

Wales Medtech

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Case Study Overview

The Medtech sector encompasses diagnosis and treatment devices to improve health and wellbeing. As such it has links to technologies employed in a range of industries including pharmaceuticals, electronics, manufacturing, software and data analytics, all of which have presence in Wales. In this case we include the whole of Wales while recognising this region may have distinctly separate areas of activity with limited interaction between each other and strong connections to regions outside Wales. The north of Wales appears to interact with industry in assets in Liverpool and Manchester, and the south of Wales has better infrastructure and network connections with Bristol and surrounds. Therefore, it is difficult to describe Medtech in Wales as a cluster, although the area has many of the knowledge and support assets to fuel growth. The sector will benefit from the unique position with strong voice from a national devolved administration, enabling a more direct policy focus on some of the regulatory changes that affect the medical sector post-Brexit, however threading the needle of access to international markets for Wales based firms requires engagement and coordination with those proximate regions such as Northern Ireland and the Republic of Ireland which have seen increased activity due to their access to markets.

Characteristics and history: According to the 2019 study (NESTA 2019), the Welsh population considered “Making the UK’s population healthier” the most important area for innovation, and, after climate change, they perceived most innovation activity to be addressing this area. Medtech, medical devices that enhance diagnosis, treatment and monitoring of patients, has a vital contribution to make to innovation that addresses societal needs in Wales.

The sector has developed into established clusters of excellence in high-growth markets including, in-vitro diagnostic, single use technology and wound care” (Welsh Government 2021, 3). Interviewees differed in their opinion of key Medtech activity in Wales, emphasising the importance of digital, diagnostics and devices as core sub-sectors. This illustrates the breadth of activity that falls under the Medtech sector.

A wide range of niche specialisations within the Medtech sector appear to be localised around a variety of anchors. For example, electronics manufacturing of devices is localised around Siemens-Healthineers in the North (Welsh Government 2022a), while ophthalmic activity appears localised around the OpTIC Innovation Centre at Wrexham Glyndŵr University (Welsh Government 2022b). Other activities appear to be co-located with related clusters of activity such as the specialisation in semiconductor manufacturing in the South-East cluster. For example, GlucoRX has recently launched a world first, non-invasive glucose monitoring device using engineering expertise from Cardiff university (Medtech News, 2022).

Medtech activity is underpinned by a legacy of electronics manufacturing. For example, Siemens has operated out of Llanberis since 1992, and currently employs around 400 people at its 36-acre site (BBC 2022), and Wales is home to the “world’s first semiconductor cluster” (Welsh Government 2017).

Geography and size: Medtech is an important and dynamic sector in Wales making up 60% of companies within the life sciences sector in the region. Medtech firms (approx. 200 firms) include large

multinational as well as small and medium enterprises (Welsh Government 2021). Although med-tech companies supply local and national supply chains, the bulk of sales is export focused.¹

The Medtech sector appears clustered in two distinct regions in the North and South-East of Wales, coalescing around transport networks (the M4 and A55 motorways). Each cluster has better transport infrastructure linking to proximate neighbouring English areas of industrial activity (Liverpool and Bristol respectively) than they have to one another. The map below highlights how these two regions are divided. The majority of Medtech activity occurs in the South of Wales.

