

Health Tech
Report

Aspect

Exploring Collaborations Between Social Sciences Academia & The Health Tech Industry

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Executive Summary

1. Purpose

This report presents the results from a scoping exercise led by Aberystwyth University, funded by ASPECT. ASPECT provides specialist support for organisations looking to make the most of commercial and business opportunities from social sciences research. This piece of research aims to scope perceived opportunities, contributions, barriers, and facilitators of collaboration between social sciences researchers and the health tech industry. It has been carried out as part of a deep dive study to inform best practice for business engagement with the sector.

2. Recommendations

From the insights gained during this research project, we recommend the following to encourage and develop the environment for a successful collaboration:

1. Increase funding opportunities which encourage and/or require social sciences academia and health tech industry collaborations.
2. Drive up engagement between the health tech industry and social sciences academia.

For example:

- a. Match making or networking events, to enable better understanding of each other's skills, expectations and needs.
 - b. Virtual poster sessions with facilitated Q & A time with the innovator and/or project team.
 - c. Webinars sharing results of ongoing collaborations with opportunity for interaction.
3. Encouraging collaboration earlier in the product development process to gain maximum benefit from meaningful engagement.

Practically this could include:

- a. Raising awareness through continuing to develop, publish and share case studies through existing networks and groups such as; ASPECT, The Life Sciences Hub, The ABPI, BIA, MedTech Europe.

- b. Set up specific outlets by which to share these examples and testimonials, e.g. Via LinkedIn open groups that people could follow.
- c. Encourage a university / academic wide approach by providing some templates to easily gather feedback and document case studies after a project which would allow a uniform approach.
- d. Proactively follow up with industry / academic partners.

3. Introduction

This report explores benefits and barriers affecting collaborations between social sciences academics and the health tech industry. The research data was collected via a small-scale online survey and 10 in-depth interviews¹.

The small-scale online survey was conducted and disseminated to academics in the social sciences and individuals within the health tech sector. The survey consisted of open-ended questions investigating the perceptions of the role of social science within the health tech industry, barriers and facilitators to collaboration and specific collaborative experiences. It was disseminated using email and social media to the networks of ASPECT and Aberystwyth University. This included university partners, Welsh Government, and industry contacts.

The interviews were conducted by Gatehouse ICS, an independent healthcare research agency, with individuals who have been involved in collaborations between the health tech industry and social sciences academics. The interviewees were equally split; 5 individuals from academia and 5 from the health tech industry or implementation organisations (such as the NHS). The interview discussion guide was composed of open-ended questions with probes to facilitate natural discussions about the collaboration, focusing on barriers, benefits, learnings and recommendations.

From these interviews, we have created 5 case study exemplars of successful collaboration projects. Section 5 of this report looks in-depth at the benefits of collaborating with the health tech industry and with social sciences academia; barriers to be overcome; key components of a good collaboration; multi-partner collaborations; and, the impact of COVID-19.

1. Research ethics approvals were provided by Aberystwyth University's psychology department ethics committee [ref. number 19054]

The data from the survey responses and interviews have been analysed, the results and insights are presented in this report. Firstly, we will present the broad survey findings. Followed by the more in-depth interview insights, leading into the 5 case study exemplars. Concluding by drawing together the key findings from the survey and interviews. Recommendations from these conclusions are given in the executive summary in section 2, page 3.

4. Online Survey

Responses to the online survey include 5 individuals from a variety of different areas of social science including psychology, social work, business and ethics of science and technology, with 2 responses from the health tech industry including areas such as artificial intelligence, telemedicine, mobile health development and software development. The table below summarises participants responses around aspects of relevance, perceptions, and collaboration.

