issue:	Area and Estimated % "Contribution" to the Welsh Business Productivity Gap with London (From Boddy (2006))	Specifically Identified Resources from WAG 2008-11 budget (and % of Total Identified Productivity-related Policies))	Author-Identified WAG Policies of Potential Relevance from WAG 2008-2011 budget (Whilst these may impact upon more than one productivity issue for budget allocation purposes have been allocated to that deemed most relevant)
1. Capital and Structure	Capital Stock (20.0%) Industry Structure (15.0%) Full Time : Part Time Mix (2.5%) Total : 37.5%	Flexible Business Solutions - (Grants Programme, etc.) £370,494,000 Total: 5.94%	Regional Selective Assistance: Single Investment Fund ; Broadband Wales Programme (High Bandwidth ICT); Attraction of HQs; Stable overall business environment; High Bandwidth ICT ; Single Investment Fund : Knowledge Bank for Wales; Regional Selective Assistance: Single Investment Fund; Sectoral Foci on Energy Partnerships, Hi Technology; Automotive, Aerospace, Agri-Food, Tourism, Financial Services, Creative Industries
2. Public Infrastructure: Connectivity and Place	Travel Time to London and Major Cities (20.0%) Population Density (7.5%) Total : 27.5%	Regeneration (including Cardiff Bay) European Union (EU) Funding and Matched (assumed 25% of total) Improving Trunk Roads, Rail and Air Wales Spatial Plan £1,448,781,000 Total :23.23%	Improvements in transport infrastructure ; Wales Spatial Plan ; Wales Transport Strategy; Broadband Wales programme (High Bandwidth ICT)
3. Human capital: Skills and Qualifications	Total : 15.0%	14-19 Learning Skills For a Prosperous Wales HEFCW (Reaching Higher and Capital Budget) Strategic Investment European Funding and Matched (assumed 33% of total) £4,140,675,000 Total : 66.38%	Skills and Employment Action Plan (including Graduate opportunity Wales); Broadband Wales Programme (High Bandwidth ICT); Tailored Policy through Department for Education and Lifelong Learning; Supporting Key drivers for individual businesses (skills)
4. Social Infrastructure: Enterprise, Networks and Innovation	Web site for external use, Multinational Ownership, Public:Private Ownership (2.5%) Unexplained (Innovation, Enterprise and Geography) (17.5%) Total : 20.0%	Innovation and Technology Enterprise International Business Promotion European Funding and Matched (assumed 42% of total) £277,433,200 Total : 4.45%	Business Advice and Support:- RSA attraction of inward investment: Single Investment Fund: Knowledge Bank for Wales; Trade promotion; Public Sector Reform; Innovation and Enterprise ; Wales: Spatial Plan: Techniums; Knowledge transfer initiatives : Support for business innovation and R&D; Maximising the economic impact of academia (now encapsulated within Academic Expertise for Business Programme A4B); Support for Innovation & R&D Centres; Implementation of new technologies including ICT ; Sectoral activities; Innovation Action Plan; Entrepreneurship Action Plan; Knowledge Bank for Wales: Single Investment Fund; Broadband Wales Programme (High Bandwidth ICT)

Source: Derived from WAG (2008)

Table 2 indicates that there are considerable differences between the relative importance of the four main issues identified as important to business productivity and the proportions of identifiable policy resources focused upon them, with an obvious focus on human capital, a relatively proportionate focus of resources on public infrastructure, and only very small proportions of resources focused on capital and structure, but also on the social infrastructure elements linked to enterprise and innovation. Unsurprisingly, therefore, There continues to be much debate as to the coherence and effectiveness of Welsh productivity and competitiveness policy (see for example, Bristow, 2005), and the role of regional and spatial planning, particularly in the advent of devolution in the UK (see Alden, 2006).

Whilst Brooksbank et al (2001), for example, highlighted the increased importance placed on entrepreneurship and skills development in the Welsh Objective One Programme, they also raised issues over its links with previous policy, and the need for spatial targeting given the very different nature of different parts of Wales. They also highlighted the very different governance approaches required for “top-down” inward investment attraction and more “bottom-up” entrepreneurship and skills development.

Adams and Robinson (2005) also criticised the initial WAG economic development strategy document– A Winning Wales, as being weaker than similar documents in Scotland or Ireland, due partly to less well developed policy making communities. According to Adams and Robinson (2005), the Welsh Assembly Government has also continued to give greater emphasis to increasing levels of employment and, particularly more recently, reducing economic inactivity, rather than business productivity per se.

The focus of WAG business productivity policy emphases also need to be seen in the light of there being more restricted resources in some areas, and greater resources in others

(particularly the areas of skills, entrepreneurship and innovation) where additional EU Objective One funding is available. Adams and Robinson (2005) also identified a range of business productivity related policies brought forward focused on clusters policies, science parks, and the knowledge economy in particular into which the UK (and EU) also has significant input and thus control. This highlights a restriction in part imposed on policy making because of issues over resources and control over the ways in which they can be used. It must also be recognised that some potential policies are currently unrealistic for the Welsh Assembly Government to actually implement, given the current political settlement. For example, options for different fiscal policies in Wales compared with the rest of the UK are currently limited, though there may be possibilities that this could change in the future.

In areas where Wales does have policy levers, however, there are also a number of issues. For example, the strongest contributory factor for FDI locating in Wales during the 1980s and 1990s was the availability of government grants and subsidies facilitating the initial location process (Huggins, 2001). Whilst most recent investments in manufacturing were more focused on the availability of productive and skilled labour because of the trend of bringing in more technologically advanced products (Evans et al., 2008), relatively low multiplier effects have been created by more recent (but still often government resource supported) FDI attracted into the services sector (Evans et al, 2008) in Wales. This calls into question the appropriateness of this policy approach in terms of maximizing the benefits from the resources given.

