

Cynulliad Cenedlaethol Cymru / National Assembly for Wales
Pwyllgor yr Economi, Seilwaith a Sgiliau/ Economy, Infrastructure and Skills
Committee
Ymchwiliad i ymchwil ac arloesedd yng Nghymru/ Research and Innovation
in Wales
Ymateb gan Wesley Clover / Evidence from Wesley Clover

1. INTRODUCTION.

1.1 Wesley Clover is delighted to have the opportunity to contribute to the Committee's consultation on Research and Innovation in Wales. Wesley Clover is an Anglo-Canadian investment management and holding company chaired by Sir Terry Matthews. Wesley Clover's United Kingdom headquarters are located in Newport. The headquarters of its Canadian operation are based in Ottawa.

1.2 Wesley Clover believes it is suitably qualified to contribute to this important exercise because of its intimate understanding of the process involved in the commercialisation of intellectual property. This intellectual property can be the output of research conducted at Higher Education Institutions. Wesley Clover combines experience in the development of rapidly scalable, market leading enterprises, sometimes labelled "frontier firms", with international business interests in the technology sector. In the four decades since its formation Wesley Clover has been responsible either singly or in partnership with other institutions and individuals for the foundation, funding and development of 126 technology ventures. Some of these companies have remained in private ownership, a number have listed on public markets, others have been subject to trade sales and in a minority of instances some have failed. The companies are positioned across sectors including; software, semi-conductors, 'cloud' technology, computer/ telephony integration, cyber security, media and mobile communications.

1.3 Furthermore Simon Gibson and Ian Courtney, respectively the Chief Executive of Wesley Clover and its Director of External Affairs, were the Chair and author of the report of the Commercialisation Review, a Task and Finish Group commissioned in 2006 by the then Welsh Government Economy Minister Andrew Davies. The purpose of the Review was to assess the economic impact of Welsh publicly funded commercialisation activities. It concluded there was substantial room for progress. This was largely the result of a misunderstanding of how good ideas are developed into economic value. In essence the Review found that Higher Education Institutions were generally not structurally equipped nor possessed the experience and skills to undertake commercialisation activity to enable the smooth transfer of research into applied innovations. Later these views were largely endorsed by the Reid Review.

1.4 Partially in response Wesley Clover pioneered, with its partners the Welsh Government and the Waterloo Foundation, the establishment and funding of the Newport based education charity the Alacrity Foundation. The Foundation's mission is "to mentor and train the brightest and best graduates and create a new generation of British hi-tech companies in Wales." The Foundation delivers this via its twelve month Graduate Entrepreneurship Programme. A singular feature of the Programme is that it challenges teams of graduates to solve a real life business problem by the development of a software application. Upon completion of the Programme teams are expected to have incorporated as a company, created a working product and secured their first commercial sale. Having achieved these three conditions teams are regarded as an investible proposition and qualify for venture funding to a ceiling of £250,000, on condition they headquarter their

companies in Wales. The Programme has been designed to allow teams to benefit from the skills and experience of the partners in building commercially successful start-ups.

2. THE VALUE AND IMPORTANCE OF INNOVATION.

2.1 The Organisation for Economic Co-operation and Development (OECD), one of the world's foremost economic research institutes, defines four sources of innovation; "an innovation is the implementation of a new or significantly improved **product** (good or service), or **process**, a new **marketing** method, or a new **organisational** method in business practices, workplace organisation or external relation" (OECD, 2005, "The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data: Oslo Manual, Third Edition" prepared by the Working Party of National Experts on Scientific and Technology Indicators, Paris).

2.2 It follows that the value of innovation activity to the Welsh economy cannot be overestimated. Wesley Clover concurs with the conclusions of the OECD and others that innovation performance is a crucial determinant of productivity, competitiveness and national progress and wealth. Moreover, innovation is important to help address global challenges, such as climate change and sustainable development. The application of advances in technology, in combination with entrepreneurship converts scientific and technological advances into a more productive economy.

