Developing a National Research and Evidence Base for the Health and Wellbeing Chapter of the Welsh Government's 2023 Innovation Strategy for Wales: A Case Study

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Abstract: This paper presents research informing the Welsh Government's (WG) Health and Wellbeing chapter of the new Innovation Strategy for Wales (ISW). WG recognises the need for a cross portfolio Innovation Strategy to bring greater coherence and alignment to our existing Welsh health and social care innovation ecosystem, particularly in a post EU environment. This approach aims to support greater collaboration between healthcare, industry, academia and the third sector to deliver greater impact and value (Davies *et al*, 2021) by developing, sharing and adopting innovative practice, leadership and skills development and supporting new technology development (WG, 2018). As part of the development process, key stakeholders were identified as part of an innovation 'push' and innovation 'pull' nexus (Chesbrough, 2003) approach. Organisations were categorised into domains of health and social care providers, innovation infrastructure, technology platforms, innovation centres, and partnerships across Wales's health and life sciences ecosystem. A qualitative, action research led approach was used to derive the key themes supporting development of the ISW health chapter. Multi-sector consultations were conducted with experts from various fields, including health, social, care, research, and technology. Our analysis of qualitative data collected through an extensive consultation process led to the emergence of areas of prioritisation for the ISW. Three areas of prioritisation were identified in the analysis: Creating coherency across the innovation ecosystem, where every partner understands their role. Focusing innovation activity on NHS Wales organisational needs/priorities, generating 'Innovation Pull'. Creating an 'adoption ready' pipeline of innovation externally into health and social care at scale, creating an 'Innovation Push' offer. The ISW aims to create the optimal conditions for an innovation ecosystem underpinned by clear infrastructure and a robust policy framework, which has the full support from health and social care leadership, to create a culture of innovation at all levels of the health and social care system. The ISW was launched on 27th February 2023, with full political support from the Welsh Government Cabinet; a majority Labour party government supported by the Plaid Cymru party, as part of the Welsh Government's 2021 election cooperation agreement. (344 words)

Keywords: Innovation; Innovation Ecosystem; Wales; Healthcare Innovation; Innovation Strategy; Innovation management

1.   Introduction

1.1   Background and context of the Innovation Strategy for Wales (ISW)

Over the past few decades, Wales has been transitioning into a knowledge-based economy from its industrial roots. The Welsh Government has been collaborating with academia and industry to facilitate this transition by focusing on innovation, especially in targeted sectors (WG, 2018). As is the case in the wider UK, Wales has been addressing public health challenges, including pre-existing health disparities (Brunt *et al*., 2017), which have been further exacerbated by the Covid-19 pandemic. Throughout its transition to a knowledge-based economy, Wales has leveraged EU Structural and Investment Funds (ESIF) for Research, Development and Innovation (RD&I) initiatives post-industrial era, making it a hotbed for EU RD&I programmes driving cross-sector RD&I opportunities for socio-economic development. As such, Wales is rich in collaborative efforts between world-leading research centres, multi-national corporations, SMEs and public sector organisations like Welsh Government and NHS Wales.

To ensure coherency and a more integrated approach to innovation across Welsh Government portfolios, Welsh Government Cabinet Ministers signed up to develop a new Innovation Strategy for Wales (ISW) following the 2021 elections, of which health and wellbeing occupies a main chapter.

Wales is now in a new era post Brexit, where ESIF funds are no longer available, so brings greater focus for the Welsh Government's ISW to be responsive to the needs of the population and consider alignment with the UK Government's plans for the UK Shared Prosperity Fund (UKSPF). It is the UKSPF which aims to replace the European Regional Development Fund (ERDF) and European Social Fund (ESF) (UK Gov 2023). The UKSPF represents a cut in the overall funding equating to approximately £10 million shortfall per year for Wales, representing £450,000 per local authority. These challenging circumstances coincide with a period of managing a path towards recovery from the COVID-19 pandemic (WG, 2021).

These circumstances have accelerated Welsh Government's plans to develop and implement the ISW in alignment with Wales's priority areas which include supporting innovation across education, the economy, health and wellbeing, and in climate and nature (WG, 2023).

