ITHACA CASE STUDY NO.1: LIVERPOOL CITY REGION

Acknowledgements

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1. INTRODUCTION

1.1 Background to the Case Study

1.1.1 Hosted by NHS Liverpool Clinical Commissioning Group (LCCG), Liverpool City Region was the setting for the first of nine ITHACA project *Exchange of Experience and Peer Evaluation (EEPE)* events on 4 and 5 April 2017. It comprised a series of talks, demonstrations and site visits to key initiatives designed to inform the visiting delegation of experts [1] about how Liverpool City Region is working to accelerate the scaling up of smart health and care solutions for active and healthy living whilst achieving the triple win of economic growth, more sustainable health and care systems and improved well-being for its citizens. It concluded with an interactive and structured peer evaluation session.

1.1.2 The Liverpool City Region EEPE was structured around three pillars that are the hallmark of the ITHACA project. These were the City Region's:

- strategic and policy framework;
- eco-system for scaling up smart health and care solutions;
- experience across the innovation cycle (invention, co-creation, market testing, validation and scaling up).

1.2 Methodology

1.2.1 This case study is informed by and derives from:

- documentation provided by Liverpool City Region stakeholders before and during the EEPE event – including strategy documents, evaluation reports and promotional materials;
- the information and evidence presented and demonstrated during the event – including PowerPoint presentations;
- peer evaluation feedback from visiting delegates presented during the EEPE's concluding peer evaluation session and in follow-up, written reports.

1.2.2 Liverpool City Region stakeholders were briefed to provide information that would help the visiting delegates to understand the City Region's policy,

[1] 31 delegates attended the Liverpool City Region EEPE. They were from 8 ITHACA regions: Zealand (Denmark), Baden-Wurttemberg (Germany), Nouvelle Aquitane (France), Nord Brabant (Netherlands), Friuli Venezia Giulia (Italy), Slovenia, Basque Country (Spain) and Malopolska Region (Poland).

activity and infrastructure and make informed assessments of their strengths and weaknesses. Equally, the visiting delegates were briefed about the peer evaluation process (see section 5.1). This enabled them to act as an 'evaluation and feedback team" and to provide structured feedback to the hosts about what they saw and learnt. In this context, visiting ITHACA delegates brought their own knowledge and experience and, with the benefit of a fresh eye, they provided Liverpool City Region stakeholders with an expert critique and recommendations about the region's approach. It provided a forum to engage in a mutual discussion about visiting delegate perceptions and flagged up implications for policy and practice going forward. The verbal and written insights of visiting delegates emerged through the peer evaluation process and have influenced and added considerable value to the content of this case study.

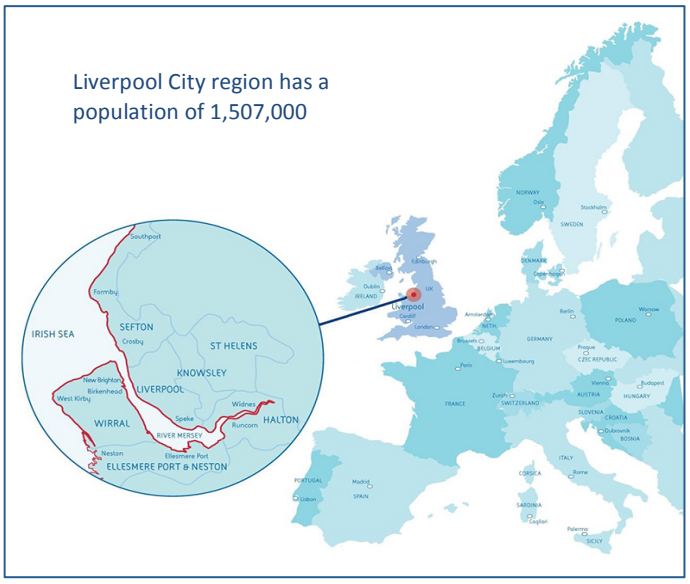
1.3 Structure of this Case Study

1.3.1 The rest of this report sets out the approach adopted in Liverpool City Region in scaling up smart solutions for health, care and well-being along with highlighting the expert feedback from the ITHACA delegation. Section 2 outlines the strategies and policies in Liverpool City Region that shape and drive the smart health agenda. Section 3 highlights the City Region's ecosystem. Section 4 focuses on the innovation cycle and the range of initiatives and innovations in Liverpool City Region that stakeholders presented at the EEPE event. Section 5 flags up key assessments from the visiting delegates that were fed back during and after the EEPE event, discusses the key findings that have resonance and presents the case study's recommendations.

2. STRATEGIC AND POLICY CONTEXT

2.1 Overview

2.1 Liverpool City Region is a leading player in the digital health care and innovation field. It is a 3 star European Reference Site within the European Innovation Partnership for Active and Healthy Ageing (EIP AHA) - giving the region wide recognition as a "go-to" region for good practice. It has a leading role in the Coral (Community of Regions for Assisted Living) network (a strategically prominent network of 38 European regions) and is a member of the Reference Site Collaborative Network. It has established collaborative links with numerous European regions. Importantly, health and innovation is a key pillar of LCR's smart specialisation and European Structural Investment Fund (ESIF) agenda and its ESIF Innovation Plan. LCCG's *Digital Care and Innovation* Programme actively supports this European focus.



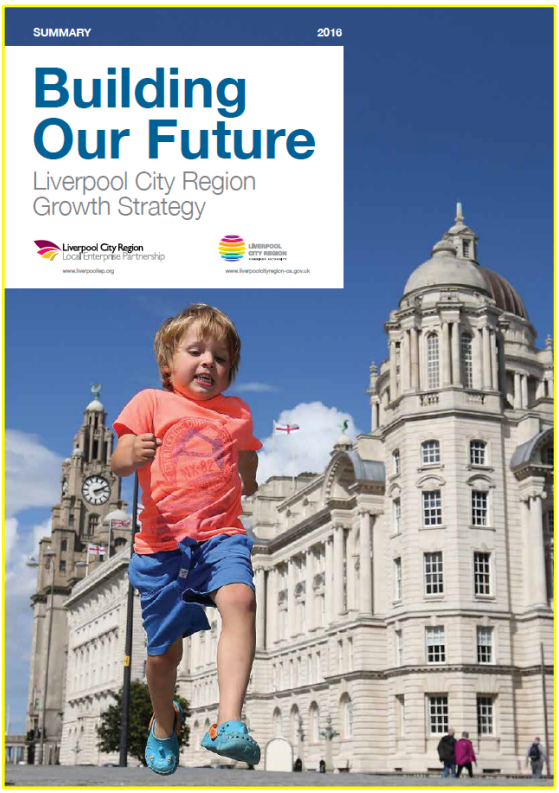
2.2 Several key documents provide the strategic and policy framework for Liverpool City Region's agenda for innovation in health, care and well-being. Mirroring the EIP AHA's "triple win" ambitions, they are:

- Building our Future - Liverpool City Region Growth Strategy
- Healthy Liverpool: the Blueprint
- Driving a Digital Future – the Merseyside Digital Roadmap

2.2 Liverpool City Region Growth Strategy

2.2.1 Liverpool City Region's Growth Strategy is the primary current document that highlights the City Region's smart specialisation priority to expand its smart health economy. Its health and well-being strand was a priority area within the preceding *Liverpool City Region Innovation Plan 2014-2020*. That earlier

manifestation of the smart specialisation approach has shaped the local deployment of the City Region's structural funds. It incorporated a strategic delivery programme, focusing on the design, delivery and scaling of smart health and care solutions – including assistive technology. It led to the approval of the ERDF supported €4.5 million *Health Innovation Exchange* project designed to address market failure across the innovation cycle for smart health and care solutions (see section 4.2.1).