This resource use issue has also been raised in terms of other economic development policies, for example in terms of the development of Techniums. These require collaboration between government, universities and industry. Abbey et al (2008) arguing that the Technium approach is helping generate a distinct sub-regional innovation system in South-West Wales, and incorporating many features identified as critical to successful localized

collective learning and innovation. There has also been criticism, however, that techniums are more about property development and are expensive in terms of cost per direct job. WAG data has indicated that the cost has been nearly £190,000 per job-created using total cash values (Bristow et al, 2007) and more recently the techniums project has been drastically curtailed (Western Mail, 2010)

Overshadowing all of this, is the fact that falling levels of public sector resources for Wales are having a knock on effect on the economic development policy resources available, making even more important the issue of opportunity cost in the allocation of future resources. The UK's Barnett funding formula for the devolved nations of the UK, and based on simple population proportions, has been seen as giving Wales fewer resources than would be denoted by its needs. As Midwinter (2004) argues, the real test of the Barnett formula's durability under democratic devolution occurs when different parties are in power in London and Edinburgh (or Cardiff), as is now the case. In addition, unlike the previous 10 years, there are now reduced resources being distributed from London. Unsurprisingly, therefore, the most recent Economic Renewal Plan has seen increases in one area of economic development policy (specifically funds for the new focus on infrastructure) come at the expense of reduced resources in other areas of economic development expenditure.

This highlights that the policymaking process in many areas requires a collaborative networked approach because of the increasing need to utilise shared resources. This need exists, both between different tiers of government and also with industry and institutional stakeholders (such as universities) in terms of both policy formulation and implementation. This is an area, however, where WAG policy has recently focused, but still faces problems in obtaining effective stakeholder engagement (see Bristow et al, 2008). This therefore raises an important question concerning how one might best leverage scarce resources generally to maximise their benefit through the combination of different policies.

Comparisons between Wales and Ireland

In examining this, comparison with Ireland is also potentially useful (an exercise carried out in more detail in Acs et al. 2007). Despite the recent problems that have beset the Irish economy, comparison of Wales and Ireland's economic development policies with regard to the promotion of knowledge-based entrepreneurship over the two decades are still instructive.

Ireland and Wales are both relatively small, peripheral economies (a population of approximately 4.5 million in Ireland, and 3 million in Wales). The two cases are characterised by different historical industrial and political development trajectories. Ireland is an independent sovereign state, whilst Wales is a quasi-autonomous nation within the UK, creating different policy constraints and policy options in terms of EU funding. Ireland and Wales do, however, both lack indigenous knowledge creating capacity, spending only around 1.1% of their GDP on R&D, compared with an OECD average of 2.25% (OECD, 2006a). In addition, both have been relatively successful in attracting inward FDI over the past several decades. FDI inflows in Ireland and Wales for the period 1993-2002, for example, were US\$97.2 billion and US\$38.8 billion respectively. The Welsh figure represents approximately 8% of inflows into the UK. Relative to OECD countries, this places Ireland 12th of 30 countries. While the UK ranks third, inflows into Wales would rank Wales as 20th.

Despite both having years of economic development policies aimed at attracting inward FDI, however, Ireland and Wales differ significantly in terms of economic performance, with Ireland experiencing rapid economic development during the period of 2000 to 2008, whilst, as we have seen, Wales' relative GDP per head has dropped steadily over the last 20 years. The two countries also differ in terms of the nature of FDI (Table 3 below). Sectors with higher levels of FDI in Ireland compared to Wales include chemicals, machinery and equipment, and services generally, with a clear concentration in Ireland on transport,

communications and financial services. Sectors where inward FDI is more important in Wales than in Ireland include timber-based industries, electronics and motor vehicles.

Table 3: Distribution of early stage entrepreneurial activity (2003-2006) and FDI (Ireland 1998-2002; Wales 1990-1999) by sector

	Ireland		Wales	
	Early stage entrepreneurship p (n=470)	FDI	Early stage entrepreneurship p (n=910)	FDI
Total Manufacturing	8.5%	53.0%	6.6%	94.5%
- Food	0.6%	4.0%	0.8%	3.3%
- Textiles	0.2%	0.001 %	1.1%	0.6%
- Wood/paper and publishing	2.3%	0.001 %	1.8%	6.6%
- Fuels and man made fibres	0.0%	20.0%	0.2%	12.1%
- Minerals	0.9%	1.0%	0.1%	2.5%
- Metals	0.2%	0.5%	0.4%	11.1%
- Equipment	1.1%	10.0%	0.1%	1.1%
- Radio, TV, electrical goods	1.5%	15.0%	0.1%	39.6%
- Vehicles	0.0%	0.5%	0.7%	15.7%
- Other	1.7%	2.0%	1.3%	1.9%
Agriculture	5.5%	0.001 %	4.7%	0.0%
Mining	0.6%	0.001 %	0.3%	0.01%
Wholesale, retail, repair of motor vehicles	13.2%	8.0%	14.5%	2.8%
Construction	13.2%	1.0%	13.4%	0.1%
Hotels and restaurants	5.5%	0.010 %	7.5%	0.0%
Transport, storage, post	6.6%	10.0%	4.4%	0.0%
Real estate, business services	28.5%	22.0%	26.0%	2.4%
Electricity, gas, water supply	0.9%	4.0%	0.3%	0.0%
Education, health and water	6.6%	0.001 %	10.8%	0.0%
Other sectors	10.9%	0.0%	11.4%	0.0%