1.2 Importance of a cross-portfolio approach to innovation in health and social care in Wales

The decline of ESIF to support RD&I across all sectors has necessitated the development of a new Health and Wellbeing chapter of the ISW to meet challenges and demands posed by rising public expectations, demographic and epidemiology changes, limitations of workforce capacity for education and training, and healthcare system performance. Figure 1 illustrates the extent of the problem, as Wales and the rest of the UK no longer have access to those funds. This leaves Wales in a precarious position going forward with the prospect of a substantial decrease in funding.
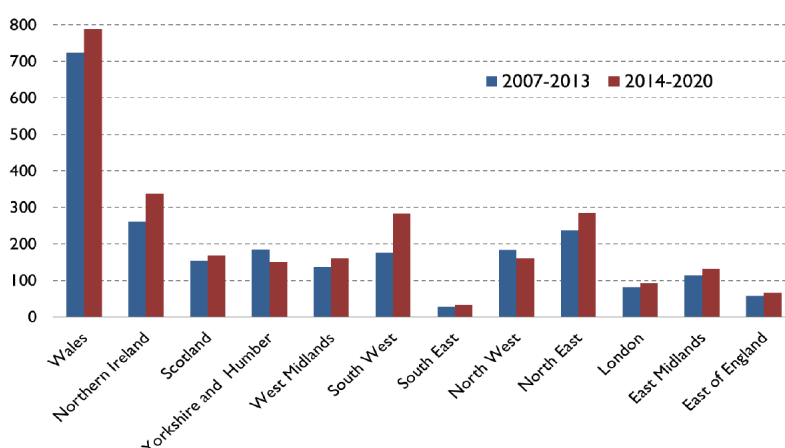

Figure 1: Regional draw down of ESIF by EU Capita 2007 – 2020

(Source: Welsh Government, Economy Innovation team)

Both UK and Welsh Government strategies (UK Gov 2021 & WG, 2018) support greater collaboration between health and social care, industry, academia and the third sector to deliver greater impact and value (Davies *et al*, 2021) by developing, sharing and adopting innovative practice, leadership and skills development and supporting new technology development (WG, 2018). The Welsh health and social care innovation ecosystem has previously drawn significantly from ERDF and Welsh Government supported life sciences sector innovation accelerators, such as Accelerate and AGOR-IP. It has also provided both collaborative platforms for managing life sciences sector innovation in Wales and relationship brokerage of key public and private sector ecosystem stakeholders locally, nationally, and internationally (Donne *et al* 2021). In an era of receding EU funds, Welsh Government seeks to develop a chapter of the ISW which serves the current and emerging complexities of health and social care by creating an environment in Wales which stimulates job creation, skills and training provision, RD&I and commercialisation activities.

1.3 Purpose of the research paper

This paper describes the arrangement of Welsh innovation ecosystem actors into 'innovation push' and 'innovation pull' categories and explores the development of Welsh Government's three overarching areas of prioritisation for the Health and Wellbeing chapter of the ISW. The paper describes the qualitative, action research led approach adopted for the study and the results of analysis undertaken to derive the key themes that support the development of the Health and Wellbeing chapter of the ISW. The paper then describes the implications of the research findings on the chapter's development and the importance of a clear infrastructure and policy framework to support innovation.

2. Literature Review

2.1 Innovation in health and social care

The pursuit of innovation in health and social care at the national level has been a longstanding goal (Mossialos *et al.*, 2018, Flessa & Huebner, 2018), with key stakeholders constantly facing challenges in overcoming the inertia and complexity of existing structures (Greenhalgh *et al.*, 2017), limited opportunities for experimentation (Fleuren *et al.*, 2004), and difficulties in disseminating successful ideas (Malcarney *et al.*, 2017, Yusof *et al.*, 2008).

The Welsh Government has made a significant investment in the innovation landscape to achieve the goals outlined in *A Healthier Wales* (WG, 2018). This includes the creation of Research, Innovation, and Improvement Coordination (RIIC) Hubs in each of the Regional Public Board areas, ongoing investment in the Small Business Research Initiative (SBRI) and the Bevan Commission, and the Life Sciences Hub Wales. Health Boards have also invested in employing Innovation Leads and numerous transformation projects. The innovation landscape is crucial in supporting the necessary cultural and activity changes required to activate essential innovative practices (Wilson, 2021).

These challenges have led to the development of various strategies and frameworks to promote innovation in health and social care, including the use of networking and collaboration among stakeholders (Fleuren *et al.,* 2004), the identification of human, organisational, and technology-fit factors (Yusof *et al.*, 2008), and the application of the NASSS framework to analyse the role of complexity in technology programs (Greenhalgh *et al.*, 2017). To address these challenges, WG has attempted changes and sustained effort to support an environment and ecosystem which is receptive to adapt and adopt successful innovations in health and social care.