2.2.2 The Growth Strategy outlines the city region's strengths and assets within each of its local authority areas. Its vision is to build on "core strengths and capacity for innovation to create a truly global and competitive City Region at the heart of the Northern Powerhouse"[2]. Two of the seven prioritised growth sectors are:

> ***Health and Life Sciences***: The strategy sets out the aim for Liverpool City Region to be "home to world leading centres of excellence for precision medicine, infectious disease, children's health, independent living and eHealth attracting research funding, talent, investment and business to commercialise this excellence".
>
> ***Digital and Creative:*** The strategy sets out the aim for Liverpool City Region to be "a world-leader in the application of high performance and cognitive computing and sensor technology to revolutionise productivity across all sectors, and the best place in the UK to start, grow and scale up a digital or creative business".

2.2.4 Specifically, the strategy's healthy, independent living and ehealth strand identifies a series of specific opportunities related to:

- community care, self-care and ehealth;
- Big Data and predictive analytics and health, care and related data;

[2] The UK Government describes the Northern Powerhouse as its ambition to bring together the cities, towns and rural communities of the North of England and Wales to become a powerhouse for the economy.

- developing a LCR Living Lab (networked with international activities) to support the development of healthcare innovations.

2.3 Healthy Liverpool: The Blueprint

2.3.1 Integral to the Healthy Liverpool Programme [3], innovation for health, care and well-being is a policy priority for Liverpool. Led by LCCG, with the city's NHS organisations, Liverpool City Council, other public services and community organisations, Healthy Liverpool aims to ensure that health and care services meet peoples needs and the health challenges that the city faces. Aiming to improve outcomes for citizens and new ways of working, it set's out a new model of care to transform the whole health and social care system in Liverpool. Five integrated core transformation programmes include:

Health profile

In Liverpool:

- cancer mortality rates are amongst the highest in the country;
- over half of adults are obese or overweight;
- 30% of people live with one or more long-term conditions;
- 93,000 people are affected by mental health issues;
- high health inequality means that the difference in life expectancy varies by 10 years for different areas in the city;
- by 2021, there will be 9% more people over 65 years old and 10.7% increase in people living with dementia.

[3] Since the EEPE in Liverpool, the Healthy Liverpool Partnership has been superceded by the One Liverpool Partnership. This is a whole system plan, setting out how partners will come together to deliver improved health.

1) Living Well
2) Community Care
3) Digital Care and Innovation

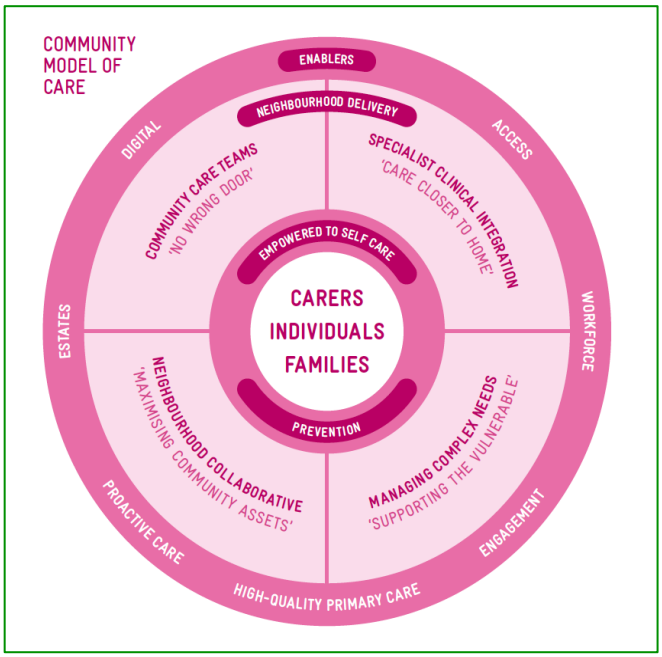
Living Well Programme

2.3.2 In supporting people in Liverpool to become healthier and more active, the Living Well priority is to increase physical activity levels for people who are currently inactive or moderately active. Key aims include:

- using existing expertise and creating new community assets;
- investing in indoor and outdoor places to maximise opportunities for physical activity and sport;
- encouraging mass participation in physical activities including through social marketing campaigns;
- integrating physical activity and sport into healthcare;
- rolling out workplace activity programmes.

Community care

2.3.3 The community care model aims to bring together the many different strands of care that happen outside of hospital settings into a single, person-centred system, with integrated planning, commissioning and delivery, which is easier to navigate for both professionals and patients. It emphasises the importance of prevention and empowers individuals to "self-care" – i.e. manage their own health and wellbeing.



2.3.4 Within this paradigm, further specific aims include creating a new system of care where planning and services:

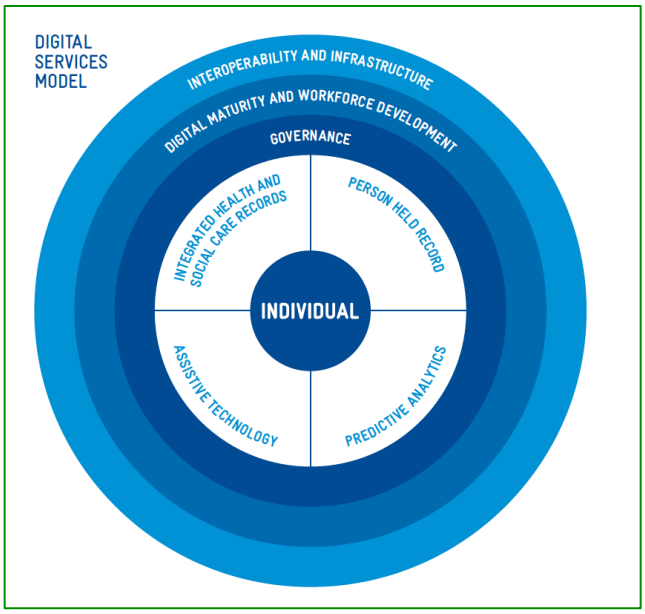
- take into account the impact and dependence on families and carers;
- enable proactive care, targeted at people most at risk;
- support people to remain independent and living in their home;

Digital Care and Innovation

2.3.5 Liverpool has the ambitious aim to be one of the top ten most digitally advanced health and social care economies in Europe by 2020. Key to this is the goal to transform the way services are delivered "through a step-change in the use of digital technology and innovation".

2.3.6 Specific aims include:

- empowering people to take control of their own health and wellbeing, while ensuring professionals have access to the information they need to use technology to deliver safe and efficient 'seamless' care;
- a health and social care economy with integrated systems;
- enabling the use of smartphones and other personal devices to open up better self care.



2.3.7 Delivery is based around four connected themes:

- Integrated Health and Social Care Records
- Person Held Record
- Assistive Technology
- Predictive Analytics

2.4 Driving a Digital Future – the Merseyside Digital Roadmap

2.4.1 The Merseyside Digital Roadmap covers much of Liverpool City Region area – Its vision is to support better health and care for people by maximising the benefits of digital technology and innovation. Much of its agenda mirrors the *Digital Care and Innovation* strand of the Healthy Liverpool Blueprint.

2.4.2 Reflecting national digital priorities, the roadmap has three digital themes shared by the Merseyside organisations that deliver health and social care services. These are:

(a) Digitally empowered individuals

2.4.3 The roadmap's focus is to:

- enable people to utilise digital technologies – including assistive technologies and apps - to manage their own care;
- enable people to take control and work in partnership with health and care professionals in relation to their health and wellbeing;
- ensure digital inclusion;
- enhance digital skills for the health and care workforce and citizens.