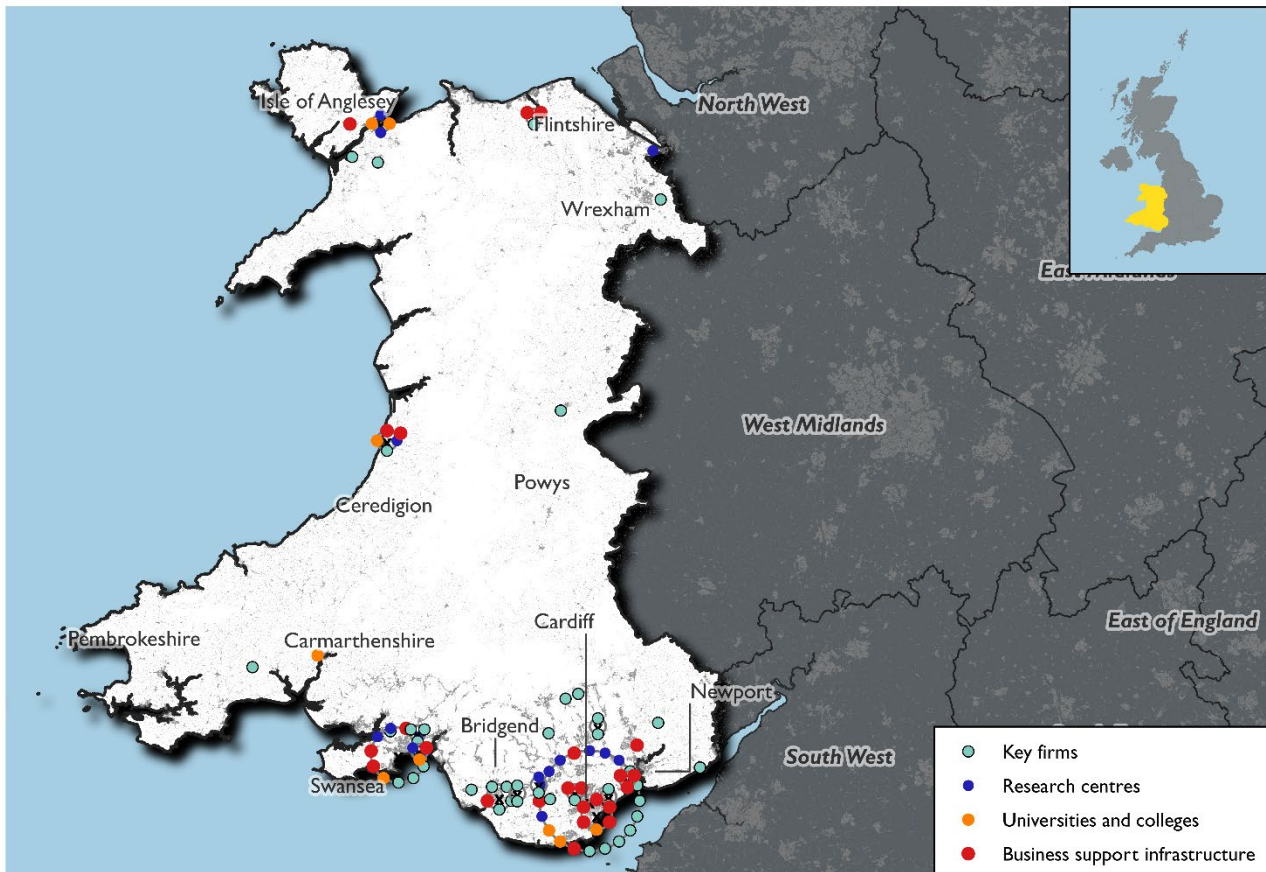


Figure 1: Wales Medtech map.

Areas of potential future growth: With an ageing population in Wales, the UK and globally, interviewees noted that the potential for future growth for Medtech activity lies in tackling problems related to healthy ageing such as dementia and cancer. The opportunity for Wales lies in leveraging their established, world class research capabilities. Examples include diagnostic and monitoring devices that incorporate research from the neuroscience capabilities at the Brain Research Imaging Centre in Cardiff University, and the Rutherford Cancer Centre which is one of the only centres in the UK with proton beam technology.

¹ 75% of the life sciences market in Wales is export focussed, amounting to about £980 million p.a. (Welsh Government 2022c).

Reflections: The fact that activity in Medtech is geographically divided between southern and northern parts of Wales creates interesting challenges for cluster dynamics and development. While there is evidence of research linkages between the two regional subclusters, we know less about whether similar relationships exist between firms. The fact that it is physically easier to travel to England than between cluster poles creates both challenges and opportunities that will need to be considered in any evolving cluster strategy.