Effective management, improvement and innovation are key components of successful organisations in health and social care. However, gaps between evidence and decision-making can occur at all levels of health and social care, making effective decision-making difficult. To address this issue, knowledge translation through a framework provides a strategic approach to promote the application of research and facilitate the process of decision-making, particularly for policymakers (Straus *et al.,* 2009). An ecosystem approach which emphasizes the importance of building networks based on shared objectives can serve as a powerful driver of innovation in health and social care and the wider community in sustaining and developing innovation and providing better health outcomes (Wilson, 2021; Summers *et al.*, 2018).

2.2 Innovation ecosystems and their importance

The idea of innovation systems has been used routinely in the field of innovation studies and it is commonly accompanied by various descriptors, such as national innovation systems (Lundvall, 1992) or sectoral innovation systems (Breschi & Malerba, 1997). There has been much debate surrounding the consensus for definition of an 'Innovation Ecosystem' following the publication of a definition by Adner (2006) in a Harvard Business Review article, defining an innovation ecosystem as "the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution" (Adner, 2006, p. 2). An historical review case study by Granstrand & Holgersson (2020), investigated Apple's mobile telecommunication and video cassette recorder (VCR) innovation ecosystems and came to the following definition:

> "An innovation ecosystem is the evolving set of actors, activities and artifacts,
>
> and the institutions and relations, including complementary and substitute relations,
>
> that are important for the innovative performance of an actor or a population of actors."
>
> (Granstrand & Holgersson, 2020, p1),

The models describing innovation push and innovation pull dynamics between organisations have been studied for decades (Godin & Lane, 2013). More recent studies explore the dynamics of innovation push and innovation pull in the context of innovation ecosystems. These studies provide insight into the specific features of an innovation ecosystem, such as the diversity of actors, the type of collaborations and relationships between those actors and how the actors integrate with the ecosystem across the innovation 'pull'–'push' nexus (Boyer & Kokosy, 2022).

2.3 Welsh 'Push' and 'Pull' innovation nexus approach.

Wales is home to a rich life sciences innovation ecosystem which boasts a wealth of diverse organisations, including small and medium-sized enterprises (SMEs), multinational enterprises (MNEs), academic institutions, research centres, healthcare providers, social care providers, third-sector organisations and others (WG, 2018). Each of these entities contributes to the multifaceted innovation ecosystem in its unique way. To better understand the dynamics at play within the push-and-pull organisational nexus, the relevant organisations and actors can be characterised according to their role in either an innovation "push" or an innovation "pull" approach.

The push and pull innovation nexus of the system need both push and pull dynamics between actors (i.e., individuals and organisations) in the innovation ecosystem. Understanding the landscape of the innovation ecosystem helps to explain how the complex interactions among actors can stimulate creative ideas and implement both new technology-push and market-pull strategies (Boyer & Kokosy, 2022). In this paper, organisations and actors across the Welsh innovation ecosystem including NHS Wales, universities, research institutes, Life Sciences Hub Wales, technology platforms, infrastructure centres and partnerships were categorised, and their stated innovation priorities and aggregated national needs were identified through a mixed methodology approach.

3. Research Methodology

3.1 Mixed Methodological Approach

Embedded within a wider research programme, an action research approach was taken to develop the national evidence base for the development of the Health and Wellbeing chapter of ISW. This research identified and characterised organisations in the Welsh Life Sciences Innovation Ecosystem prior to deployment of a mixed methods approach to developing an understanding of organisational priorities for the development of the Health and Wellbeing chapter of ISW.

> "Action research is about taking action, for improving practices……." (McNiff, 2017, p18)

Categorising Innovation Ecosystem Organisations: Life sciences and public sector organisations in Wales were identified and assigned to 'Innovation Push' or 'Innovation Pull' categories based on traditional innovation literature. Traditional literature describes organisations associated with supply-side factors related to advances in science and technology as 'Innovation Push' organisations. Those associated with demand-side factors (e.g. NHS Wales and Social Care) are described as 'Innovation Pull' organisations (Clausen et al, 2020).

