

Enterprise and Learning Committee

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Introduction

Universities Scotland is the representative body of Scotland's diverse higher education sector. The sector consists of 14 universities, two arts schools, the Royal Scottish Academy for Music and Drama, the UHI Millennium Institute, the Scottish Agricultural College and the Open University in Scotland.

The economic impact of universities

Universities Scotland recently commissioned a report entitled Prosperity Scotland, which is probably the most comprehensive analysis of the economic contribution of higher education in Scotland ever produced. The full report can be found on Universities Scotland website - www.universities-scotland.ac.uk.

Universities make a significant contribution to the Scottish economy. Their impact can be seen in five broad modes of influence:

Employer/producer

Human capital

Research and innovation

Hub or cluster

Consultancy

Employer and producer

In 2006/07 the Scottish higher education sector spent £2.25 billion. Higher education in Scotland as an industry is on par with the post and telecommunications industry and more significant than real estate and land transport. Higher education is also significant employer in Scotland and directly employed a total of 34,826 full-time equivalents in 2006/07.

Human capital

The economic value of graduates can be measured in a number of ways. Most crudely, the fact that the market is willing to pay more for a graduate indicates the relative value of the high-skill human capital - the pay premium over non-graduates reflects the value firms place on the skills and aptitudes which a graduate can bring to an employer. Calculations of the private rate of return from higher education in Scotland result in a premium of between 11 and 17 per cent. This is supported by five separate international studies of the rate of return of higher education, all of which show a strong positive benefit. The social rate of return is a measure of the value of higher education to society as a whole. The analyses which have been made of the social rate of return on higher education use different assumptions and therefore have a fairly wide range of outcomes varying from five to 17 per cent. Nevertheless, the results suggest that for every £100 society invests in educating a graduate it receives up to £117 of direct value in return.

A more direct measure of the impact human capital created by higher education can have on economic growth is the effect on individual and collective productivity. Higher graduate productivity would show that the value created in the economy by people who have a higher education is greater than that produced by those without. Similarly, higher productivity in economies with more graduates would show that concentrations of graduates created more economic output. There have been quite a few international studies to test this. Each uses different methodology and seeks to measure slightly different things. However, the range of findings demonstrates that while methodologies are different, they demonstrate a similar positive effect of higher education on productivity. For example studies have found that in the US and Sweden tertiary educated workers are 1.7 and 1.3 times as productive respectively as uneducated workers; a one percentage point increase in the proportion of workers in the workforce with higher qualifications raises annual output by between 0.42 and 0.63 per cent and a one per cent increase in human capital is associated with an 11 per cent increase in GDP growth rate.

Research and innovation

The importance of innovation to advanced economies cannot be overestimated. The mass production of products can be done more cheaply elsewhere so it is the development of new products which will be Scotland's competitive economic advantage and will fuel continued economic growth. Innovation can help industry to increase the quality and range of goods and services and to improve

market share or enter entirely new markets. However, at present Scotland's business community does not invest competitively in research and development. Scotland's level of Business Expenditure Research & Development (BERD) was 0.56 per cent of GDP compared to the UK rate of 1.08 per cent of GDP and the EU average expenditure of 1.09 per cent of GDP. As a result Scotland is largely dependent on its higher education sector as the source of innovation. Scotland's level of higher education research and development (HERD) was and 0.70 per cent of GDP, which is the highest proportion per GDP of all UK regions.

The innovation role of universities in advanced economies has been studied. Evidence from knowledge-intensive regional economies in the US and from small EU economies such as Finland and Denmark accords universities a very positive and strong role in encouraging economic growth. This is backed up by economic evidence which has been carried out on the importance of industrial research and development activity. An analysis of 63 separate studies by prominent economists into the rates of return to a business which invests in research and development concluded that rates of return are in the order of 20 to 30 per cent. However, this is only the private rate of return (the financial returns to the business carrying out the research and development). It is generally accepted that the social rates of return (to the wider economy and society) are even larger. While the evidence suggests that rates of return from academic research may be at the lower end of that spectrum that would nevertheless mean that a rate of return of the magnitude of around 20 per cent or more is realised from the research and development activity carried out in Scottish universities.