(b) A connected health and social care economy

2.4.4 Ambitions include:

- ensuring that health and care professionals will be able to directly access and exchange, digitally, all clinical records;
- enhancing care and quality, whilst ensuring greater system efficiency;
- reducing fragmentation and duplication of record keeping.

(c) Exploiting the digital revolution

2.4.5 The roadmap aims to maximise the benefits of emerging technologies and the potential of big data to improve services and people's health and well-being by:

- utilising advanced and predictive analytics to provide 'intelligence led healthcare';
- utilising assistive technology and sensor development;
- embedding genomic medicine into heath and care services.

2.4.6 The roadmap also sets out a series of principles that will inform how it makes progress against these objectives. These include adopting person-centred and co-designed approach to digital services. Annex x sets out the *current initiatives* and *Digital Top 10* (priority programme delivery areas) that demonstrate the transfer of strategy into practice and provides a flavour of the range of initiatives taking place within the Digital Road map area.

3. ECO-SYSTEM

3.1 The Liverpool City Region Eco-System Context

3.1.1 One of ITHACA's central tenets is to build on good practices in constructing and strengthening the innovation eco-system – that can serve as a foundation for smart specialisation strategies and drive the scaling up of smart solutions for active and healthy living and ageing. Equally, there is a growing body of evidence that regional approaches to innovation for health, care and well-being have been most successful when they have brought together key stakeholders - including Government Bodies, Health and Care providers, industry, academia and civil society – into a coherent partnership or ecosystem. This "Quadruple Helix" arrangement can enable all stakeholders to be more aware of health and care priorities, challenges, needs and economic opportunities, and so enable researchers and industry to focus on more rapidly developing solutions to be tested, to scale up the deployment of innovative solutions and to demonstrate evidence of impact.

3.1.2 In Liverpool City Region, the eco-systems that reflect this quadruple helix approach include:

- The Liverpool City Region Innovation Board
- the eHealth Cluster;
- HELIUM.

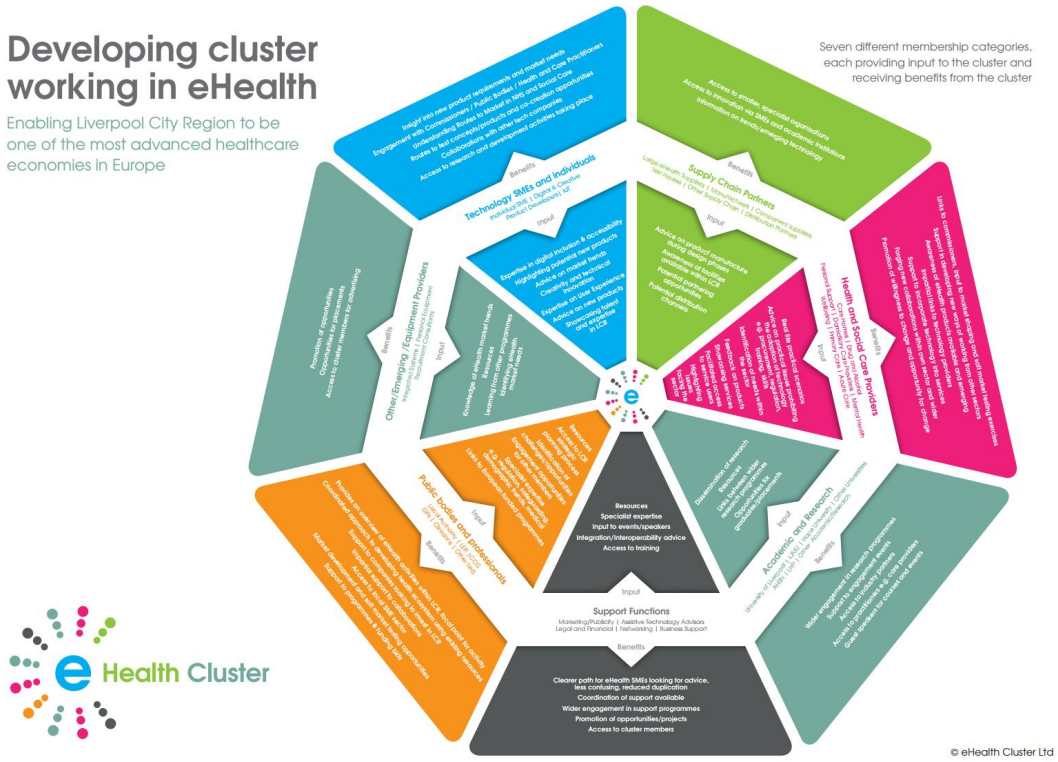
3.2 Liverpool City Region Innovation Board

3.2.1 Led by the Vice President of Operations and Open Innovation at Unilever Global R&D, the Liverpool City Region Innovation Board is responsible for driving the strategic development of the City Region's innovation agenda. The City Region's Local Enterprise Partnership services and facilitates the Innovation Board.

3.2.2 The Innovation Board primarily aims to deliver the City Region Growth Strategy (see section 2.2) by translating knowledge and ideas into commercial activities, and to accelerate the growth and competitiveness of the City Region's economy. This is within a wider devolution context and the recent election of the first ever Liverpool City Region Metropolitan Mayor. The Mayor has lead responsibility for the City Region's innovation and digital agenda.

3.2.3 The Innovation Board comprises a series of strategically important stakeholders within Liverpool City Region. Including Unilever, there are leading industry representatives, Innovate UK, STFC, Liverpool University and and Liverpool John Moores Universities, Liverpool CCG, Liverpool Health Partners, and the Combined Authority (made up of all City Region local authorities.

3.3 eHealth Cluster



3.3.1 The LCR eHealth Cluster was launched in 2013 by a small group of technology sector SMEs that had an interest in working in the health and care sector. This grassroots initiative, whilst remaining SME-led, has expanded to become a multi-sectoral cluster (see table 3.1) with 330 individuals engaged. It brings together large organisations, like LCCG and Liverpool City Council, with social care providers and SMEs. The cluster's SMEs are from diverse sectors - technology companies, domiciliary care providers and charities that provide supportive living.

3.3.2 The cluster creates entry points into the eco-system for these different groups and, importantly, enables members to develop an understanding of what different members and groups are seeking to achieve. Strategically, the eHealth cluster is a vehicle for marrying the "social model of health" with

clinical needs and the technology sector. In this way, it promotes a focus on innovation in prevention, self-care, well-being and quality of life matters.

Table 3.1: Sectoral distribution of eHealth Cluster members

Summary of Categories	% of total contacts
Technology SMEs and individuals	26%
Supply Chain Partners	10%
Health and Social Care Providers	14%
Academic and Research	9%
Support Functions	15%
Public bodies and professionals	21%
Other	5%
	100%

3.4 Interreg Supported Projects

3.4.1 Like ITHACA, HELIUM is an Interreg project engaged in the smart health and care sector. HELIUM has formed a Liverpool City Region Steering Group that brings together academia with health commissioners and providers, and the multi-sectoral eHealth Cluster (see box 3.2). It is a dementia-focused, inter-sectoral partnership to enhance the city region's living lab capacity.