Source: Ireland figures based on UNCTAD (2005); OECD (2005); Wales figures based on Regional Selective Assistance data; * includes high technology

Global Entrepreneurship Monitor (GEM) data from 2003-2006 contained in table 4 also indicates clear differences in terms of both the levels and nature of entrepreneurial activity

generally and specifically those related to knowledge-based activities between Ireland and Wales. Using GEM-defined variables, *Total Early Stage Entrepreneurial Activity* (nascent entrepreneurs plus those that have started a new firm in the previous 42 months), for example, is 8.2% for Ireland and 5.7% for Wales (Table 4). If entrepreneurship is classified by sector, the rate of *Total Early Stage Entrepreneurial Activity* classified as high-technology knowledge-intensive averages 0.9% in Ireland, compared to 0.3% in Wales. That is, in Ireland the rate is three times higher than the rate reported for Wales. The difference between Ireland and Wales is smaller when the broader classification of knowledge-intensive sectors is used, the rate of *Total Early Stage Entrepreneurial Activity* in Ireland being 3.2%, compared to 2.6% in Wales. In terms of a narrower classification of entrepreneurship, *New Firm Activity* (i.e. those that have started a new firm in the previous 42 months) there is a larger difference between Ireland and Wales when *New Firm Activity* is classified into sectors. Rates of *New Firm Activity* in the High and Medium Technology Manufacturing sector are 3.1% in Ireland compared to 0.6% in Wales.

Table 4: Early Stage Entrepreneurial Activity and Components for Ireland and Wales, 2003-2006 (average)

	Ireland	Wales
Nascent Entrepreneurial Activity	4.9%	3.1%
New Firm Activity	3.8%	2.9%
Total Early Stage Entrepreneurial Activity	8.2%	5.7%
Knowledge-Intensive Total Early Stage Entrepreneurial Activity ¹	3.2%	2.4%
High Tech Knowledge-Intensive Total Early Stage Entrepreneurial Activity ²	0.9%	0.3%

Source: GEM 2003-2006

1: Includes only those early stage entrepreneurs classed as knowledge-intensive;

2: Includes only those early stage entrepreneurs who operate in high technology, or medium-high technology manufacturing sectors, or the high technology knowledge-intensive service sectors.

By showing the potential for knowledge and technology brought into a region by inward investors to “spill over” into the economy more generally and to be exploited by local entrepreneurs, the knowledge spillover theory of entrepreneurship, (Audretsch and Keilbach, 2007), highlights the benefits to be derived from explicitly linking inward investment policy with indigenous firm development activities. Policies, also benefit from integration both with each other and with education, science and technology policy more generally to increase levels of knowledge creation and utilisation, as was highlighted to exist in the Ireland situation by Jones-Evans (2002). Acs et al. (2007) also illustrate that Ireland was relatively successful in attracting inward FDI but within a context of Irish industrial policy simultaneously seeking to support export-oriented indigenous firms, including new enterprises. Acs et al (2007) illustrated evidence that the performance of indigenous manufacturing firms has also improved, Irish entrepreneurship policy seen by Acs et (2007) to have focused on a narrower range of ‘high potential start-up’ ventures, mainly manufacturing firms with export potential and ‘internationally traded services’ businesses.

In contrast, Welsh policy can be seen to have much focused more exclusively on inward investment up until the later 1990s when attracting it became more difficult, with policy then switched to focus on indigenous development (Morgan, 2007), rather than coordinating the two policies simultaneously. Indeed in Wales the resources obtained by FDI on an ongoing basis potentially reduced the resources available for entrepreneurship policy (Brooksbank and Pickernell, 2001). Cooke (2003) also concludes that the Welsh Assembly Government’s recent attempts to develop a Welsh ‘regional innovation system’, may have failed both because of the absence in recent years of large scale FDI inflows, but also because of a failure to foster entrepreneurship and innovation because of risk aversion, tight central control of budgets, and enterprise and innovation support instruments designed for public rather than private benefit. The enterprise policy focused on the growth of small Welsh businesses and raising entrepreneurship in general and for under represented groups rather

than more specifically on knowledge-based entrepreneurship (see Entrepreneurship Action Plan, 2000). Policies on entrepreneurship in high growth businesses did offer £15M to support 200 firms through the Entrepreneurship Action plan and the Knowledge Bank for Wales (KB4B) also provided an additional £14M to support high growth potential firms (Welsh Assembly Government, 2005). Many of those assisted initially by KB4B, however, were larger established firms.

The comparison of Wales and Ireland thus illustrates that, whilst there may indeed be policy-related links between FDI and the nature of subsequent entrepreneurial activity, the timing and coordination of policy and its longevity may also be important. To an extent this may be a result of issues over resources and their control, an issue likely to increase in significance in the current economic climate. This makes it even more important to explore how resources can be levered in different ways and from different sources to those of government.

Stakeholder Based Approaches to Economic Development Policy

Whilst there can be a particularly strong role for the government via innovation, through the “triple helix” of government, industry and institutional interactions, Etzkowitz and Leyesdorff (2000), for example, also emphasise the importance of network and collaborative activities between these three groups of stakeholders. Focusing on the role of institutions such as universities, they clearly have importance, specifically in generating knowledge and acting as a conduit for knowledge generated elsewhere, disseminating knowledge, but also generating new businesses and opportunities (Pickernell et al 2008, Pickernell et al, 2009). The recent analysis contained within Pickernell et al (2011) also reinforces the potential importance of universities, graduate entrepreneur-owned firms in the UK found to be statistically significantly more likely (than non-graduate-owned firms) to own more export-oriented

businesses, in high knowledge services, to have intellectual property, and be of high growth potential.