	Academia Respondents	Health-tech Respondents
Perceived relevance of social science research to the health tech industry	The view that social science has significant relevance for the health tech industry but that collaborations and knowledge exchange at different stages needs to be meaningful to be beneficial.	The view that social science has significant relevance at different stages including design, deployment and transferring technology from a market to an environmental context.
Perception of social science research or health tech industry of one another	Perceptions are mixed, with the overarching view that social science is perceived negatively, potentially rooted in comparisons between social science with harder sciences. On the other hand, recognition that this is dependent on different companies, and the relationship between the sectors is still new and developing.	Perceptions are mixed with views that the health tech industry needs to be more accommodating. View that social sciences perceive the health tech industry as academically dull, focused more on practicalities and bound by regulatory and commercial pressures.
Available methods to identify partners for collaboration	Methods for identifying partners include predominately business development officers within universities and word of mouth.	Methods for identifying partners focus on private networks developed by team project members alongside different organisations and initiatives that drove cross discipline collaboration (e.g., Swansea University's Life Sciences Hub).
Key challenges for collaboration	Lack of understanding of each other's needs, to include; differing values and expectations, methodological approaches, timescales of work/research. Lack of opportunities for cross discipline events to network and collaborate. Lack of appropriate funding for technology- based projects or to enable access to products/licences for research.	Lack of funds for new start-ups seeking collaboration to commission / fund research. Differing views about the need for commercial success for impact.
Key benefits of collaboration	Opportunities for industry to benefit from insights during all stages of the process. Industry gain the opportunity to improve products making them more commercially viable.	Providing credibility/legitimacy for products. Access to new perspectives, insights, skills and research resources otherwise unavailable. Opportunity for external support and promotion through academic contacts.

4.1 Insights from the survey

The aim of the survey was to generate broad views of the sectors in question. Unfortunately, the survey returns were lower than anticipated given the limited time scales of the research and as such are not necessarily generalisable to the wider sector. However, the challenges of recruitment echo the sentiments of participants, that identifying and reaching suitable collaborative partners is a key challenge in this sector.

There was agreement that social science research has a valuable role to play in the health tech industry. This was recognised to be from early product design and development, through to user engagement and evaluation. Interestingly, little discussion was had about the potential benefits that collaborating with health tech industry offered social science in the form of opportunities for theoretical application and research impact and may warrant further promotion.

However, each party felt that their own discipline was viewed negatively, either being considered less scientifically rigorous (social science view) or academically dull and money focused (industry view). This likely stemmed from the lack of networking events or platforms where individuals could identify partners, explore the opportunities for collaboration and develop a better understanding of each other's skills and needs.

Sourcing collaborative opportunities was seen to be particularly challenging for small companies or new start-ups where research budgets were unavailable. Academics also voiced concerns that limited funding streams existed to support engagement with this type of research.

5. In-depth insights from the interviews

The following themes and insights have been collated from the 10 interviews, which focused on the individual's experience(s) of collaborations between the health tech industry and social sciences academia. These collaborations often included partners from other sectors, such as the NHS, third sector, local government and other academic disciplines. Therefore, many of these themes can be viewed more widely as benefits, barriers and key components for multi-partner collaborations.

The points below are paraphrased and/or summarised insights from responses given in the interviews. Direct

quotes have been presented in anonymous "quoted italics" to further expand and add detail, we have indicated whether the quote was from a social sciences academic by (academia) or an industry or implementing partner by (non-academia).

5.1 Benefits of collaborating with the health tech industry

5.1.1 Increasing accessibility to academic research

- Technology provides an opportunity for academically proven results to reach the general public and gets the research out into the real world, beyond the walls of academia. For example, enabling interventions to be delivered through a method which is regularly used in daily life – e.g a mobile phone App.

"Normalisation and accessibility are key in successful interventions." (academia)

- Technology provides live feedback possibilities, which can support quicker and easier collection of evidence in academic research projects / trials.

5.1.2 Increasing opportunities for collaborations

- The health tech industry is evolving, approximately 3-4 years ago there were a number of big players, now there are a lot of very specialist health tech providers. Increasing the number of potential collaborations of value to all partners.
- There is an increasing pressure for commercial health tech companies to prove that they support and develop innovations which have a long term aim to meet the needs of the population.
- A large volume of the population is already open and willing to use Technology Enabled Care (TEC). This increases the opportunities for academic research collaborations and development of evidence-based TEC which will deliver a measurable difference in people's lives.

5.2 Benefits of collaborating with social sciences academia

5.2.1 Deliver independent credible analysis

- Analysis conducted by an academic team ensures that the objective of the outcomes are independent and not commercially linked or focussed.
- Provides data to support outcomes and deliverables of the technology.