Box 3.2: HELIUM Regional Steering Group

S/N	Institution/Company	No of Representative
1	Liverpool John Moores University	4
2	Liverpool City Region Local Enterprise Partnership & Innovation Agency	1
3	Alder Hey Hospital/National Institute for Health Research	1
4	Halton Clinical Commissioning Group	1
5	Liverpool Heart and Chest Hospital	1
6	Wirral Council/Liverpool City Region Integrated Commissioning	1
7	Citrus Suite	2
8	Deepbridge Capital	1
9	eHealth Cluster	1
10	Mast Group	1
11	Liverpool City Region Local Enterprise Partnership	1
12	University of Liverpool	1
13	Alder Hey Children Hospital	1
14	NHS Liverpool CCG	1
15	Northern Health Science Alliance Ltd	1

3.4.2 HELIUM builds on the earlier *Innovate Dementia* Interreg project that aimed to develop innovative, transferable dementia care models by exploring how technology and innovation can develop products and ways of living that can improve quality of life for people living with dementia and their families. It provides further opportunity to share transnational learning through good practices dedicated to health innovation. Specifically, it aims to create a large scale, accessible, attractive, connected and sustainable experimental landscape. The Living Lab approach (see section 4) is at the heart of this approach.

The Hartree Centre: Eco-System Partner and Driver for Big Data and Predictive Analytics

The Hartree Centre, located at Sci-Tech Daresbury, is a major asset and resource for Liverpool City Region's eco-system for health, care and well-being innovation. Its high performance computing, big data and cognitive technologies have the potential to transform outcomes and intelligence-led smart solutions for industry and the health and care sector.

Backed by over £170 million of government funding and significant strategic partnerships with organisations such as IBM and Atos, the Hartree Centre is home to some of the most technically advanced high performance computing, data analytics, machine learning technologies and experts in the UK. It works with early stage SMEs, international corporations, the research community and the NHS to address real life challenges and accelerate the adoption of high performance technologies that provide the opportunity to deliver transformative gains in performance, productivity and time to market.

4. INTERVENTIONS AND IMPLEMENTATION ACROSS THE INNOVATION CYCLE

4.1 The Innovation Cycle in Liverpool City Region

4.1.1 The Liverpool City Region EEPE introduced visiting delegates to a range of initiatives and interventions that are part of the milieu of approaches to scaling up smart solutions that can help to improve health, care and well-being in the city region, support the sustainability of the health and care sector and boost economic growth and the profitability of local SMEs. Some involved efforts to strengthen capacity and resources across the innovation cycle. Some offered support tailored to tackling the specific challenges of the health and care sector and of the City Region's profile. Others reflected interventions and products that have been developed and implemented within Liverpool City Region. Specifically, they relate to:

- Strengthening the innovation cycle
- Providing data infrastructure and services
- Tackling skills gaps
- Boosting innovation in secondary care
- Innovation in adult social care
- Promoting public procurement
- Scaling up telehealth
- Digital resources and awareness training for dementia
- Apps for health, care and well-being

4.2 Capacity Building and Implementation

Strengthening the Innovation Cycle: the Health Innovation Exchange

4.2.1 The Health Innovation Exchange (HIEx), with investment from the European Regional Development Fund (ERDF), is a key initiative for strengthening and building innovation cycle resources and capacity across Liverpool City Region. Fundamentally, it aims to address market failures and exploit opportunities for economic growth in the health, social care and innovation sector. It provides support for Liverpool City Region SMEs to develop and commercialise innovative products and services within sub-sectors where the city region is a market leader and has a smart specialization strategy (including assisted living, well-being, eHealth, children's health and some life sciences). It aims to boost development of supra-sectoral technologies, like

sensor technology and materials, and repurpose existing technologies through applying them to health and social care.

4.2.2 The HIEx incorporates SME support for invention, co-creation, real-world testing and specialised support for commercialising innovation. Specific services include:

- stimulating stakeholder collaboration and co-creation to enable SMEs to develop and test new innovative solutions;
- facilitating technology, creative and digital SME and micro-business access to the health and social care market – including support in overcoming technical obstacles to providing digital and eHealth services to the NHS (see section 4.2.4);
- facilitating care and support SMEs to gain access to technology, creative and digital industries;
- generating additional finance (for SMEs and Commissioners/Procurers) to accelerate implementation and market growth.

4.2.3 HIEx and HELIUM are exploring appetite and potential models for a Liverpool City Region Living Lab. One option on the table is a networked Liverpool City Region Living Lab. This approach could include fully exploiting existing Living Lab resources – such as the Alder Hey Innovation Centre (see section 4.2.7) - whilst further strengthening the Living Lab infrastructure across the City Region. In this way, city region organisations would be able to combine their fixed spaces for early-stage development and testing with further testing in real world settings, such as people's homes, community and primary and secondary care settings. This Liverpool City Region living lab network – along with improved processes – could open the opportunity for local SMEs, micro-businesses and Universities to be able to access and benefit from state of the art, co-creation and real-world testing resources.

4.2.4 Working with AIMES Grid Services Ltd (see section 4.2.6) the HIEx also aims to overcome some of the major technical obstacles to SMEs providing digital and eHealth services to the NHS. These obstacles are generally focussed around Information Governance and Technical Architecture. For instance, an organisation looking to process PID (Patient Identifiable Data) and interface with clinical and patient administration systems needs to adopt a model of Information Governance that provides unambiguous assurance that it is aware of how data should be managed and protected, and will comply fully with the data protection legislation and NHS governance and compliance

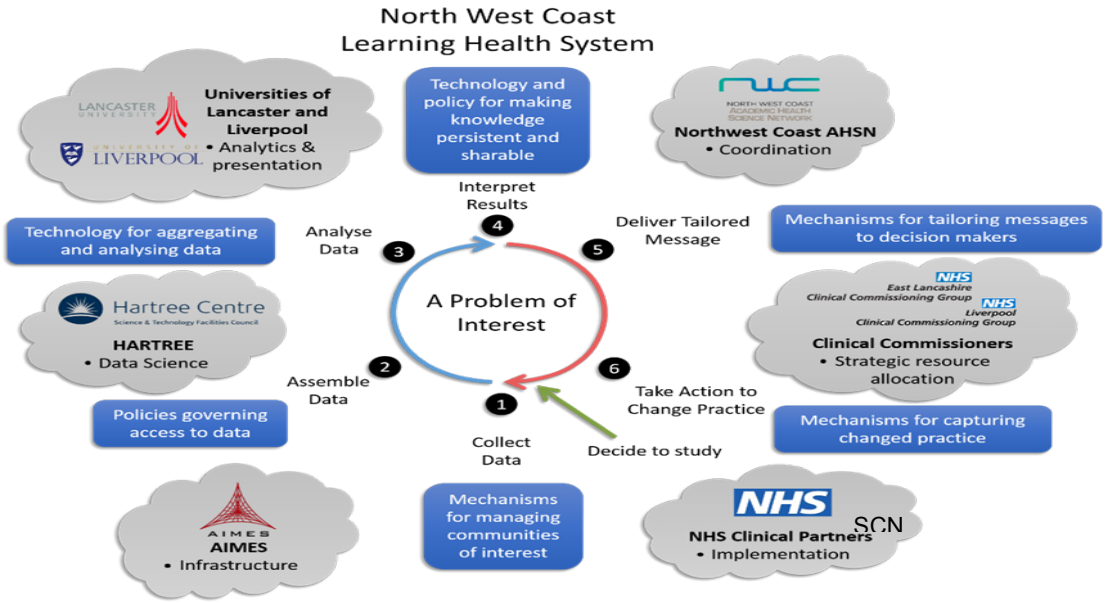
requirements.[4] Without such assurances, NHS Commissioners and procurers of digital services will not commission digital products and services.

4.2.5 Equally, environments that connect to or host patient identifiable and/or patient sensitive data must adhere to legal and operational standards for the processing of such data. In relation to the NHS England private network, known as N3, SMEs that are new to the healthcare market will generally lack the expertise and experience necessary to put an NHS IG Toolkit-compliant Information Management and Security system in place. Within the HIEx, AIMES Grid Services Ltd, delivers consultancy services to Liverpool City Region SMEs business to help them overcome these technical obstacles.