Core Assets

Market structure and anchor firms: Medtech in Wales has focused on national EU and US markets and has been guided and governed by the regulation and market size in each. Interviewees highlighted that Wales is only 6% of the UK market so often it is not viable to sell only to Wales, even as an initial market. Further, they noted that despite being highly navigable with only 7 NHS trusts, these are difficult to sell into, although the small size of the Welsh environment is attractive for collaboration in research and development. As a result, most Medtech firms are exporting companies, and international medical regulations are therefore as important as national regulations. Interviewees noted that companies take clinical trials anywhere they can get done, as they do with manufacturing. For example, although a Fujifilm mobile x-ray machine project with ambulances was placed into NHS trials (FujiFilm 2021), manufacturing was subsequently lost to China.

Although large international Medtech firms feature prominently in both the North and South-East clusters, less than 10% of Medtech firms are MNCs - most are SMEs. Interviewees noted that these typically require more guidance in accessing business support and funding, and often lacked awareness of opportunities and programmes available.

In addition, the Covid pandemic has brought to the fore a new SME anchor with approximately 150 employees (Wales 247, 2020). Lighthouse Lab in Newport is a specialist COVID-19 lab that processes 10,000s of tests a day, providing a service on which many Medtech customers can build.

Higher education and training institutions: Wales has a number of world class universities in both the North and South. Each has centres of research supporting specific activities within Medtech. These are primarily centred around **Cardiff University** with the *Brain Research Imaging Centre (CUBRIC)*, the *Wound Healing Research Unit*, *Wales Cancer Research Centre*, *Cardiff Medicentre*, the *Dementia Research Institute* and the *Cardiff School of Sport and Health Sciences* which prides itself on its reputation for internationally excellent research. **Swansea University** is also an anchor, with the *Centre for Innovative Ageing*, the *Centre for Ageing and Dementia Research (CADR)*, *Centre for Nanohealth*, Joint *Clinical Research Facility*, and the *Institute of Life Sciences*.

Other notable research institutions include **Cardiff Metropolitan University's RobotiCare Lab** for healthcare, hospitality and tourism, the *Centre for Excellence in Rural Health Research* at **Aberystwyth University**. **Bangor University** hosts the *Wales Centre for Behaviour Change*.

According to interviewees, "the new medical school at Bangor University in North Wales will be significant. It will join the clusters together." It is expected to open in 2025 (Nation Cymru, 2021).

Other research and anchor organisations: Wales has a number of collaborative research centres that are key developers and/or adopters of Medtech. These are often the result of close partnerships between universities and healthcare providers. Notably, sometimes these networks are geographically agnostic – e.g., include universities from around Wales, such as the Wales Institute of Cognitive

Neuroscience (WICN) – and other times these networks are more geographically concentrated, such as the **All-Wales Intensive Learning Academy** centred on Cardiff and Swansea.

Welsh Wound Innovation Centre (WWIC) – located in Pontyclun, WWIC is the first national wound healing centre world-wide and is the flagship facility for clinical innovation in Wales. The centre is experienced in undertaking multiple stages of clinical trials investigating both medical devices and pharmaceuticals related to wound healing, from First-in-Human trials, large-scale RCT's to Post-Market Surveillance studies.

Wales Institute of Cognitive Neuroscience (WICN) – based in Bangor, this was established by a £5.2m grant from the Welsh Assembly Government (WAG) to support the development of world-leading expertise in cognitive and clinical neuroscience within Wales at Bangor, Cardiff, and Swansea Universities.

All-Wales Intensive Learning Academy for Innovation in Health and Social Care is a world-class teaching and research base to equip existing and future leaders with the ability to deliver innovation across health, social care, and the third sector. It is a multidisciplinary partnership between **Swansea University, Cardiff & Vale University Health Board, the Bevan Commission, and Cardiff University.**

Finally, there is some evidence of Medtech linkages with other Medtech regions. For example, **AMRC Cymru** in Chester is part of the **University of Sheffield Advanced Manufacturing Research Centre** and a member of the **High Value Manufacturing (HVM) Catapult** (AMRC, 2023).

Support structures and infrastructure: According to interviewees, the attraction for large Medtech firms to establish in Wales is largely driven by financial incentives. Similarly, they conceive of 'business support' as funding. Nonetheless, there are numerous support structures in place in Wales that offer attractive reasons to conduct innovative activity.