Authors such as Malecki (2010) also argue that universities are core to knowledge-based regional development because of their ability (via intended and unintended, formal and informal mechanisms) to act as a "pipeline" for transfer of global knowledge into the region (Benneworth and Hospers, 2007). These links can be exploited both by indigenous firms and also through collaboration with inward investors. In this way the attractiveness of Wales as a location to inward investors in sectors focused upon by government can be increased. Lockett et al (2002) go further, however, arguing that universities can now play the role of "incubators without walls". This, however, requires them to provide shared office services, business assistance, access to capital, business, networks and rent breaks.

It also requires, according to Lockett et al (2002), however, that universities exist within a network of interdependent relationships with input providers including venture capitalists, business angels, and venture management companies bringing an array of complementary resources to those offered by industrial partners and public support agencies. Lockett et al (2002) found that the more successful universities made more use of so-called "surrogate entrepreneurs", brought in from outside to assist the academic innovator bring the innovation to market. This also fits in with the idea of "connected universities" (Kitson et al, 2009), where technology transfer activities are supported by networks built with clusters of local firms, and also 'boundary spanning' individuals able to link universities with business.

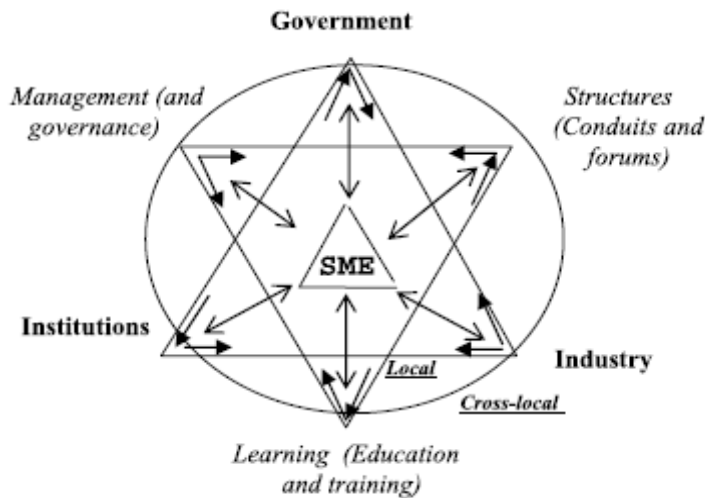
Recent Scottish research (Roper et al, 2007) conducted into innovation policy <http://www.scotland.gov.uk/Resource/Doc/170949/0047879.pdf>, also highlights, however, a general problem in the use of universities in regional economic development policy, because

of potential mismatches between their knowledge generation and transfer capacity and the local needs / absorptive capacity of local small and medium sized enterprises (SMEs).

This contrasted with much better University-foreign multinational links. In Wales this scenario could be seen as fitting with the previous Regional Innovation System literature highlighted by Cooke (2003). Work by Cooke et al (2005) and Cooke and de Laurentis (2006) also emphasises the potential importance of cross-locational links in the development of successful firms in many knowledge-based industries. Whilst Wales may require much more focused FDI-attraction/utilisation policies that have greater potential to lead to spillovers of knowledge from (non-local) cross-locational sources, in order for local entrepreneurs to fully exploit this, there would also seem to be a need for entrepreneurship policies that encourage entrepreneurial activity and capacity building (in high potential, high growth areas) among those with the resources and knowledge to exploit such spillovers.

In addition, the work of Roper et al (2007) also suggests that it is in areas such as more direct university-SME links, that policy also needs to be focused. Given that it is SMEs that will ultimately have to realize the benefits of innovation, therefore, it is for them that enabling mechanisms will need to be put in place. Overall, Pickernell et al (2009) summarised the conditions necessary in figure 1 below.

Figure 1 Innovation Creation, Diffusion, and Utilisation Framework



Source: Pickernell et al (2009) p.3

Figure 1 explicitly places SMEs at the centre of the innovation generation, diffusion and application interface. The arrows highlight the two-way flow of information that may be necessary, the precise nature of the relationships depending on the type of industry and the clustering or networking required. Most crucially, the framework illustrates that successful development, diffusion and utilisation of an innovation involve requires, in addition to the innovation itself through the triple helix, the development of appropriate management and governance relationships between the actors, functioning network structures to act as conduits for the knowledge itself, supported by relevant skills and training that enable firms to build the necessary capacity to take advantage of such innovations.

Discussion

Given the relative lack of resources available, this suggests that it may be useful to explore relevant approaches such as bricolage. Bricolage theories were developed by Levi-Strauss (1967) to illustrate the creation of something new through involved actors in the process of recombination and transformation of existing resources, "material" bricolage where people use and combine the various resources they have "at hand" as a means of finding workable approaches to a wide variety of problems and opportunities (Baker, 2007). The bricolage

concept is therefore a potentially useful tool to apply to increasingly resource constrained environments, because it emphasizes the benefits to be gained from combining and coordinating policies as a way to overcome problems of resource limitation. There are, however, also negatives associated with bricolage behaviour, particularly if the resources are insufficient, because the focus of bricolaged solutions is often about “getting the job done” and just “good enough” outcomes rather than “getting the job done well” (Berchetti & Hulsink, 2006).