Providing Data Infrastructure and Services: AIMES CIC

4.2.6 AIMES CIC[5] is a Cloud Services Provider specialising in health informatics. AIMES provides secure, flexible and innovative cloud services for the NHS and the UK Health Informatics Community. AIMES's infrastructure and collaboration with the NHS provides secure hosting of NHS records whilst supporting the City Region's role as a leading UK region for digital health. As already observed, AIMES, as a partner in the HIEx is integral to efforts to generate economic development from the region's health economy.

Connected Health Cities Programme:



[4] Such as, the Data Protection Act 1998, NHS Information Governance Statement of Compliance (IGSoC), NHS Information Governance Code of Practice and local data sharing agreements

[5] A **community interest company** (**CIC**) is a type of company introduced by the UK government in 2005 under the Companies (Audit, Investigations and Community Enterprise) Act 2004, designed for social enterprises that want to use their profits and assets for the public good.

4.2.7 AIMES is also linking the city region with other parts of the UK, such as through the *Connected Health Cities Programme* that is promoting, through the integration of research and care, the concept of a "Learning Health System". It aims to strengthen, Liverpool's existing assets as a major centre for health research – including for personalised medicine, infectious diseases and pharmacology.

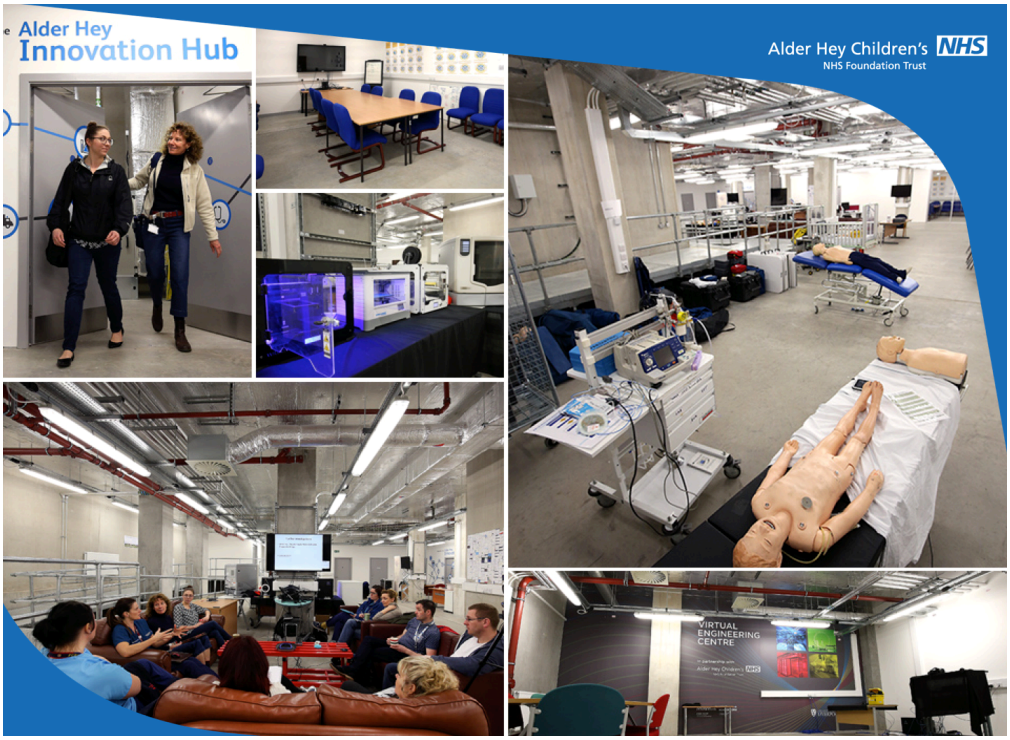
Tackling Skills Gaps: ALTAS

4.2.8 The difficulty in securing health and social care professionals' engagement to utilise, help people to use and accept the adoption of assistive living technologies is a key obstacle to supporting people to live independently. Partly, this is due to gaps in training opportunities for practitioners in assistive living technologies and the lack of a recognised qualification for competence in their suitability and use. As a result, awareness of what assistive living technologies are available, what they can do, when they are suitable, who could benefit from them and in what way remains low amongst front line health and care workers and their managers. Led by LCCG with partners from Spain, Denmark, Norway and elsewhere in the UK, the ALTAS *(Assisted Living Training and Skills)* project, funded by Erasmus +, is working to plug this gap. It is developing, testing and evaluating ALTAS standards, curriculum and courses (including an e-course) that can provide health and social care professionals with the knowledge, skills and confidence to use, deploy and recommend ALT devices, technologies and related services.

Boosting Innovation in Secondary Care: Alder Hey Children's Hospital Innovation Centre

4.2.9 The Alder Hey Innovation Service recruits and works with SMEs to deliver innovative solutions to secondary healthcare problems, and links them to large-scale producers to accelerate commercialisation. A cornerstone of the LCR Living Lab Infrastructure, the Hospital's Innovation Service operates from an Innovation Hub that provides a space for health care professionals, industry and academia to co-create, develop and drive the best of new technology into healthcare.

4.2.10 It works with key technologies including Artificial Intelligence, Sensors and Virtual Reality. It has access to state of the art equipment that allows the modelling of certain clinical conditions either physically or virtually along with specialist life science expertise that facilitates collaboration and co-creation of products that have far reaching application in the field of healthcare. A key enabler of its interaction with industry is its role as a partner in the ERDF funded HIEx programme.



Innovation in Adult Social Care

4.2.11 Increasing need along with financial constraints and service capacity and quality pressures is behind Liverpool City Council's proactive stance on driving innovation in adult social care. Its approach has prioritised embedding innovation in services. It has incorporated:

- bringing in different resources and approaches – such as Hackathons, and using systems design thinking;
- ring-fencing some budgets to pump-prime ideas that are clearly linked to a longer-term opportunity - such as, testing new ideas ahead of a forthcoming procurement;
- keeping some dedicated capacity to drive new ideas forward.

4.2.12 The development of an integrated telecare system between health and social care is an exemplar. Jointly funded by Liverpool City Council and LCCG, It enables GPs to prescribe falls detectors to their most vulnerable patients and social workers can assess if wider assistive technology may also be of value. In January 2017 – over 3000 people were receiving the service. Perceived benefits include increased proactive care, improved service user outcomes, improved pathways and enhanced management of demand. The Stop and Go project is providing further social care support to adults by introducing technology such as digital care plans and improved sensory monitoring into domiciliary care services (see section 4.2.13).

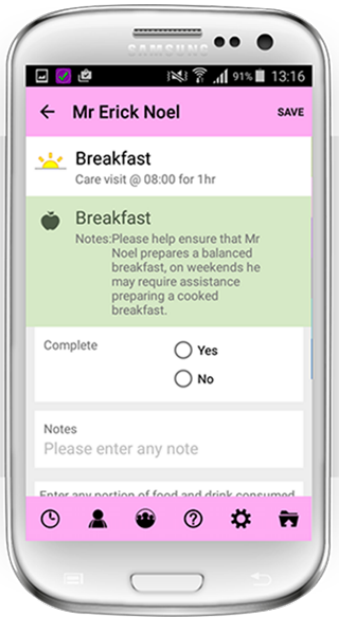
Promoting Public Procurement: STOP and GO

4.2.13 Stop and Go (*Sustainable Technology for Older People – Get Organised)* is an EU funded PPI (Public procurement of innovation) pilot project. Its focus is specifically on procuring services that are enabled by existing technology – not simply the procurement of innovative technology. Supporting the process of the public procurement of innovation, it aims to develop a common procurement template for health and social care for older people whilst encouraging technical innovation and interaction with other countries.