2.3 The role of university based research activity and critically the ability to harness it is critical to the Nation's welfare. As was reported in the Commercialisation Review "the relationship between the Welsh economy and its higher education institutions will be enduring and grow in importance." To help us better understand the contribution of higher education Wesley Clover has analysed HE-Business and Community Interaction returns for years 2014/15 and 2015/16. The results of this analysis are shown below;

Institution	No of Active Graduate Start Ups		Value of External Investment for Graduate Start-Ups (£000s)		Average Turnover Per Graduate Start-Up (£s)		HEI IP Revenue (£000s)
	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16
Aberystwyth	56	56	1,120	1,120	22,500	22,500	156
Bangor	57	53	0	0	140,800	94,750	38
Cardiff	190	204	0	0	52,600	46,000	13,445
Cardiff Met	293	205	0	0	15,000	15,365	0
Glyndwr	0	0	0	0	0	0	0
Swansea	70	88	122	130	95,600	81,150	44
Trinity/St Davids	567	420	350	300	15,000	15,000	10
USW	354	348	0	0	11,370	10,370	43

2.4 The data contained in the table suggests on all measures the performance of Welsh universities varies. In most instances the headline data indicates a strong performance amongst institutions in their ability to aid the foundation of graduate start-ups. On closer inspection data for average start-up company turnover and their ability to attract external

investment suggests much of the potential has yet to be realised. Start-ups associated with Bangor, Cardiff and Swansea all demonstrate exceptionally healthy levels of average annual turnover. From a commercial perspective the remainder appear to be trading at sub-optimal levels. This raises issues about their ability to develop over the long term. An indicator of the capacity of companies to maintain a sustainable pattern of growth is their ability to secure investment from external sources. According to the data the only institution in Wales to have spawned graduate founded start-ups that have attracted external funds at scale is Aberystwyth University. What makes the performance of start-ups associated with Bangor, Cardiff and Swansea so significant is their ability to achieve the reported levels of growth in the absence of external funding.

2.5 The table also reveals data for individual institution's income derived from the commercialisation of intellectual property. This is an important figure since it provides a guide to the institution's ability to exploit publicly funded research activity. A public policy issue that rests at the centre of the Committee's enquiry. In this respect Cardiff University stands out from the remainder. This might be expected for a number of reasons. Cardiff University is a member of the Russell Group of universities. Cardiff has also pursued a policy of collaboration with the commercial entity IP Group, a company established to develop commercial income from publicly funded research activities. Whilst this approach may not be suitable for every Welsh higher education institution the benefits of engaging with commercialisation specialists for university finances and the wider economy is potentially large.

2.6 In the next and last section of its evidence Wesley Clover applies its experience and knowledge to respond directly to the issues highlighted by the Committee. Wesley Clover acknowledges these responses should be seen in the context of wider issues affecting collaboration between business and universities. Of specific relevance to this enquiry is the consistent identification of the low level of demand from business for access to knowledge and intellectual property created within universities (Lambert Review of Business-University Collaboration, 2003; 'The Gibson Review' – Commercialisation in Wales; Report of the Independent Task and Finish Group, 2007).

2.7 According to Dr Drew Nelson, a co-founder of Cardiff headquartered semi-conductor materials specialist IQE and a member of the team responsible for the establishment of the Compound Semi-Conductor Applications Catapult in South Wales, typically universities account for 3% of company sources of innovation. The majority is sourced from within the company or from a member of that company's supply chain. Whilst there is seen to be considerable virtue in encouraging university/ business relationships to promote innovation the reality is the level of demand for them does not match the level of activity that goes into encouraging them.