Data Collection: This study employed a multi-faceted approach to data collection to ensure a comprehensive understanding of the factors driving innovation in public sector organisations. To capture diverse perspectives, the study utilised semi-structured interviews, questionnaires, ministerial reports, official documents, and minutes of relevant meetings and consultations. Participants for the interviews were selected using purposive sampling to ensure a range of perspectives and experiences, while a combination of convenience and snowball sampling techniques were used to recruit participants for the questionnaire. Additionally, the study conducted workshops, focus groups, and other forms of engagement with relevant stakeholders to further enhance its holistic understanding of the topic and develop consensus on areas for prioritisation in the ISW. This approach to data collection was chosen to provide a comprehensive overview of the subject matter from different perspectives and to ensure that a range of voices and experiences were included in the analysis.

Transcription Process: To maintain the integrity and accuracy of the information collected from a range of sources, all the collected data were transcribed verbatim. This included interview recordings, questionnaire responses and consultation minutes. The transcripts were reviewed to ensure proper contextual understanding and consistency across different data sources and their alignment with development of priorities and themes to support the development of the new strategy.

Thematic Analysis: The collected data were subjected to thematic analysis to identify patterns and trends in responses across data sources. The inductive approach involved five steps:

1. Familiarisation.
2. Coding.
3. Theme Generation.
4. Theme Review.
5. Theme Definition & Naming.

The coding framework was developed based on the research objectives and relevant literature. The transcripts were systematically coded to assign meaningful labels to sections of the data. Similar codes were then clustered together to form overarching themes and areas of priority. The emerging themes were critically examined to ensure coherence and consistency and refined or merged as necessary throughout a consultation process. Final themes and areas of prioritisation for the new ISW were identified. This comprehensive thematic analysis allowed for a deeper understanding of the relationships and patterns within the data, providing valuable insights that informed the study's conclusions and recommendations towards developing areas for prioritisation for the ISW.

Public Reporting and Consultation: As a result of the research activities, multiple reports were developed or commissioned to summarize the findings and insights. These reports provided findings and offer recommendations for policymakers and practitioners. The reports served as a resource to inform strategy development and were made available to the public for use and dissemination.

3.2 Data capture from push and pull organisations as stakeholders.

This section presents the three key sources of data capture and evidence generation from push and pull organisations. These data were used to inform areas of prioritisation for the ISW. These include (i) NHS Wales COVID-19 Innovation Study, (ii) the Cardiff Business School Key Opinion Leader Study and (iii) Formal Welsh Government Public Consultations. The wider body of key evidence generated to inform the ISW through the COVID19 is illustrated in Figure 2.
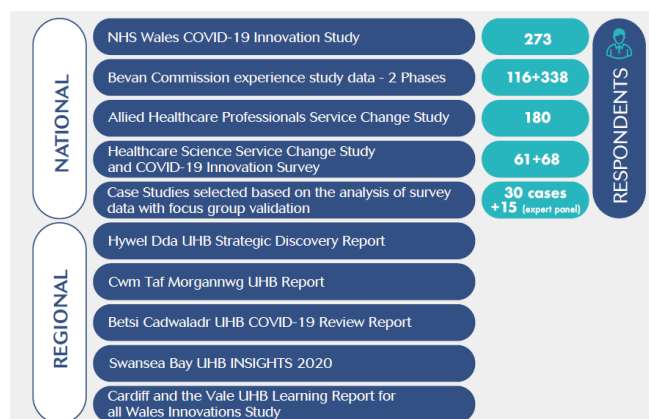

Figure 2: Body of Evidence Sources Forming the NHS Wales COVID-19 Innovation Study

(i) The NHS Wales COVID-19 Innovation and Transformation Study: This study was led by Swansea University's School of Management I-Lab Research Centre. The study represents the first of its kind to explore research and innovation approaches developed and adopted within the healthcare sector during the Covid-19 pandemic in Wales. The Study was co-funded and supported by a consortium of key stakeholders, including all 11 NHS Wales organisations, WG, Health Education Improvement Wales, Bevan Commission, Swansea University, ARCH partnership and the Welsh NHS Confederation. This diverse range of funding partners provided not only financial support, but also access to a wide range of organisational investment and individual expertise. Drawing on a primary data set of over 1,000 health and care practitioners from every NHS Wales organisation, the study employed a range of qualitative and quantitative research methods, including individual staff studies, executive team reports, experience studies, innovation stakeholder fora, and regional consultations.