4.2.14 Within Liverpool, the domiciliary care market is ripe for improving efficiency and effectiveness with the support of technology. In this context, the City Council launched a tender process for a new *Help to Live at Home Service*. As part of the process, a market consultation day brought together 20 domiciliary care providers (who had little experience of working with technology) with 50 technology companies to open the door to them joining together to bid for the new services

4.2.15 Evaluating the tenders on the basis of the quality of service, chosen technologies included:

- **PASSsystem** that updates digital care records in real time: it utilises smart phone technology and enables carers to swipe a QR code on records when they arrive at the client's home for tasks and outcomes to be achieved and they update activities. Families are able to use an app to see in real time what activity has taken place and domiciliary care companies can see a "dash board" in real time if there are any outcomes outstanding.



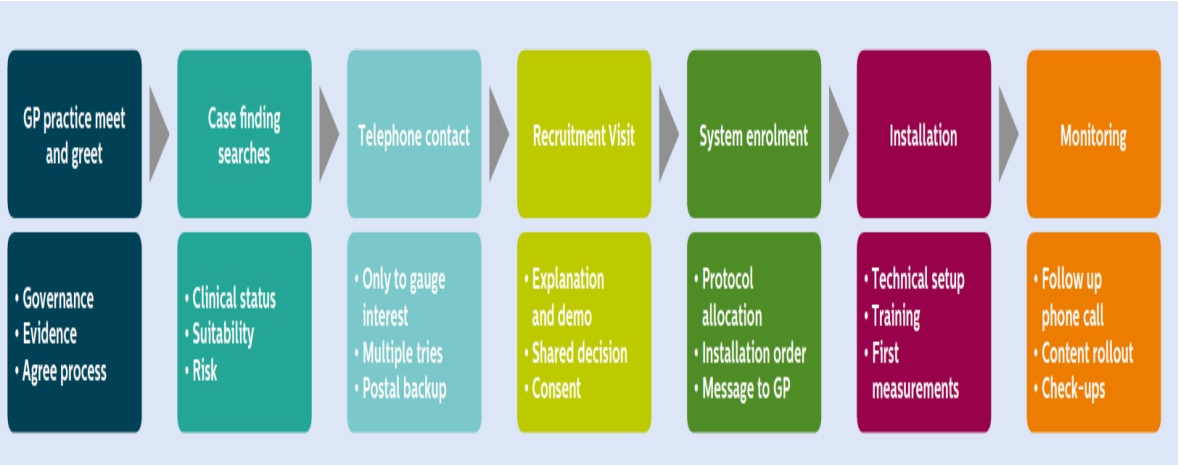
- **LoRaWAN** that uses IoT technology to monitor ambient circumstances of home and opens option for a new model of care.

Scaling up Telehealth

4.2.16 LCCG and Philips have developed community care based remote monitoring at scale. Through the service more than 5,000 people with long term conditions have already received support and self-care coaching.

4.2.17 A clinically staffed hub, that supports patients and their physicians using technology in peoples' homes, is central to the service. The hub is responsible for daily monitoring and case management and plays a crucial role in engaging stakeholders, recruiting patients and developing the service. Figure 2 illustrates the process.[6]

Figure 4.1: Clinical hub process engagement and recruitment process



4.2.18 Using Philips Motiva technology, the service assists in the management of long-term conditions including COPD, Chronic Heart Failure and diabetes. The objective is to empower patients to actively manage their disease state and change their behaviour by providing appropriate coaching and education. The patient interface consists of a tablet or TV set-top box that is wirelessly connected to scales, blood pressure cuffs and pulse oximeters. Patients also receive a schedule of videos, follow up questions and daily or weekly questionnaires. These check up on health parameters such as breathlessness, sputum production and medication compliance. There are also questionnaires issued at longer intervals (monthly or longer) to assess quality of life, mental health and engagement with self-management. The results of the vital sign measurements and questionnaires

Co-creation and user involvement

The **Business Design Team at Shropshire Council** have facilitated the co-creation approach to developing health and care services and service pathways that have incorporated technology solutions in Liverpool. They played a key role in the development of the telehealth service.

The team utilises insight research from various sources – such as surveys, patient stories and focus groups – to improve the quality of end users (professionals and citizens) experience.

[6] Van Berkel C, Smith M, Horsfield D and McManus H (2016), *Evidence for supported self care at scale: a population approach to evaluating technology enabled support for long term condition management,* Philips and NHS Liverpool CCG.

are processed through intervention rule-driven algorithms which set alerts and steer workflow. Agreed protocols define the measurement types, scheduling of questionnaires and videos and intervention rules. Protocols are customised according to disease type(s) and intervention level.

Evidence of impact and added value

By March 2016, there were 2,729 Motiva telehealth services users and a further 544 users of Flo. Analysis based on 1,064 patients, combined with self-reported survey returns of 870 users, showed:

- Impact on Primary Care providers: People with risk of admission of > 50% on telehealth have 0.55 (19%) less admissions per year than the control group (statistically significant (p=3%)). 60% of users self-report fewer visits to GPs and hospital and from Community Matrons.
- A high level of satisfaction with using Motiva:

Further *research (van Berkel et al, 2016 [see footnote 5])* matched a study cohort of 1,808 patients to a pseudonymised control cohort that mirrored the study cohort in recruitment date, disease, age, previous emergency admissions, future emergency admissions risk, deprivation and polypharmacy. Both cohorts were compared before and after the start of the programme. These comparisons were studied in detail in terms of emergency admission risk, length of time after the start of the programme (of each individual patient) and length of time on the programme. Results showed:

- 32% reductions in emergency admissions for those who have a risk score of >30% and who used the service for 6 months or more.
- Reduction in inpatient secondary care costs – e.g. there was a gross cost reduction of 23% amongst the intervention group for those with a risk score of >25% compared to the control group.
- Patient reported outcomes also show that 90% of patients feel more in control, have gained confidence and/or feel better able to cope with their condition.

4.2.19 One of the largest telehealth urban deployments in Europe, it continues to expand. Liverpool partners and Philips [7] developed a tailored *Motiva* teleheath system, alongside a *Florence (Flo)* simple telehealth service - a text message system that functions as a step-down from Motiva. Motiva. Flo currently targets people at risk of hypertension and monitors blood pressure levels.

[7] Since the EEPE, Docobo has taken on the telehealth supplier role from Philips.

Digital Resources and Awareness Training for Dementia: House of Memories

4.2.20 Developed by National Museums Liverpool (NML), House of Memories aims to provide dementia awareness knowledge and a greater understanding of how information about a person's history and life experience can be a valuable tool for positive communication to support people with dementia. It incorporates award winning, dementia awareness training for health, social care and housing providers, combined with a "suitcase of memories" and a digital memory resource app:

- A **Training Day** deploys drama interpretation and practical interactive experiences to introduce basic knowledge about various forms of dementia. It explores the challenges faced by families and of those diagnosed from early stage to progressive dementia.

- A **Suitcase of Memories** is a physical suitcase that contains objects, memorabilia and photographs. It encourages conversation and incorporates multi-sensory items to stimulate smell, hearing, movement and taste. Many themed suitcases have been developed including those that reflect people's different cultural, ethnic, and employment history. The Memory suitcase is a free loan service.

- The **My House of Memories app** is a digital memory resource for iPads and tablets. It was co-designed with people living with dementia and their carers as part of a living lab collaboration with Innovate Dementia. The first app, designed for users in Liverpool offers access to

Evidence of impact and added value

The programme has trained over 9,000 people in Liverpool and it has been "exported" iwidely. In the UK, NML has rolled out the training and new app content to 10 other cities. In the USA, NML has developed the *My House of Memories* app for Minnesota care-giver communities.