3. RESPONSES TO COMMITTEE QUESTIONS.

3.1 Welsh Government says that there needs to be a "major increase" in research intended to help solve specific challenges facing Wales (challenge-led research). It also says this type of research needs to be balanced with the more traditional type of long-term research undertaken by universities which pushes the boundaries of knowledge; **(1.) To what extent do you agree with this view and how can Welsh Government ensure that an increase in one type of research activity doesn't mean the other type loses out?**

1. Wesley Clover believes a misalignment exists between different types of publicly funded research in the United Kingdom and by implication Wales. Analysis conducted

by Wesley Clover indicates that government funding for traditional types of HE centred long-term research was £4.5 billion annually, the vast majority being distributed until April 2018 via Research Councils UK. This contrasts with an annual figure of £450 million of public funds for commercialisation research activities, administered at the time by Innovate UK, for Catapult activities. By definition these are closer to market and therefore act as a suitable proxy for 'challenge-led research'. The practical consequences of the difference in magnitude in these two numbers is profound. The costs and time involved in commercialisation, taking an idea from initial research through to international reach, are back-end loaded. In Wesley Clover's experience the cost of refining a piece of pure research into a product or service that has commercial appeal is one and a half to two times the cost of the initial research. From a time perspective the process can take between five and ten times longer than the initial research. These requirements of finance and time stand in contrast to the allocation of public funds which are front end loaded. As a consequence there is a distortion between the level of public research funding and the resources needed to fund successful innovation. This is not to imply there is a binary choice between the two categories of funding. Just like pure research commercialisation is not a linear process. Successful economies require funding for pure research and commercialisation, the challenge is to establish a better balance between them.

3.2 Welsh Government has said it wants to bring all research funding together and that this funding should then be available to small and medium-sized enterprises (SMEs), large private businesses, and other organisations as well as universities and colleges; **(1.) To what extent should businesses and other organisations be able to receive Government research funding that might have otherwise gone to universities and colleges? (2.) How could this be done without under-funding some organisations – might there be unintended consequences?**

1. & 2. For the reasons highlighted in paragraph 3.1 Wesley Clover believes it is appropriate for businesses to qualify for Government research funding. In an era of spending restraint it seems inevitable that if businesses are to benefit some organisations that are currently in receipt of funding will suffer. One way of mitigating the impact of this and accelerating the rate of innovation activity is to establish conditions in the award of funding that encourage genuine collaboration between higher education and businesses. Too often barriers to collaboration exist because universities and businesses have widely divergent objectives. Wesley Clover believes Welsh Government should undertake a rapid but nonetheless comprehensive consultation exercise involving higher education, HEFCW and research intensive businesses of all sizes (and not confine it to the representative bodies) to help shape a set of criteria governing the research funding award process.

3.3 In a recent review into research funding, it was argued that there was a strong risk of university research and innovation interests overshadowing the research and innovation interests of private businesses. But it didn't then go on to suggest a way of stopping this happening; **(1.) What needs to be done to ensure businesses and their interests are not over-shadowed by universities when it comes to research and innovation funding and activity?**

1. Wesley Clover's response contained in paragraph 3.2 provides an outline of a principle that could be applied to ensure the interests of business are not overshadowed by those of universities. Genuine collaboration is established as a minimum condition for receipt of funding. Without prejudicing the outcome of the proposals for a consultation exercise contained in paragraph 3.2 universities have a

number of existing research relationships with business. What is not clear is the extent to which the benefits of these relationships actually percolate into the Welsh economy. Welsh Universities that work with multi-nationals frequently neither have an objective to insist nor have the negotiating power to insist that any commercial exploitation of research is conducted in Wales. Whilst Wesley Clover is an advocate of an open approach to trade and business there appear to be no measures in place that encourage the benefits of research and intellectual property creation to remain within the local economy. This might be addressed by the design of funding award criteria that incorporate a presumption in favour of proposals that demonstrate an intention to maximise the benefits of research and innovation in Wales.