Whilst it could be argued that Wales must get used to “getting” by on relatively limited resources, the problem with the approach adopted for Wales, however, is that it is more likely to result in, at best, bricolage solutions that allow Wales only to “get by” rather than “get ahead”. This is because government in Wales does not seem to have a particularly good track record with regard to the establishment of the network relationships seemingly necessary for implementing more beneficial types of network bricolage based solutions (see Senyard et al, 2010 as an example).

In Wales, successive devolved administrations have expressed a desire for partnerships, highlighted in documents such as ‘Making the Connections: Delivering Better Services for Wales’ in 2004 and restated in “Making the Connections: Delivering Beyond Boundaries” in 2006. Unlike in England, however, where ‘partnership’ encompassed public and private sectors, to the extent that it was seen as akin to privatisation (Entwistle, 2006), in Wales the focus has been much more on partnerships between public sector organisations. Here, however, there was great dissatisfaction with the way in which they worked (Bristow et al, 2003), the criticism being that they are often not effective and akin to committees (Hockeridge, 2006, Entwistle 2006).

Given the importance focused on skills and innovation this necessarily means a strong role for Higher Education. Unsurprisingly, WAG (2010), therefore:-

“Challenges our higher education providers to become much more deeply engaged in supporting the future economic success of Wales through stronger relationships with business and more commercialisation of new and existing knowledge... We have also asked HEFCW to review its approach to institutional planning to create a higher education system in Wales where institutions focus on their individual strengths and collaborate locally, regionally, nationally and internationally to enhance the economic impact of Higher Education... Substantially fewer institutions Encouraging collaboration between researchers across Higher Education institutions to increase our capacity to participate in higher value research contracts and increase the quality of competitive bids...Encouraging collaboration between Higher Education and business for mutual benefit as part of an “end-to-end” approach”.

Pickernell et al’s (2008) work suggests, however, that there is work to be done in the degree and type of networking undertaken between universities in Wales as well as between government and universities and universities and business. This is partly because of previous resource ‘mismatches’ that Morgan (2002) identified, which highlighted that much of the research resource given to the traditional “elite”-type universities in Wales was not of relevance to its economy. Conversely, the “outreach” type universities were much less well funded. One networked solution to this would be for much greater collaboration and cooperation between these two types of universities in Wales, within a structure that Pickernell et al (2008) likened to a social network arrangement. This, they argued however, highlighted

“a clear need to develop and strengthen the existing structures and processes that already fit into the social network cluster type, as well as making changes to more of a focus on sharing knowledge, relationships, long-term network development and learning that promotes doing different things and doing things differently” (P. 58).

For Government itself, it is also necessary to acknowledge that the overlapping nature of the problem of relatively poor economic performance in Wales and potential solutions mean that rational comprehensive planning is often inadequate for the range of issues that arise. This suggests that economic development policies fall within the remit of ‘wicked problems’ (Rittel and Webber 1973) the solutions for which are largely a social process (Roberts 2000) ongoing over a long period of time. This is because the issues outlined contain interdependencies, multi-causal aspects and have many stakeholders holding different opinions. Their relationships are consequently both unstable and evolving, and the knowledge base for defining the nature of problems and the scope of possible solutions is disputed (Head 2008).

Focusing on the structure of policy, WAG (2010) now has explicit policy focus on “investing in high quality and sustainable infrastructure”, “making Wales a more attractive place to do business”, “broadening and deepening the skills base”, “encouraging innovation”, and “targeting business support” into the 6 sectors mentioned earlier. Encouraging enterprise and entrepreneurship, however, whilst being mentioned in the document (4 times for enterprise, 5 times for social enterprise and 4 times for entrepreneurship), seemingly has a much lower focus than innovation (mentioned 50 times) and skills (mentioned 90 times).

There has seemingly, therefore, been much less recognition that entrepreneurship policy needs to be long term in nature, and to be about both new businesses and also high growth businesses. Contrary to anecdotal evidence and the more focused approach of WAG (2010),

successful business may come from a variety of industries and circumstances (Henrekson and Johansson 2008) and fast growth firms can be found in labour as well as knowledge intensive industries, in both manufacturing and service industries (Davidsson and Delmar 1997).

This may be because there is a perception that, as OECD (2008) highlighted, policymakers do not see a problem in terms of start-ups, but rather of growth in existing businesses, something potentially reinforced by the comment in WAG (2010, p44.) that "early stage entrepreneurial activity in Wales is reasonably strong, with a TEA rate of 6% in 2009 against a UK rate of 5.8%. Whilst this may be true, the most recent GEM data for Wales, from Hart and Levie (2009), shows that Wales has consistently had a worse record for Total early stage entrepreneurial activity than the UK average over the past decade.

In terms of the main policy conduit for entrepreneurship policy OECD (2008) also highlighted that whilst the Entrepreneurship Action Plan (EAP) had initial success in raising total entrepreneurial activity, the Valleys areas continued to have low levels of entrepreneurship. Wales's better record (at the time) regarding entrepreneurship was also seen as more linked to UK rates going down than Wales ones going up. Because up to 1/3 of Wales Total Entrepreneurship Activity (TEA) could be attributed to government policy at the time there seemed to be continued need for policy focused in this area. This, however, is not something that can be said to have occurred, and without a strong entrepreneurial base there is a danger that, however successful the innovation generation and skills development parts of the WAG (2010) approach, there will be insufficient commercial exploitation of the resulting ideas.