An evaluation of House of Memories design found:

- increased awareness and understanding of dementia, and confidence in trying new approaches to dementia care;
- skills development including listening, communication and empathy;
- improved knowledge, skills and access in relation to memory activities;
- appreciation of creative and interactive training approach, and of therelevance and value of museums in dementia care;
- increased awareness and confidence in using digital media and technology to support people living with dementia.

Evaluation also demonstrated a social return on investment of £44.68 for each £1 invested together with improved dementia awareness, care standards and professional development

content linked to Liverpool and of wider UK interest. It contains more than 100 object images, music, film and social history references from 1920 to 1980. It enables people to browse objects across the decades and is animated with music and film. The App can be personalised to save objects to people's own digital memory tree. It includes advice and information for family, health and social carers.

APPs for Health, Care and Well-Being: Exemplars from the Baltic Triangle

4.2.21 The Baltic Triangle area of Liverpool is home to a wide range of digital and creative SMEs that are part of a renaissance for the area's economy and built environment. They include SMEs that are providing a wide range of digital innovations for the health and care sector. In the Liverpool EEPE event, exemplars of newly developed apps included:

CATCH (developed by Damibu)

http://www.catchapp.co.uk/index.html

4.2.22 CATCH is a free health app aimed at parents and carers of children aged 0-5. Originally commissioned from a Liverpool-based SME by the NHS in Cheshire East. It aims to give parents or carers the confidence to know when a child needs medical treatment or when self-care would be more appropriate. As well as incorporating health service information, health advice and reminders – such as for vaccinations – it offers guidance about what to do in an emergency. As well as providing support to parents, its co-created designed aims to reduce pressure on local NHS services and unnecessary A&E attendances.

CHILLI PANDA (developed by Onteca)

https://play.google.com/store/apps/details?id=com.onteca.panda&hl=en_GB

4.2.23 Chilli Panda is an app that allows children and adults to start to understand how their bodies respond to different feelings. The app can measure heart rate, uses a simple scale to rate feelings, and incorporates play based activities demonstrated by a panda avatar. It has a mental health focus that aims to enhance self-regulation of emotions by introducing ideas and skills that could help children and families understand the relationship between their feelings, body sensations and different activities.

5. PEER EVALUATION PROCESS, FEEDBACK AND RECOMMENDATIONS

5.1 Peer Evaluation Process

5.1.1 The Liverpool City Region EEPE event involved diverse stakeholders from across the City Region's eco-system. It showcased the strategic and policy context, the shape of the eco-system and the range of interventions and innovations across, and to strengthen, the regional innovation cycle for health, care and well-being. This final section of the case study discusses the findings from the exchange of experience and peer evaluation process and sets out recommendations, for Liverpool City Region (and particularly the regional ITHACA Stakeholder Group) and for the wider ITHACA partnership, that derive from them.

5.1.2 Visiting delegates to the Liverpool City Region EEPE acted as an 'evaluation and feedback team" who observed and provided structured feedback to the hosts about what they saw and learnt at the EEPE. This was delivered at two stages. Firstly, during a verbal peer evaluation feedback session in the final afternoon of the EEPE and, subsequently, in written reports.

5.1.2 Visiting delegates were asked to provide feedback on one of five themes. All themes were covered by the overall delegation. The key themes were:

- Policies, priorities, objectives and aims
- Eco-systems and clusters
- Implementation across the innovation cycle
- Innovation in policy and practice, dissemination and transferability
- Evaluation and impact

5.1.3 For each theme, delegates peer evaluation reviews focused on:

- What the host region has done;
- Strengths, areas for improvement and gaps;
- Good practices - and potential for transferability;
- Lessons learnt and their implications;
- Recommendations for the host region;
- Recommendations for other ITHACA regions.

5.1.4 The final sections of this case study summarise the key comments provided by the delegation. It is structured according to evaluation theme.

Recommendations flowing from the peer evaluation - and the EEPE event overall - are flagged up.

5.2 Peer Evaluation Feedback and Recommendations

Policies, priorities, objectives and aims

5.2.1 Delegates highlighted that Liverpool City Region is a good example of how political decision makers and other stakeholders can prepare a comprehensive plan for improving the well-being and health of the population. The expert peer evaluation concluded that it is a useful exemplar for other regions and cities in the EU. In particular, it was argued that, as in Liverpool City Region, a substantial shift in practice should start with well-prepared strategic documents that have clear and verifiable objectives and are shaped by a consensus amongst various stakeholders.

5.2.2 The peer evaluation highlighted that Liverpool City Region's strategic approach was enhanced by its emphasis on:

- shifting from an "illness centred" to a "health centred" approach;
- reducing health inequalities;
- integrating health and care;
- the health and care sector being a driver for economic growth;
- setting clearly defined outcomes;
- continuous progress assessment that builds in learning when things do not achieve desired goals.

5.2.3 Delegates also pointed out the importance of ensuring that, to maximise potential, smart health and care services and solutions should reach all parts of the City Region and involve end users in the process.

Recommendations for Liverpool City Region

It is recommended that:

- future smart specialisation strategies for Liverpool City Region **continue to recognise the economic growth potential of innovation in health, care and well-bein**g and build on growing assets and experience;
- efforts are further strengthened to **spread policy implementation across the whole of the city region –** in the process**,** driving improved pathway consistency and exploiting the benefits of economies of scale;
- the Liverpool City Region stakeholder group ensures that **learning from all ITHACA EEPEs and other events is taken into account in shaping future strategies and policies** at city region, sectoral and organisational levels.

Recommendations for ITHACA partners

It is recommended that:

- the **good practice lessons** from Liverpool City Region relating to strategy and policy feed into the shaping of the ITHACA Framework Strategy;
- ITHACA partner regions **recognise the potential of a strategic framework for scaling up smart solutions for health, care and well-being** – and the importance of alignment with sectoral and stakeholder strategic priorities – that together can demonstrate and secure political leadership and ownership of the agenda by key stakeholders and drive demand.

Eco-systems and clusters

5.2.4 Delegates approved of the high level of active integration amongst numerous actors across the ecosystem in Liverpool City Region – including the role played by the eHealth cluster in bringing different types of stakeholders together. In particular, peer evaluation flagged up the positive effects on innovation and scaling up of smart solutions that flow from:

- a productive and open innovation culture supported by a "vast and active web of relevant ecosystem participants";
- the implementation of several "well defined projects that have sustainable financing" that results in high quality services;
- efforts to "brand" the city region – for marketing purposes and in efforts to develop a Liverpool City Region Living Lab Network - in a way that can create a cohesive identity that is supportive of driving innovation in health and care;
- active participation of diverse stakeholders (including doctors, post-docs, nurses, and patients), as demonstrated within Alder Hey Children's Hospital's approach to innovation, that was underpinned by its Living Lab innovation centre resource.

5.2.5 The peer evaluation also revealed several areas of potential improvement that, delegates argued, could enhance the strength of the City Region's eco-system and its impact on the innovation cycle. Despite the important role played by the eHealth cluster, it was argued that "a more systematic approach and visible overview of ecosystem actors" could generate more inter-sectoral interventions and enhance innovation and its deployment within the home care field. Equally, delegates also highlighted that whilst there were examples of academic, research and end user involvement within the city region, greater integration with Universities and end users across the innovation cycle could further enhance impact and outcomes. Generally, it

was argued that a more structured and systematic integration of quadruple helix stakeholders could increase innovation, service and economic potential.