To further enhance the study's impact, the researchers selected thirty-five case studies highlighting real-world examples of NHS Wales practitioners adapting to the pandemic, from A&E consultants to healthcare scientists to physiotherapists. The report generated significant national interest and media coverage and was presented at the NHS Wales Chief Executives' meeting in March 2021 at the request of the then NHS Wales Chief Executive, Dr Andrew Goodall. The report was widely accepted and endorsed by NHS Wales Chief Executives, with the lead Chief Executive for Innovation and others committing to adopting the recommendations within their own Health Boards.

(ii) Cardiff Business School Key Opinion Leader Study: This study developed and captured a range of primary qualitative data through semi-structured interviews with 30 key opinion leaders across the health and social care innovation ecosystem in NHS Wales. Interviewees included clinical academics, Innovation directors and

leads, heads of innovation, senior Welsh Government officials, leading academic and senior industry professionals. The interviews were conducted on a one-to-one basis and took up to one-and-a-half hours.

The evidence and comments collected were analysed thematically to identify key themes related to the health and social care innovation landscape in Wales. Specifically, the analysis focused on strengths, weaknesses, opportunities and threats, policy framework, support for innovation, targeted investment, promoting and rewarding innovation, skills and capacity, and working in partnership. In spring 2022, thirteen evidence submissions were received from all 11 NHS Wales organisations, Bevan Commission and Health Technology Wales. The submissions provided additional insights and perspectives on the health and social care innovation landscape in Wales.

(iii) Formal Welsh Government Public Consultation: From the period of 20th July 2022 until 28th September 2022, this public consultation sought views on the Welsh Government's development of a new ISW. The consultation asked the public their views on what would be needed for Wales to innovate, and for more people in Wales to benefit from innovation. The 153 responses from the public consultation were independently analysed by a third-party research organisation, Miller Research, and summarised to form the basis of this consultation report, which set out a range of themes across all devolved policy areas in Wales.

4. Analysis and Results

4.1 Ecosystem and prioritisation areas

Based on analysis of the evidence sources above, three priorities (set out on page 1) were presented to the NHS Wales Chief Executives at their Leadership Board session in October 2022. In November 2022, Judith Paget, Director General and CEO of NHS Wales wrote to all NHS Wales executive leads for innovation, and Innovation, Technology and Partnership (ITP) programme delivery leads from across the health and social care innovation ecosystem.

This letter confirmed the three priorities to drive a new innovation system for health and care, focused on a model of coordinating 'Innovation Pull' (system need) from NHS Wales with an 'Innovation Push' (system offer) from the ITP programme and wider external ecosystem. This model for the ecosystem is set out in figure 3 below.
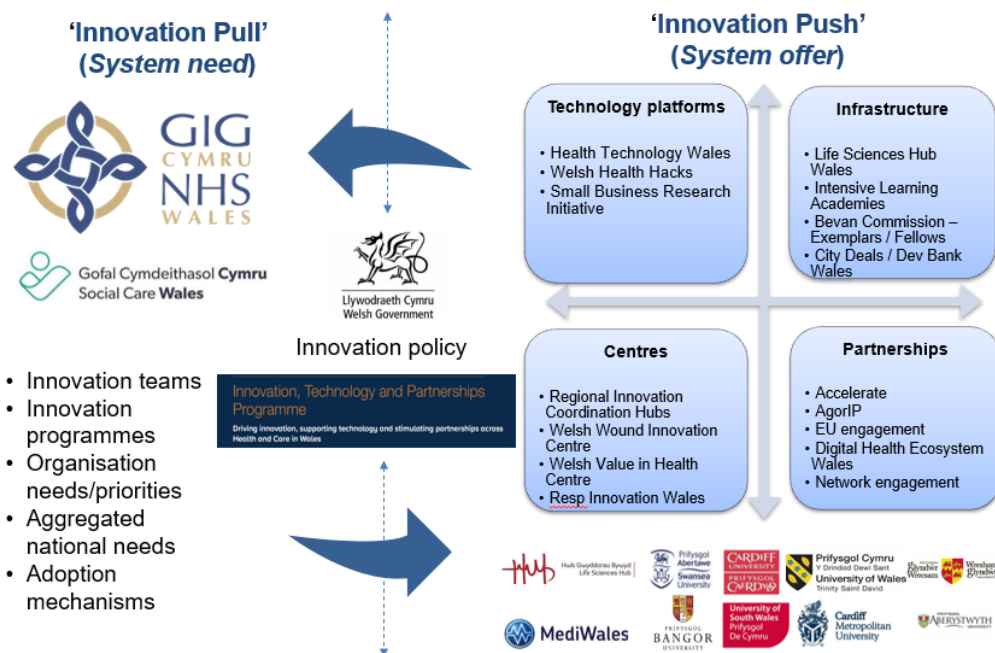

Figure 3: Welsh Innovation Ecosystem 'push' and 'pull' organisations. (WG, 2023)

In response, NHS Wales innovation executive leads responded, setting out their innovation team structures, their current innovation infrastructure, and set out the 'innovation pull' priority areas.