"Evaluation is everything and too much of what is done in the world is not evaluated properly therefore it isn't improved as much as it could be." (non-academia)

5.2.2 Access to university network

- Provides and expands access to multi- / inter-disciplinary teams.
- Provides access to independent specialists and generalists, who are able to have open conversations and give honest feedback, willing to say "x needs changing".
- Provides access to networking events and opportunities with the wider university network.

"Smaller universities tend to be easier to work with because they are small enough to work efficiently and effectively across departments because they recognise that it's in everyone's interest." (non-academia)

5.2.3 Opens up access to wider patient / user population

- Academics often have an existing pathway to patients and end users, either through direct partnerships with University Hospitals or previous clinical studies conducted.
- Sometimes health tech development can occur in silo, disconnected from patient / user needs. Collaboration with academia can bridge the gap and connect developers to potential users.

"Academia can help to see if there's appetite for your chosen population and can really help gather and analyse user experiences." (academia)

5.3 Barriers to be overcome

5.3.1 Challenge of managing mutual expectations

- The definition of success of a project can be very different from an industry and an academic perspective. It can be a challenge to reach an agreed set of priorities between researchers and health tech companies, who can have different perceptions.
- There tends to be diverse and varied organisational strategy and vision across different commercial and academic organisations. Therefore, it is common to have differing visions and goals for a collaboration project, which can cause a barrier if they are not clearly defined and communicated early in the partnership. A key component to navigate this potential barrier is agreeing up a shared vision and strategic alignment.
- Robust research takes a long time. Globally, across industry and academia, there are frustrations and limits to collaborations due to the time it takes for research to be put into action.
- There is often a lack of understanding of the time required to fix a problem / develop a new iteration of technology innovations.
- There are always unexpected hurdles and barriers.

"You don't know what you don't know." (non-academia)

5.3.2 Politics, protocol and governance

- Inter-organisational relationships can be complex and political, whether in industry or academia, and there may be various levels of sign off, people to convince of the value of such a collaboration.
- Internal organisational process, governance and finance are often complex and can cause delays, or indeed prevent a collaboration proceeding, if they are not clearly communicated or understood fully by key partners in the collaboration.

- For scale up there is a requirement for enough flexibility within the technology and/or system to adapt to the different protocols, existing pathways and services across different hospitals / regions / healthcare systems / universities. This represents many potential pitfalls, delays and barriers to delivery of a successful project and adds to the issues of funding (by increasing start-up costs), evaluation of value (see funding, 3.3.5), inequity of care, and requirement for sign off at various levels.

5.3.3 Individual personalities and skills

- Without the right combination of individuals with the right skills and traits to fulfil the various roles needed for the project to succeed, there can be major issues.

“As with any collaboration, the meld of personalities can make or break a project.” (academia)

5.3.4 Miscommunication between partners in the collaboration

- Lack of clearly defined communication channel(s) and no aligned communication pathway in universities or health boards leads to miscommunications & stepping on toes.
- Lack of clear communication within the departments responsible for process, governance, and finance. This is perceived to be especially true in larger organisations such as universities and health boards.

5.3.5 Restrictions and limitations on funding

- There is an issue around ownership in multi-partner collaborations: who is responsible for evaluations and getting academia involved? Where/Who does the funding come from?
- There is an assumption that a commercial profit-making project doesn't necessarily require high quality research to meet the certification requirements for sales. Therefore, it can be hard to see the need for a collaboration with academia.

5.3.6 Inconsistent language defining social sciences field

- Lack of standardised titles in social science academia leads to uncertainties around which speciality within the field is the right fit for potential collaborations. This tends to lead to health tech industry and implementing organisations having to rely on word-of-mouth and existing relationships to network effectively.

“A friend's post-doc's flatmate was in the tech industry, so we reached out for an informal discussion.” (academia)

5.4 Key components of a good collaboration

Despite the variations between the types of projects discussed, and statements such as: “no one thing makes a collaboration successful” (non-academia), the following 3 components were highlighted across all the interviews as important factor contributing to the success of the collaboration.

5.4.1 Good communication

- Communication style and technique enhances collaboration projects, the following aspects were highlighted:
 - i. Clear, regular communication
 - ii. Joint problem solving
 - iii. Good sense of humour

5.4.2 Agreement on expectations and common motivation

- Co-production of something “good” with complete buy-in from both/all sides.
- Agreement and focus on the collaboration being essential to meet mutual need.
- Ensure everyone in the collaboration is on the same page with their expectations and have clear, realistic lead times at start of contract.