Finally, concerning specific sector policy fora, some policy experts reported in OECD (2008) also argued that there needed to be increased facilitation of the emergence of stronger

representative organisations across Welsh industrial sectors (*i.e.* to replace the often government dominated forums that currently exist - *e.g.* see Clifton *et al.* (2008) for aerospace), to create enhanced co-operation capital between companies as well as with higher education institutions and government. This is something also highlighted in a recent paper by Jones-Evans and Bristow (2010). Under 18% of WAG's resources were found to support innovation went to the private sector, and less than 5% of Objective One funds for this purpose went to private sector organisations. Consequently, they also highlighted a need in the future for greater interaction between public, private, and university sectors, and also a building of capacity in terms of innovation creation, dissemination and utilisation in these three sectors.

Conclusions

The most recent WAG policy document, Economic Renewal Programme: A new direction (WAG, 2010) claims to have been created after a high degree of stakeholder involvement. This is to be welcomed, given that Welsh government policy since devolution, to an extent, may be perceived, however, as an ever-changing series of top-down "Big Ideas" that have caused there to be a lack of a collective long term strategy running through them, unlike in Ireland for example. In addition, even the most recent policy swing, with its focus on a small number of industries (ICT, Energy and environment, Advanced materials and manufacturing, Creative industries, Life sciences, Financial and professional services- which represents only a third of private sector employment) can be seen as a continuation of Wales's history, in terms of reliance on focusing on a small number of industries (in the past coal and steel, and more recently manufacturing and the public sector).

An OECD (2001) publication, "Governance in the 21st Century", unsurprisingly highlighted that nurturing social capital - based on networks and mutual recognition of worth, is both a key outcome and requirement of tomorrow's broader governance environment. The

suitability of the management and governance mechanism(s) used will, therefore, be of great importance in determining success or failure of economic development policy. The recommendations from OECD's (2008) evaluation of a range of economic development policies from around the world and their suitability for Wales recommended :-

- Adoption of overall policy-making processes that incorporates the full range of stakeholders involved in a business productivity improvement process, in order to produce both increased engagement, and also to provide additional knowledge sources and strengthened analysis of growth potentials
- Greater up-front concentrations on "soft" information and network-related resources (alongside "hard" infrastructures) with a focused group of key industry, university and government stakeholders in the industrial sectors deemed of greatest strategic importance to the Welsh business productivity policy agenda.
- An inter-related, targetable suite of innovation creation, knowledge transfer and utilisation activities that can assist in improving overall business productivity for firms affected and, importantly, supports existing policy in this area.
- Continued benchmarking of existing Welsh policy as well as areas for new policy adoption, assuming that further network and capacity building between stakeholders takes place.

Ultimately, however, making economic development policy a success in Wales requires, as well as more holistic approach to policy, also a different relational approach within and between stakeholders to that which currently predominates, to allow the social infrastructure so vital to economic development to occur.

References

- Abbey, J., Davies, G., and Mainwaring, L (2008) Vorsprung durch Technium: Towards a System of Innovation in South West Wales, *Regional Studies*, 42 (2): 281-293.
- Acs, Z.J., Audretsch, D.B., Braunerhjelm, P. and Carlsson, B. (2004). The Missing Link: The Knowledge Filter and Entrepreneurship in Endogenous Growth, *Discussion Paper, No.4783, December*, London, UK, Centre for Economic Policy Research.
- Acs, Z., O’Gorman, C., Szerb, L., Terjesen, S. (2007) “Could the Irish miracle be repeated in Hungary”, *Small Business Economics*, 28(2/3): 123-142.
- Acs, Z., Brooksbank, D., O’ Gorman, C., Pickernell, D., and Terjesen, S. (2007) The knowledge spillover theory of entrepreneurship and foreign direct investment. *Jena Economic Research Papers*, 2007, p.059.
- Alden, (2006) Regional Planning, An Idea whose time has come ?, *International planning Studies*, 11 (3-4): 209-223.
- Audretsch, D. and M. Keilback (2007), ‘The Theory of Knowledge Spillover Entrepreneurship’, *Journal of Management Studies*, 44 (7): 1242-1254.
- Baker, T. (2007). Resources in play: Bricolage in the Toy Store(y). *Journal of Business Venturing*, 22(5): 694-711.
- Benneworth, P. and Hospers, G-J (2007) The new economic geography of old industrial regions: universities as global-local pipelines, *Environment and Planning C: Government and Policy*, 25: 779-802.
- Berchicci, L., and Hulsink, W. (2006) *Of Bikes and Men: Innovation patterns and strategic entrepreneurship in the human-powered vehicle sector*. Paper presented at the Strategic Entrepreneurship: the role of networking Vrije Universiteit Amsterdam July 3-4.
- Blomström , M .and Kokko, A. (2003) ` “The Economics of Foreign Investment Incentives”, CEPR,February