Where Scotland does exhibit a competitive edge in terms of innovation, further analysis identifies links back to the higher education sector. For example Scottish businesses out perform the UK in terms of novel innovation (where entirely new products or processes are introduced to market). In particular to Scotland, analysis has found that firms that are novel innovators have a higher proportion of science and engineering graduates amongst their employees compared with the UK average and therefore make better use of highly educated workers; they make greater use of the science base as a source of knowledge for innovation activities and they have a higher propensity to enter into cooperative arrangements with the science base for innovation than UK counterparts.

Hub and cluster impacts

Scotland's universities have a proven role in both generating and sustaining industry clusters which can serve as key determinants of regional growth. The co-location of similar or related similar economic activities in 'hubs' or 'clusters' positively impacts on the economy in that it increases the likelihood of spill-over's of technology and knowledge through common pools of labour, infrastructure and specialised business services. An MIT study into models of innovation in local economies looked at examples from the UK, US, Finland, Norway and Japan and found four models of regional, innovation-led growth. The study highlighted a significant role for universities in all four models of regional innovation including the creation of new industries; the relocation of industry to a region; the diversification of technologically new industry from existing local industry and upgrading the technological base of an existing, mature industry. The report found that universities are often closely associated with the emergence of new industries that have no technological antecedent in the region. The emergence of opto-electronics in the central belt of Scotland is a classic example of this type of regional innovation.

The economic impact of clusters in Scotland is significant. Scotland's oil and gas industry has long-established links with the universities in Aberdeen. The biotechnology and electronics industries are examples of two relatively new emerging industries that have clustered around higher education institutions in Glasgow, Edinburgh, Dundee and Aberdeen. Scotland creative industries, which are estimated to contribute more than £5 billion to Scotland's economy and employ around 100,000 people also benefit from higher education clusters in Glasgow, Dundee and Edinburgh.

Consultancy

Consultancy offers a specialised and independent research service for the client. It is a fast and cost effective means to gain an objective, in-depth and realistic insight into areas where organisations lack specific knowledge. The types of service which higher education institutions can provide include specifically tailored training packages, process analysis work, highly applied research contracts, policy advice and more. The sector's role as consultants to business, industry and the public sector is relatively new and has only recently been recorded in any systematic way therefore the full impact of this contribution is less developed than for other areas. However, we know that:

Estimates from the Scottish Funding Council put the value of consultancy work performed by the Scottish higher education institutions at £46 million in 2005/06 alone.

Income generated from this form of activity increased by more than 47 per cent between 2004/05 and 2005/06 from £31.3 million to £46.1 million.

Consultancy is well suited to Small and Medium Enterprises (SMEs), which constitute 99 per cent of all Scottish businesses. Consultancy work undertaken for SMEs accounted for nearly one fifth of all consultancy work, as measured by income in 2005. This is significant as historically it has proven more difficult to establish positive knowledge transfer links with SMEs. Even now income from SMEs accounts for less than 7.5 per cent of total income generated from all knowledge transfer activities.

Funding

Public funding of knowledge transfer activity is a recent development. The Knowledge Transfer (KT) Grant, distributed by the Scottish Funding Council, was introduced in 2001, in recognition of the value of this area of work and to help improve the flow of knowledge, expertise and ideas to business, enterprises and public services. The KT Grant, which was worth a total of £19.1 million in 2007/08, is intended to be a flexible funding stream for knowledge transfer activities and the commercialisation of research. Institutions have freedom to determine which activities best meet their aims and build on their existing strengths whilst considering Scottish

Government's priorities of creating a high-technology, knowledge-based economy. In 2006/07 a cultural engagement element was added to the KT grant in recognition that not all knowledge can be or should be applied for economic benefit. A budget of £0.5 million was distributed to institutions to support the great diversity of cultural knowledge transferred from higher education institutions into their local and national communities.