5.4.3 Proactive investment in the relationship(s)

- Mutual respect, trust and reliance on each other's expertise and belief everyone is trying to do the best they can.
- Team cohesiveness and everyone genuinely feeling that they are part of the same team.
- Every project discussed in the interviews incorporated a word-of-mouth element of how the collaboration started.

"We're a close-knit community in Wales." (academia)

"We knew them." (academia)

- Proactive investment in building a strong, long term relationship between collaboration partners.

"Relationships, it all comes down to relationships." (non-academia)

5.5 Multi-Partner Collaborations

Most health tech industry and social sciences academia collaborations involved one or more other partners, most commonly an implementing partners such as the NHS, local authority, third sector or private care providing organisation. This creates additional benefits and barriers, some examples of which are outlined below.

5.5.1 Risk adverse organisations limiting opportunities for collaboration

- Innovation does not come without costs and risks, which can lead to low uptake of innovative technology in historically risk adverse public services (such as the NHS and local authority social care). Consequently, this limits the opportunities and demand for collaborations between health tech industry and academia.

"...but this is needed to give public services better tools – public services have put up with mediocracy for too long." (non-academia)

- Similarly, Technology Enabled Care (TEC) is not a statutory requirement in social care – therefore use of it is an individual decision for each local authority, which equates to a lot of decisions makers across the

country and has the potential to lead to inequity of care.

5.5.2 Need to prove value-added, increasing opportunities for collaboration

- Prevention is difficult to prove value / evaluate – especially in instances where the prevention technology is paid for out of a different budget than the cost of care it is preventing – i.e. local government social care cost Vs NHS health board cost. Social science academics in partnership with their clinical peers are best placed to lead this type of analysis and evaluation.
- Add in that the technologies implemented often have an economy of scale which is hard to accurately capture during a small-scale pilot project.
- How do you choose what "savings" to measure if you've stopped the deterioration of the individual such that they don't even come into contact with the health services?

5.5.3 Advocates for change and innovation within implementing organisations are key to success

- A key supporter to champion for technology uptake within the NHS / third sector / local authority, are individuals who are willing, able, and capable to test, use and promote the use of specific technology.

5.6 Impact of the COVID-19 pandemic

Despite it not being explicitly included in the interview discussion guide, during each interview there was reference to and examples shared of the impact of COVID-19 on these type of collaborations. On the whole, the consequences of the pandemic and response to it have led to reduction in a number of barriers outlined in the above section. Including the following:

- Due to the increased immediate need for care to be delivered out of clinical settings led to increased use of technology to deliver and support health care at home,

there has been an increase in funding availability for collaborations.

- In 3 of our 5 case studies, implementation of the technology was sped up due to COVID specific funding opportunities.
- Increased willingness of people across the spectrum, from clinical health care staff to general public, to utilise technology in every aspect of life, including health care.
- COVID regulations and limitations on face-to-face interactions, forced health care provision to utilise TEC, which has opened doors for TEC providers to have productive discussions with the NHS. This in turn has the potential to increase opportunities for collaborations with academia as the NHS tend to require evaluation of innovations by a third party, independent partner with rigours, robust methodology and standards.

"It's taken a pandemic for the NHS to fully realise that mobile phones are useful in supporting healthcare." (non-academia)

5.7 Timing for initiation of collaborations

The interviewees were asked what they thought was the right point in the development process of a health tech for a collaboration with academia. The answers are captured in the following 3 quotes:

"As soon as possible" (non-academia, echoed by academia)

"Co-production of the technology is the way to go." (academia)

"Early conversations lead to contributions at the right time. It's difficult to backtrack once development has begun." (academia)

However, there was a caveat that collaborations with social sciences academics are still beneficial post development of the technology because they enable improvements in the implementation and/or development of future iterations of the technology.

"Even when something is fully developed, social science is interested in how something functions in the real world and how the patients feel when using it." (academia)

6. Case Studies

From the interviews we have created the following 5 case study exemplars of successful collaboration projects exploring factors contributing to their success and barriers they navigated.