- Boddy, M., (2006) Understanding productivity variations between Wales and the rest of the UK, *Report to the Economic Research Advisory Panel*, Welsh Assembly Government, Cardiff.
- Bristow, G. Entwistle, T. Hines, F. Martin, S. Morgan, K. and Pithouse A. (2003), *Partnerships between the Public, Private and Voluntary Sectors in Wales*, Centre for Local and Regional Government Research, Cardiff University, Cardiff, UK
- Bristow, G. (2005) Everyone's a Winner : problematising the discourse of regional competitiveness, *Journal of Economic Geography*, 5: 285-304.
- Bristow, G., Hartwell, S., Meadows, G., Morgan, K. (2007) Objective One in Wales: An Assessment and Lessons for the future, Report for the BBC, Cardiff.
- Bristow, G., Entwistle, T., Hines, F., and Martin, S. (2008) 'New Spaces for Inclusion? Lessons from the 'Three-Thirds' Partnerships in Wales', *International Journal of Urban and Regional Research*, 32(4): 903-921.
- Brooksbank, D., Pickernell, D., and Morse, L.(1998) Reviving the Valleys of South Wales: Case Study evidence of a link with low pay, *European Urban and Regional Studies*, 5 (3): 277-281.
- Brooksbank, D., and Pickernell, D. (2001) 'Changing the Name of the Game? RSA, Indigenous and Inward Investors, and the National Assembly for Wales', *Regional Studies*, 35(3): 271-277.
- Brooksbank, D.J., Clifton, N.C. Jones-Evans-D. and Pickernell, D.G.,(2001) The End of the Beginning ?: Welsh Regional Policy and Objective One, *European Planning Studies*, 9 (2): 255-274.
- Clifton, N., David, R., Ehret, O., and Pickernell, D., (2008) Auditing Welsh Industry A clusters based approach-Aerospace, Report for the Welsh Assembly Government Small Grants Scheme, Cardiff, Welsh Assembly Government.

- Cooke, P. (2003). The Regional Innovation System in Wales: Evolution or Eclipse in Cooke, P., Heidenreich, M. & Braczyk, H. (eds) (2003) *Regional Innovation Systems* (2nd Edition), London, Routledge.
- Cooke, P, Roper, S and Wylie, P (2003) The 'Golden Thread of Innovation' and Northern Ireland's evolving Regional Innovation System, *Regional Studies*, 37 (4) 365-380
- Cooke, P. Clifton N. and Oleaga, M. (2005) Social capital, firm embeddedness and regional development, *Regional Studies*, 39 (8): 1065-1077.
- Cooke, P and De Laurentis, C. (2006) in Cooke, P., De Laurentis, C., Tödting, F., Trippi, M. *Regional Knowledge Economies: Markets, Innovation and Clusters*, (Edward Elgar).
- Crafts, N. (2007) Productivity and Living Standards in Wales: A Comparative Perspective, Paper presented to Welsh Economic Research Advisory Panel, 28th June,. Welsh Assembly Government, Cardiff.
- Davidsson, P., and Delmar, F. 1997 *High-growth firms and their contribution to employment: The case of Sweden 1987-96*. Paris: OECD Working Party on SMEs.
- Driffield, N., and Taylor, K. (2000) FDI and the labour market: a review of the evidence and policy implications, *Oxford Review of Economic Policy*, 16 (3): 90-103.
- Entrepreneurship Action Plan (2000) *The Entrepreneurship Action Plan for Wales: making it Happen, Implementation Plan*, Cardiff, Welsh Assembly Government.
- Entwistle, T. (2006). *The distinctiveness of the Welsh partnership agenda*, International Journal of Public Sector Management, 19 (3): 228-237
- Etzkowitz, H. and Leyesdorff, L (2000) The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university-industry-government relations, *Research Policy*, 29: 109-123.
- Evans, P., Holz, R., Roberts, A., (2008) Empirical Investigation Of Foreign Direct Investment In Wales, Report sponsored by Welsh Assembly Government research Unit,

- Gwartney, J., Lawson, R., and Holcombe, R. (1998) *The Size and Functions of Government and Economic Growth*, Prepared for Joint Economic Committee Washington D.C.
- Hall, R.E., and Jones, C.I. (1999) 'Why do Some Countries Produce so much more output per worker than others?', *Quarterly Journal of Economics*, February: 83-116
- Hart, M., and Levie, J., (2009) GEM UK: Wales Summary 2009, <http://wales.gov.uk/docs/det/publications/100608gemsummary.pdf> (accessed 13/04/11)
- Head, B. (2008) Public Management Research: towards relevance *Keynote Presentation IRSPM Conference*, Brisbane, Australia.
- Henrekson, M., and Johansson, D. (2008) Competencies and Institutions Fostering High-growth Firms, *IFN Working Paper, 758*, 1-57.
- Hill, S., and Munday, M., (1992) UK Regional Distribution of Foreign Direct Investment: Analysis and Determinants, *Regional Studies*, 26 (6): 535-544.
- Hockeridge, M. (2006), *Powering ahead? A critique of the impact that the new freedoms and responsibilities available to local government are having on improved local service provision in Wales*, Wales Audit Office, Cardiff
- Huggins, R., (2001) Embedding inward investment through workforce development: experiences in Wales. *Environment and Planning C*, 19(6): 833-848.
- Jones-Evans, D. and Bristow, G (2010) Innovation And The Objective 1 Programme In Wales: Lessons For The Convergence Fund, Paper presented to the Enterprise and Learning Committee, National Assembly for Wales , March 18th 2010.
- Keast, R. Mandell, M. and Brown, K (2005); Governance Arrangements and Network Management: The Impact on Hybrid Networks, paper presented to the Ninth *International Research Symposium on Public Management*, Milan, 6-8 April.

Kitson, M., Howells, J., Braham, R., and Westlake, S., (2009) The connected university: Driving recovery and growth in the UK economy, *NESTA Research Report*, April 2009, NESTA London.

Levi-Strauss, C. (1967). *The Savage Mind* Chicago: University of Chicago Press.

Lockett, A., Vohora, A. and Wright, M (2002) Universities as incubators without Walls, *International Journal of Entrepreneurship and Innovation*, 3 (4): 245-256

Malecki, E (2010) Global knowledge and creativity: New challenges for firms and Regions, *Regional Studies*, 44 (8): 1033-1052.