ITP programme delivery leads described their 'innovation push' system offer to Health and Social Care, with some details of adoption-ready innovation projects.

4.2 Innovation action plan workshops

Innovation action plan workshops were undertaken with NHS innovation leads ('Pull community') and external innovation delivery leads ('Push community'). Findings and recommendations generated through the research activities resulted in recognition that an Innovation Action Plan (IAP) for the ISW is required. From January to March 2023, the innovation executive leads and ITP programme delivery leads were brought together as a network to discuss the implementation of the three priority areas outlined by the NHS Wales Leadership Board and to co-design an innovation action plan to implement the ISW. The goal was to convene the innovation ecosystem, set out a revised vision for health and social care innovation and secure collective ownership of the action plan.

4.3 Implications of the ISW research findings

Building on three priority areas, the Health and Wellbeing chapter of the ISW contains specific commitments to:

- Enhance the existing innovation infrastructure.
- Scale innovation across the system.
- Adopt a more strategic approach to funding.
- The development of an innovation policy framework with underpinning tools and resources
- A single funding portal.
- A clear commercial direction.
- A common training programme for innovation.

These recommendations would support more consistent innovative activity and build capacity for innovation at all levels. Implementation of these recommendations will require a collective effort and ongoing collaboration among all stakeholders involved in the health and social care innovation ecosystem in Wales.

4.4 Potential challenges and limitations to ISW implementation

Challenges and limitations to the implementation of the ISW were identified though iterative engagement with push and pull organisations. The challenges and limitations identified included:

- Integrating health and social care in a coherent and manageable way presents infrastructure and communication challenges as expected when aligning two large complex organisations.
- Funding needs to be more strategic and focused on impact.
- Limitations to funding will slow-down the industry and university engagement, reducing capacity across health and social care.

5. Conclusion

This paper has explored the background for developing an ISW, with 3 defined priority areas.

1. Create coherency across the innovation ecosystem, where every partner understands their role.
2. Focus innovation activity on organisational needs and priorities, generating 'Innovation Pull' from NHS Wales.
3. Creating an 'adoption ready' pipeline of innovation from the wider system into health and social care at scale, creating an 'Innovation Push' offer.

Integral to the roll out and implementation of the ISW is an innovation action plan. The study has identified a significant ecosystem working across health and social care innovation in Wales offering a foundation for an ISW. This places health and social care as a component within the broader Wales innovation ecosystem, making the H&W chapter an integral element of an integrated cross-sector strategy. The unique context of Wales, with a particularly challenged funding outlook and political dynamics to resolve, makes for a greater contribution to knowledge in subsequent phases of strategy development.

Future direction for this research will

- Build on current innovation strategy and the development of the future action plan.

- Roll out and scale up priorities across the health and social care innovation ecosystem in Wales.
- The ISW will continue to develop and evolve with time.
- Research should continue to explore enhanced communication and relationships between key organisations and stakeholders.
- Ensure clear and coherent orchestration of activities across the 'pull' and 'push' innovation nexus.
- Further investigation on mechanisms to integrate other innovation programmes and interventions such as skills and training programmes.

To this end we would recommend a longitudinal study on the development and impact of the WG commissioned Intensive Learning Academies (ILAs) on push and pull organisations on the Welsh Innovation Ecosystem. The ILAs demonstrate a coherent and cohesive effort between Welsh Government and research institutions (universities) to upskill the workforce in health, social care, third sector and wider life sciences sector.   These skills development academies focus on key areas of need identified by the NHS: (1) Innovation & Transformation, (2) Preventative Health, (3) Digital Transformation, and (4) Value-Based Healthcare. The area of research might also consider mapping the current and emerging partnerships and funding opportunities such as Innovate UK and UKSPF to sustain progress in the wider RD&I activities nationally and internationally.

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