In 2008/09 a new element has been added to the KTG. This is called Strategic priority investment in research and innovation translation (SPIRIT). This has started at £2 million of ring-fenced funds of the total KTG funding available in 2008/09. The aim is to enable strategic knowledge exchange projects to be targeted. These can include projects defined by the Government, the Research Councils, the enterprise agencies and those identified by the Council, the Research and Knowledge Transfer Committee, the Knowledge Transfer Innovation Group and the Council's economic development, public policy and cultural engagement Knowledge Transfer Action Groups.

Building links with industry

There are some specific Scottish projects that have been initiated to facilitate activity between Scottish universities and industry. This is just a flavour of some of the wide range of activity that is currently going on in Scotland.

Interface

In 2006 a unique initiative called Interface (www.interface-online.org) was launched in Scotland. Interface provides a central point of access for companies to establish new partnerships with academics from the Scottish university and research institute base. It acts as a broker between companies who think they might benefit from working with an academic partner but are not sure how to begin that process and researchers who are interested in developing new links with companies. The organisation is specifically designed to encourage, ease and increase potential knowledge exchange links between academia and industry, particularly small and medium-sized enterprises (SMEs). As of December 2007 Interface was handling 52 live projects between higher education institutions and businesses. Twenty of these were consultancy agreements, seven were research collaborations between a business and a Scottish university, three licence deals were under negotiation and other projects included access to university facilities and student placements. The initiative's mid-term evaluation concluded that Interface has successfully helped to raise awareness of the expertise in the higher education sector, has improved access for business, plugging a former gap in the system and offers a high level of additionality.

Proof of Concept

The Proof of Concept Fund was launched in 1999 to award grants that act as venture capital to assist the pre-commercialisation of leading-edge technologies emerging from Scotland. Its goal is to help researchers export their ideas and inventions from the lab to the global marketplace. Its early success has led to a series of extensions and increases in funding so that the value of the programme now stands at £49 million and will run until 2009. There have been seven funding rounds to date with the seven 'priority industries' in Scotland, as identified by Scottish Enterprise including life sciences, electronic markets, food and drink, enabling technologies, forest industries, tourism and energy. The Programme currently supports 184 projects worth over £30.2 million and has already created over 500 new jobs.

Enterprise Fellowships

Enterprise Fellowships is a scheme funded by Scottish Enterprise and run by the Royal Society of Edinburgh. Enterprise Fellowships are open to researchers, post-graduates and recently graduated students that have a business idea they'd like to develop into a spin-out company based in Scotland. The Enterprise Fellowship offers one year's salary, business training to help take your idea forward, a business development fund to help get things moving and access to networks of mentors, business experts and professional advisors. Over 60 per cent of Enterprise Fellows form successful businesses ranging from yacht sail design, to cleaning systems for the oil and gas industry, and a platform technology for pest disease management. Enterprise Fellowship companies are highly regarded: they attract a high level of funding from private sector investors; the majority of companies are enjoying steady growth and EF companies have a low failure rate.

Intermediary Technology Institutes (ITI Scotland)

ITI Scotland is a company set up in 2003 by Scottish Enterprise with the support of the Scottish Government to drive Scotland's ambitious plans to identify and commercialise valuable technology-based intellectual assets across three global market sectors: digital media and communications; life sciences and energy. The company has three operating divisions known as Intermediary Technology Institutes (ITIs), each focused on a market sector where Scotland has strong economic and business potential. These are known as ITI Techmedia, ITI Life Sciences and ITI Energy. The aim of the ITIs is to bridge the gap between publicly-funded early stage research and privately-backed commercial development. ITI Scotland's activities are intended to help stimulate and benefit the Scottish economy, contributing to a high-value, knowledge economy over the long term.

Conclusion

Scottish universities are keen to create a constructive and collaborative relationship with Scottish industry. The wide range of initiatives that have been put in place in conjunction with Scottish universities illustrate the commitment of the sector to this type of activity. There is still more to do but this is a solid foundation on which to progress.

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