A number of incubators and accelerators associated with universities exist across Wales. **Wales Data Nation Accelerator** is a pan-Wales initiative to accelerate new insight, foresight and intelligence from diverse data assets for societal, health and economic impact. **Accelerate** is a collaboration between Cardiff University (CIA), Swansea University (HTC), University of Wales Trinity Saint David and Life Sciences Hub Wales. It helps innovators in Wales to translate their ideas into solutions, enabling them to be adopted in health and care. The **Institute of Life Science (ILS)** is part of Swansea University, it helps innovative organisations to grow quickly, while Cardiff University has made a £300m investment in a new Innovation Campus which includes **spark**, a space for start-ups and spinouts. **Cardiff University** also hosts **Cardiff Medicentre**, a business incubator for biotech and Medtech start-ups. Aberystwyth University hosts **AberInnovation** which provides state-of-the-art facilities and expertise for the life science sector. Startup support also comes from regional anchors such as the **Innovation Village**, opened by GE Healthcare.

These university related institutes are underpinned by knowledge assets such as the **Next Generation Data Center**, Europe's second largest Tier 3 data centre, the **SAIL Databank**, a world-leading health dataset, and the UK's **Intellectual Property Office**, located in Newport, providing advice and expertise needed for market entry. The **Surgical Materials Testing Laboratory** provides medical device testing and technical services to the Welsh NHS, enabling the NHS to better evaluate potential Medtech offerings.

Beyond startups and spinout support, science parks include **Cardiff Edge, Cwmbran Medipark**, and the **Life Science Wellbeing and Sport Campuses Project** which will expand Swansea's Institute of Life Sciences ecosystem. **M-Sparc** is a dedicated science park operated by Bangor University.

Finance: Interviewees highlighted a particularly transactional view of the cluster, with financial incentives likely being the only attraction for large multinationals to move to the cluster.

Funding for **Accelerate** is coming to an end after 4 years. It remains uncertain if it will be replaced with UK funding. The Life Sciences Research Network has provided the **Bridging Fund** since 2015 to commercialise projects, although it is not currently open for applications. Interviewees noted that many health programmes are advertised as UK wide “but the fine print indicates they are only ‘Department of Health’ funding which is England only.” For example, England only programmes include National Institute of Health and Care Research (NIHR) accelerated access collaborative funding. As a result, interviewees felt that organisations are also not applying for funding - they submit fewer applications - perhaps due to a lack of confidence or lack of awareness brought about by the changing environment. Nonetheless, funding resilience is expected through initiatives such as the **Cardiff Capital Region City Deal**, a catalyst for regional growth. It is a ring-fenced £1.2bn investment fund.

Reflections: The international and export focused orientation of the predominantly small and medium firms in the Welsh Medtech sector creates a relatively unique dynamic. This makes the sector relatively resilient to changes in the national market and a success story for the international reach of UK-based science and research. This sector is supported by very strong research-intensive universities and specialised centres as well as incubation and business development offerings. These appear to be well-networked and collaborative initiatives; however, formal networks are sometimes limited to within their own subcluster. Finance does not seem to be a barrier to growth, although lapsing EU funding may have impacts on institutions’ abilities to continue research streams and services.

Skills

Talent pool: Interviewees noted that capacity is a challenge in Medtech. Although the flow of skills has increased, further investment is needed to grow the talent pool. The region has 18,000 graduates with degrees in Medtech-related subjects (DfT n.d.).

Regional Skills Partnerships (RSPs) are in place to provide regional employer-led labour market intelligence, setting priorities for Welsh Government across the areas of employability and skills. The RSPs are:

- North Wales Regional Skills Partnership (NWRSP);
- South East Wales Cardiff Capital Region Skills Partnership (CCRSP); and
- South West and Mid Wales Regional Learning and Skills Partnership (RLSP)

Medtech research talent is supported through **Sêr Cymru**, “a multi-million-pound funding programme to bring scientific talent into research posts in Wales”. It has produced a talent pool capable of research in areas including biotechnology and life sciences. The programme has supported research chairs, rising stars, research fellowships, PhD and post-doc studentships. This programme, which has generated more than £180 million in research grant income, has increased Wales' research outputs, efficiency and impact. Substantial investment in the programme has been received from: Welsh Government, Higher Education Funding Council for Wales (HEFCW), Welsh Higher Education Institutions (HEIs), European Regional Development Fund, European Commission Horizon 2020.