5.2.6 Other specific proposals for enhancing the eco-system and support for its stakeholders included:

- building synergy with other hi-tech sectors or clusters;
- enhancing access to finance that supports SMEs from non-NHS sources;
- building human resources by improving training of front-line staff such as home care workers;
- strengthening services for internationalising health cluster member activities – both in terms of international collaboration and for access to new markets.

Recommendations for Liverpool City Region

It is recommended that:

- awareness of and collaborative **co-ordination between the LCR Innovation Board, the eHealth Cluster and HELIUM eco-systems** are maintained and strengthened;
- options for further developing a **structured and systematic integration of quadruple helix stakeholders** – including, possibly, those from other hi-tech sectors - are examined;
- the eco-system would be strengthened by **formalising relationships between the universities and other quadruple helix stakeholders** with the purpose of simplifying academic access to health and care practice and industry;
- ideas to **develop a "branded" Liverpool City Region Living Lab network** are explored.

Recommendations for ITHACA partners

It is recommended that ITHACA partner regions:

- explore the potential, within their own regional contexts, of **establishing regional Living Lab networks** that bring together innovation spaces with real world testing and deployment settings;
- begin the process of scoping the potential for **developing trans-national living labs with Liverpool City Region and each other** – to facilitate creating trans-national markets and scaling up across regional and national borders.

Implementation across the innovation cycle

5.2.7 Based on the evidence from the EEPE event, delegates identified their understanding of the resources available and the approach taken in Liverpool City Region to support SMEs and other stakeholders across the innovation cycle. They highlighted the value of living lab resources – such as the Alder Hey Innovation Centre, the role of the Health Innovation Exchange and the support available to SMEs, for instance from AIMES, to access the health and care sector.

5.2.8 Delegates identified several strengths in driving the innovation cycle including the NHS role as a de facto "accelerator" that (a) as the lead for the Health Innovation Exchange, supports SMEs at different stages of the innovation cycle; (b) facilitates scaling up by procuring smart solutions and by working with providers to integrate smart solutions into service pathways and (c) enables Alder Hey Children's Hospital to demonstrate the feasibility of generating, testing and accelerating innovation as an integral part of a hospital's function.

5.2.9 Delegates also flagged up potential areas for improvement. They indicated that:

- an emphasis on innovation within the local NHS could squeeze out support for companies to develop consumer products and services and to export their smart solutions to other areas and countries – though it was also pointed out that innovation is driven by a range of consortia and, consequently, "the region does not depend on single projects or activity by regional authorities (alone)";
- training for professionals was not yet systematically built into professional development opportunities – though it was recognised that the ALTAS project's focus on curriculum and training course development should help to bridge this gap;
- challenges remain to move some early stage innovations from the research stage and to the implementation and market ready stage;
- capacity to support bottom up, citizen and patient led innovations could be strengthened;
- resource constraints within the NHS could jeopardise its role as a catalyst for innovation that can benefit citizens and the health and care sector.

Recommendations for Liverpool City Region

It is recommended that:

- the HIEx, and City Region stakeholders generally, **reinforce their commitment to citizen involvement in innovation** for the health and care sector and, in particular, build co-creation into the design phase of creating smart solutions and so avoid risks of stigmatising of products that can result in them being unattractive to and unwanted by citizen end users;
- the HIEx and stakeholders should also ensure **that businesses benefit from input from health and care practitioners** when developing new health, care and well-being products and services;
- stakeholders review the extent and effectiveness of **support to SMEs to commercialise and export** new innovations;
- the **ALTAS training course**, once developed, is utilised within the City Region and made available nationally and internationally;
- given resource constraints in the NHS, stakeholders should **place increased importance on building self-care principles** into service and practice models.

Recommendations for ITHACA partners

It is recommended that:

- ITHACA regions examine the extent, and identify any blockages to, their **own health and care organisations acting as a catalyst and driver** for innovation.

Innovation in policy and practice, dissemination and transferability

5.2.10 This theme provided the opportunity for peer evaluators to highlight the most innovative aspects of the host region's policy, programme, projects and solutions – as well as their specific elements (such as processes or techniques) that are important for successful outcomes. It also focused on the extent of, and peer evaluators' judgement of the potential for meaningful dissemination and transferability to other regions and countries.

5.2.11 Delegates emphasised the importance of Liverpool City Region's clear and ambitious policy agenda, and its strategic framework, as a key driver for innovation and the scaling up of smart solutions for health, care and well-being. They considered that the explicit recognition of citizens' needs and the potential of smart solutions to contribute to meeting them whilst addressing efficiencies and effectiveness within the health and care sector is fundamental to progressing the strategic agenda. Investment in and

association with the Hartree Centre was also seen as indicative of the potential for taking advantage of digital innovation in the future. The potential for the technology sector to contribute to urban regeneration was seen as an innovative good practice of interest to other regions. By "recycling" old industrial areas and converting them to innovation hubs and incubators, it was asserted that Liverpool's Baltic Triangle illustrates the potential to enhance the built environment and reinvigorate local economies.

5.2.12 The peer evaluation also flagged up specific innovations that have important lessons for ITHACA and its partners. These included successes within Liverpool City Region in scaling up telecare and telehealth provision facilitated by progress towards integration of health and social care and enabling general practitioners to prescribe assistive technology and remote monitoring. These examples, as well as leading to implementation at scale, have incorporated elements of innovation and adaptation within existing service design and provide an ecosystem within which new innovations – such as sensors for ambient fall detection – could be tested and deployed. However, delegates also observed that more emphasis could be given to supporting SMEs, after initial testing of smart solutions, to secure private sources of finance and to gain traction in the market. It was suggested that bringing private companies into the innovation loop at an early stage could enable more consideration to be given to business models and the potential to exploit national and international markets.

Recommendations for Liverpool City Region

It is recommended that CIty Region stakeholders and the HIEx :

- **ensure that SMEs are supported to access private sector finance,** where required, for later stage development and market penetration of smart solutions;
- enhance **support for SME business planning and business models to incorporate exporting** to other regions and internationally.

Recommendations for ITHACA partners

It is recommended that:

- ITHACA partners **build in learning from the good innovation practices** in Liverpool City Region into its considerations **for shaping the ITHACA Framework Strategy and the subsequent Regional Action Plans**.

Evaluation and impact

5.2.13 Given the extensive range of initiatives being carried out in Liverpool City Region, peer evaluators felt that more investment should be made in evaluating impacts, lessons learnt and how findings can feed back into the policy process. Although evaluations of scaled up initiatives - such as for telehealth and *House of Memories* – have been carried out (see section 4), delegates argued that more extensive evaluation (at programme and intervention levels) along with more robust methods of feeding evaluation findings into future policy and activity would be beneficial. More generally, delegates argued that whilst high level indicators give a picture of how the health of the population is changing the impact of innovation in health and care on these indicators (for instance, on health inequalities) is less clear.

Recommendations for Liverpool City Region

It is recommended that:

- **where evaluations have been carried out, they are disseminated visibly and widely** to other regions so that learning about what works well or works less well is shared effectively;
- stakeholders should **consider increasing the resources available for evaluations of health, care and well-being programmes, specific interventions and new innovations** – particularly where such assessments could improve future actions and future policies;
- City Region policy makers should make certain that robust systems are in place to **ensure that evidence from good practices and lessons learnt will meaningfully inform existing and new, policies and practices**;
- Liverpool City Region **stakeholders look to learn from evidence of good practices and lessons - from other ITHACA regions and elsewhere** - to more rapidly progress its aims to scale up smart health and care solutions that can benefit the health and care sector, the regional economy and citizens.

Recommendations for ITHACA partners

It is recommended that:

- **ITHACA regions take account of the evaluation lessons from the Liverpool City Region EEPE** – both within their own regions and in shaping the ITHACA Framework Strategy.