Midwinter, A. (2004), Financing devolution in practice: the Barnett formula and the Scottish budget, 1999–2003. *Public Money and Management*, 24 (3): 137–144.

Morgan, B. (2002), 'Higher education and regional economic development in Wales: an opportunity for demonstrating the efficacy of devolution in economic development', *Regional Studies*, 36 (1): 65–73.

Morgan, K. (1997) 'The Learning Region: Institutions, Innovation and Regional Renewal', *Regional Studies*, 31(5): 491-503.

OECD (2001) *Governance in the 21st Century*, OECD, Paris.

OECD (2005). FDI Database. <http://www.oecd.org/dataoecd/14/3/8264806.xls>.

OECD (2006a) *Main Science and Technology Indicators*. Paris, OECD.

OECD (2006b) *Factbook 2006: Economic, Environmental and Social Statistics*, Paris, OECD.

OECD (2008) *A Review of Local Economic and Employment Development Policy Approaches in OECD Countries: Part II: Policy Transferability to Wales*, OECD Local Economic and Employment Development (LEED) Programme, <http://www.oecd.org/dataoecd/42/20/42768683.pdf> (last accessed 28th January 2011).

- ONS (2010) Regional, sub-regional and local gross value added 2009, Office for National Statistics Statistical Bulletin, <http://www.statistics.gov.uk/pdfdir/gva1210.pdf> (accessed 13/04/2011)
- Pickernell, D., (1999) Inward Investment, diffusion of knowledge and new working practices, *Local Economy*, 14 (2): 144-160.
- Pickernell, D., Brooksbank, D., Christie, M., and Rowe, P. (2007) Developing a framework for network and cluster identification for use in economic development policymaking, *Entrepreneurship and Regional Development*, 19 (July), 339-358.
- Pickernell, D., Packham, G., Thomas, B. and Keast, R., (2008) University Challenge? Innovation Policy and SMEs in Welsh Economic Development Policy: Towards a New Framework, *International Journal of Entrepreneurship and Innovation*, 9 (1): 51-62.
- Pickernell, D., Clifton, N. And Senyard, J (2009) Universities, SMEs and Innovation Frameworks: Think Global Act Local?, *Industry and Higher Education*, 23 (2): 1-11.
- Pickernell, D., Packham, G., Brooksbank, D., and Jones, P. (2010) A recipe for what? UK universities, enterprise and knowledge transfer: evidence from the Federation of Small Businesses 2008 survey, *International Journal of Entrepreneurship and Innovation*, Vol 11 (4): 265-272
- Pickernell, D., Packham, G., Jones, P., Miller, C., and Thomas, B (2011) Graduate entrepreneurs are different: they access more resources? *International Journal of Entrepreneurial Behaviour and Research*, 17 (2): 183-202
- Rittel, H. J. W., & Webber, M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4, 155-169.
- Roberts, N.C. 2000 Wicked problems and network approaches to resolution. *International Public Management Review*, 1(1):1-19.
- Roper, S., Love, J., Scott, J., Cooke, P., Clifton, N., and Hewitt-Dundas, N., (2007) The Scottish innovation System : Review and Application of Policy, Scottish Executive,

Department of Enterprise, Transport and Lifelong Learning, Edinburgh,
(<http://www.scotland.gov.uk/Resource/Doc/170949/0047879.pdf>)

Senyard, J., Pickernell, D., Clifton, N., Kay, A., and Keast, R. (2007) Developing a Framework for Knowledge Creation, Dissemination and Utilisation for SMES: A case study of Biotechnology, Proceedings RENT-Research in Enterprise and Small Business XXI Conference, pages pp. 1-31, Cardiff, Wales.

Senyard, J, Davidsson, P., and Steffens, P. (2010) The role of bricolage and resource constraints in high potential sustainability ventures. In *Frontiers of Entrepreneurship Research 2010*, Babson College, Lausanne, Switzerland. (In Press)

Stiroh, K.J. (2001) What drives productivity growth ?, *Federal Reserve Bank of New York Economic Policy Review* March, 37-59.

UNCTAD. (2005). World Investment Report. Transnational Corporations and the Internationalization of R&D. New York and Geneva, United Nations.

WAG (Welsh Assembly Government) (2002) *A Winning Wales: The National Economic Development Strategy of the Welsh Assembly Government*. Cardiff: WAG

WAG (Welsh Assembly Government) (2005) *Wales: A Vibrant Economy: A Strategic Framework for Economic Development. Consultation Document*. Cardiff: WAG

Welsh Assembly Government (2003) *Wales for Innovation: The Welsh Assembly Government's Plan for Innovation*, Welsh Assembly Government, Cardiff.

Welsh Assembly Government (2005) £14m Knowledge Bank Open for Business, Press release, Welsh Assembly Government, Cardiff
(<http://new.wales.gov.uk/news/archivepress/enterprisepress/einpress2005/707405/?lang=en>) accessed 27th March 2007

Welsh Assembly Government (2010). *Economic Renewal: a new direction*, Welsh Assembly Government, Cardiff. Available at:
<http://wales.gov.uk/topics/businessandconomy/help/economicrenewal/programmepa>

[pers/anedirection/;jsessionid=12NRN1nStgHqmJPg334jflg9Q8kdn24phWpnLLD0L6W
X1n1yW4Gm!395013028?lang=en](http://pers/anedirection/;jsessionid=12NRN1nStgHqmJPg334jflg9Q8kdn24phWpnLLD0L6WX1n1yW4Gm!395013028?lang=en) [Accessed April 25, 2011].