Local skills provision: Thirteen training institutions and universities located in Wales offer courses and programmes in life sciences, with between 12,000 (Wilson 2022) and 59,000 (DfT n.d.) students studying relevant programmes. As listed above, all of the major universities (and many of their specialised research centres) offer medical and Medtech related courses and training opportunities. Bangor University has also announced a new medical school.

Interviewees noted that “FECs play a key role in apprenticeships and mainly the previous polytechnics.” The Welsh government manages an approved Welsh Apprenticeship Framework combining practical training in a job with study. Frameworks are available across 23 sectors, one of which is ‘Life Sciences’. Within this sector there are:

- Level 2/3 Apprenticeships in Laboratory & Science Technicians, suitable for roles of Laboratory Technician (multiple settings)
- Level 2/3 Apprenticeships in Polymer Processing Operations, suitable for roles of Polymer / Composite Operator, Production Operator, and Production Technician.
- Level 4 Apprenticeships for Life Science and Related Science Industries, suitable for roles including: Life Science Technician; Chemical Science Technician; Food Science Technician, and Process Development Technician.

Reflections: Wales has a significant foundation of talent in Medtech and has a strong ecosystem of higher and further education offerings for training. However, interviewees had the impression that the labour pool would need to expand to accommodate additional growth.

Knowledge Exchange

Firm research and development practices: Medtech companies in Wales vary from large corporate multinationals, which interviewees suggest generally “have their own R&D department” to smaller start-ups built around innovation arising from the Welsh academic research base, such as MedaPhor and Cyden. Interviewees described situations where large Medtech firms had entered into research agreements with universities but were frustrated by the mismatch in priorities and ownership of the output.

Knowledge sharing and flows: There are numerous organisations set up to ensure the flow of knowledge between universities and industry. OpTIC Technology centre is a business and technology centre in North Wales. The Centre for Nanohealth at Swansea University is a purpose built open access facility providing a technology and innovation base for industry and academia. The Centre for Photonics Expertise (CPE) draws on a team from four Welsh Universities and aims to accelerate business growth by working together with industry supporting the development of processes, products or systems. Wales Centre for Batch Manufacturing, established by University of Wales Trinity Saint David, and is a core component of the University’s SAI Swansea Waterfront development, “driving innovation, creativity and entrepreneurship among companies engaged in new product development and low-volume manufacture” including medical devices.

There is limited evidence of knowledge sharing and flows that are institutionalised beyond Wales North and South clusters. An exception may be the **Health Data Research UK (HDR UK) Wales and Northern Ireland**, a collaboration across Swansea University and Queen’s University Belfast, which aims to unite the UK’s health and care data to enable discoveries that improve people’s lives.

Finally, the **Life Sciences Research Network**, led by Cardiff University, aims to work closely with national and international research organisations as well as companies to develop science leading to

new treatments. The **Ser Cymru** programme supports three National Research Networks. These help academia, businesses, industrial partners and government cooperate together.

Firm network relationships: Interviewees highlighted that “information still seems to lie in people’s heads” and that collaboration is slightly different for different products, leading to fragmentation. Nonetheless, Wales has a devolved health system (7 NHS trusts) which is significantly smaller than England and more open to collaboration and demonstration to promote adoption. This results in lower requirements to have multiple conversations to reach the local market for both trials and embedding innovation and possibly less of a need to rely on formal networking organisations to engage in knowledge exchange. That said, some interviewees reflected that creating a tool listing Medtech assets and market participants to facilitate information sharing and make the research and innovation activities of the sector more visible to improve matchmaking.

Reflections: Despite the proprietary nature of much of the work in the Medtech sector, collaboration and efforts to stimulate knowledge flows appear strong. What is not clear is the impact of the geographical separation of North and South clusters on knowledge exchange. While this may be partly mitigated by strong sectoral networks operating across the entire Welsh geography, there may be an opportunity to organise more cross-cluster collaboration. There may also be opportunities to leverage the easier horizontal linkages into England to extend the reach of each cluster.