3.4 In the academic year 2016/17 there were 241 graduate start-ups reported by Welsh universities with an estimated turnover of £56 million, this was almost double the turnover of university staff start-ups in the same year; **(1.) What is currently in place from universities and Welsh Government to help and support student and graduate entrepreneurs turn their ideas into successful ventures? (2.) Is this support systematic and consistent across Wales and is there more Welsh Government and others could do?**

1. Wesley Clover is aware that Higher Education Institutions across Wales have adopted a variety of measures to promote graduate entrepreneurship. Directly or indirectly, via its involvement in the Alacrity Foundation, close relationships exist with Cardiff and Swansea Universities. Approximately a half of the graduates entering the Foundation's Programme formerly studied at these two institutions. Additionally staff of Wesley Clover and Alacrity provide guest lectures and mentorship to graduates at both Institutions. Many universities have applied capital funds for the construction of premises intended to provide accommodation for student founded companies to incubate and grow. Whilst this can be welcomed the provision of accommodation alone is not sufficient to create the conditions for success. Of greater value is the ability to surround a good idea with people with appropriate skills and experience and appropriate forms of finance. Sadly there are too many examples of property driven innovation policies that have failed to achieve appropriate outputs. Successful commercialisation and innovation is not about property it concerns intellectual property.

2. Notwithstanding its partial knowledge of individual institution's approach to the provision of support for graduate entrepreneurship it is not apparent support is systematic. Whilst it is legitimate to allow for differences between institutions it would be reasonable to expect approaches were guided by similar principles. There appear to be no expectations, articulated into clear guidelines accompanied by measurable objectives in place by which to measure success. The contribution of graduate support activities has been promoted by the institutions themselves and government. Whilst there should be no doubting the importance of graduate entrepreneurship it remains unclear whether in practice it occupies the primacy it deserves and whether it is adequately resourced and most importantly whether it is successful.

3.5 The recent review of research made recommendations to help incentivise businesses and universities to work closely together on research and innovation to take their collaborations to "greater heights"; **(1.) What are businesses and universities able to offer each other when they work in collaboration on research and innovation projects? (2.) Should Welsh Government and others be doing anything differently to bring smaller businesses together with universities to collaborate on research and innovation projects? What is working well and what isn't? (3.) What should Welsh Government and**

others be doing to help businesses use the knowledge gained from research activity and turn it into marketable products or improved services?

1. Businesses and universities are able to offer each other complementary skills and experience that neither of the other parties possess. Research and business skills are both essential for successful commercialisation. Good academics rarely make good businessmen and woman. Equally business men and women rarely make good academics. Welsh Government might wish to reflect on the possibility that one of its objectives for the revised approach to funding is the creation of conditions that rewards collaboration between business and universities.

2. Since 2015 Wales has participated with Asian, South American and other European regions in the Massachusetts Institute of Technology managed Regional Entrepreneurship Acceleration Programme (REAP). Welsh representation was led by Simon Gibson of Wesley Clover. REAP's primary purpose is to stimulate "innovation driven entrepreneurial" activity. As a consequence the Welsh team developed a 'Five Stakeholder Model of Innovation' (5SModel). The 5SModel is based on an analysis of the institutional components of the most successful regional economies. In particular whilst it acknowledges an essential role for government a distinctive feature of the 5SModel is the clear contribution to be expected of each component institution and the parity of responsibility. In the 5SModel government sits alongside academia, corporate representatives, entrepreneurs and risk capitalists in a partnership of equals. At the core of this approach is an implicit acceptance of the limits of the policy levers at the disposal of government to influence outcomes. The point of the 5SModel is to emphasise the ability of each component institution to leverage their individual contributions to create the optimal conditions for innovation. Wesley Clover believes Welsh Government should encourage the adoption of the 5SModel as a condition of applications for research funding.

3. Notwithstanding the important and supportive role of the Development Bank of Wales and especially its seed fund activity, Wales, similarly to the United Kingdom generally, has failed to create the conditions where there exists an intense relationship between researchers, innovators and venture capitalists. One explanation for successful regional economies is the existence of empathetic risk financiers. The most successful of these are actively involved in the development of their client businesses.