Networks of Coordination

Although Wales, and the NHS in Wales is devolved, the Office of Life Sciences, at a UK level, has articulated a vision through its innovation strategy which is followed in Wales. To support this, the Welsh Government has created bodies in the form of several network organisations to handle engagement and foster collaboration.

MediWales is the life science network and representative body for Wales, providing advice, support and business opportunities for its members, whilst promoting collaboration within the life science and health technology community in Wales.

Digital Health Ecosystem Wales connects developers and digital health companies with the NHS and charities as a user test base. Health and Care Research Wales is a networked organisation, which brings together a wide range of partners across the NHS in Wales, universities and research institutions, NIHR, local authorities, and others.

Health Technology Wales (HTW) is a national body working to improve the quality of care in Wales. HTW collaborates with partners, like **NICE** (National Institute for Health and Care Excellence), across health, social care and the technology sectors to ensure an all-Wales approach.

The **Life Sciences Hub Wales** is a wholly owned subsidiary of the Welsh government, aiming for collaboration between industry, health, social care, and academia.

Reflections: Networking occurs at various scales and within different industrial silos across Wales. One advantage of a devolved administration, such as Wales, is that it has many of the levers necessary to be a strong organising force and champion for its leading sectors. As noted above, the Welsh Government has fulfilled this role through strong support for a network of organisations that

shape and deliver policies related to Medtech. However, a gap remains for leadership to emerge from within the industry.

Discussion: Innovation opportunities and support needs

Evolution and market opportunities: An ageing population coupled with steady investment into health care services and technologies suggests that the Medtech sector in general has solid growth potential and Wales is well-positioned to contribute. However, regulations in Medtech determine markets. England is the biggest UK market. It is therefore important for clarity and engagement in the development of new UK Medtech regulations in light of Brexit. If these regulations are carefully crafted, firms may, by complying with UK regulations, simultaneously meet the requirements for EU and US markets. Beyond regulations, there are opportunities to develop gateways into the EU market. For example, some large Welsh based firms have established sister operations in the Republic of Ireland.

Resilience: As above, exiting the EU may have a significant impact on the Medtech industry in Wales. If firms are forced to tailor products and services to conform to more than one set of regulations it is possible this may have implications in their resource allocations to smaller markets. This may result in firms leaving Wales and may result in poorer supply relationships with UK procurers.

Areas of potential support and intervention:

- **Enhanced networking and matchmaking:** A desire was mentioned for a catalogue that facilitates introductions and strengthens the Medtech network, as well as facilitating local procurement.
- **Continue supporting the extant firms:** to act as anchor firms to support new firm entrants. This includes regulation, export, staff/training, paying for trials, finance (e.g. underwriting R+D)
- **Support to access funding and encourage companies to seek support:** This leadership sits with the Welsh government to encourage and support companies to apply for funding. Continuation funding is a challenge.
- **Innovation in navigating TRLs and market access:** A continuous emphasis on finding ways to speed up the route to market is desired. Integration between NHS and social care was mentioned as an opportunity to improve access to market and embedding of Medtech across the space.

Reflections: The growth of the Medtech sector will depend in part on evolving regulatory development following Brexit and may be strengthened by bridging the divisions between the North and South clusters. There appear to be opportunities for linkages with neighbouring clusters of activity in Liverpool and Bristol respectively, which may provide some complementary pools of talent and capabilities and present a more integrated region which requires greater political consideration as changes are rolled up, in turn increasing the resilience of the extant Medtech sector.

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About the Innovation Caucus

The Innovation Caucus supports sustainable innovation-led growth by promoting engagement between the social sciences and the innovation ecosystem. Our members are leading academics from across the social science community, who are engaged in different aspects of innovation research. We connect the social sciences, Innovate UK and the Economic and Social Research Council (ESRC), by providing research insights to inform policy and practice. Professor Tim Vorley is the Academic Lead. The initiative is funded and co-developed by the ESRC and Innovate UK, part of UK Research and Innovation (UKRI). The support of the funders is acknowledged. The views expressed in this piece are those of the authors and do not necessarily represent those of the funders.