These case studies are varied and diverse on all fronts, from the nature of the partner organisations to duration of project to size and scope of project. These varied examples were chosen to demonstrate that there are lots of opportunities for collaborations of different nature between social sciences academia and the health tech industry. There is no one size fits all or clear-cut model to be followed, which can be viewed as both an opportunity and barrier to new collaborations.

The lack of clear-cut model to replicate is especially apparent when considering the diversity of how the collaborations were initiated:

1. PocketMedic – A mutual contact in the NHS, who had previously worked with both partners, facilitated an introduction between the social sciences academic and health tech industry.
2. BabyMind App – The social sciences academic reached out informally to a friend-of-a-friend in the tech industry to discuss feasibility of her idea.
3. COVID-19 Diagnostic – A funding opportunity led to a multi-partner team being formed based on the existing network of the academic leads.
4. TiM on MyPathway – The academic team had an existing tech product they wanted to be developed further and reached out into the health tech industry to an organisation with an existing product that had synergies.
5. Delta Wellbeing CONNECT – A multi-partner non-academic collaboration with growing number of interlinking projects, each offering unique opportunities for different social sciences academic collaborations to evaluate the tech services offered. The academic involvement has been initiated from pre-existing relationships between the university (or university department) and the non-academic partner organisation.

5.3.1 Pocket Medic – COPD

Collaborators

Academic: Health Psychology Researcher– Liam Knox, Aberystwyth University

Health tech Company: PocketMedic, Kimberley Littlemore
– Creative Director

NHS: Professor Keir Lewis at Hywel Dda University Health Board (HDUHB)

Background

PocketMedic started in 2014 as a small group of broadcast professionals with ambitions to make films to support people to better manage their chronic conditions. Hywel Dda University Health Board (HDUHB) approached PocketMedic to help with the challenge of communicating with people with type 2 diabetes who were not attending their patient education courses. HDUHB serves a large geographical area including many rural constituents and communities. Many people in these communities face difficulties with poor local transport links and, for many, there are substantial distances to travel to attend courses teaching.

PocketMedic created 10 films covering various aspects of managing type 2 diabetes and evaluated them through the Diabetes Research Unit in Swansea University. The findings were published in *Primary Care Diabetes*¹; people who watched the films had measurable improvements in their diabetes control and the more films people watched, the greater the improvement that was observed in their condition over a 3-month period. It started with educating about diabetes, and now there are just over 100 films covering 10–12 different conditions.

In 2014, at the start of this project, PocketMedic had academic evidence to support the effectiveness of the diabetes films but had not yet had the opportunity to replicate that research for the other conditions. Respiratory conditions were of particular interest to Consultant Professor Keir Lewis in HDUHB who wanted to find a solution to communicate with people with Chronic Obstructive Pulmonary Disease (COPD) and motivate them to better manage their respiratory conditions. In this group, the afore mentioned travel difficulties are compounded by people needing to also travel to receive

supporting pulmonary rehabilitation and the fact that mobility may be hampered by the underlying medical condition.

Through a collaboration facilitated by Professor Lewis, PocketMedic teamed up with an Aberystwyth University PhD student, Liam Knox. This enabled PocketMedic to evaluate the digital films, and Liam to use the data for his PhD thesis.

The Project

PocketMedic develop the content of their films based on existing robust academic research in Self-Determination Theory, which proposes that motivation and behaviour change occurs through 3 components: Autonomy, Competence, and Relatedness. The PocketMedic directors are strong advocates for the importance of independent evaluations to ensure their films are delivering the results they hope for and are open to honest feedback to help them continually improve their content. For this reason, they actively pursue and develop relationships with academics early in the development of new content.

Liam had an interest in Self-Determination Theory and was keen to examine whether digital media could motivate people to self-manage more effectively and compare face-to-face learning with learning via films delivered on mobile devices. PocketMedic had ideas for two research projects, a clinical trial with about 50 people and a qualitative interview arm of 7 people, and Liam added on a third research project, with 72 participants, to form his thesis (PhD's traditionally consist of 3 separate but related studies).

PocketMedic held the IP for the films which were already professionally developed and ready for use at the start of this project and they both had equal rights to the data from the research.

Success

From the start of the collaboration there was a proactive investment in the relationship from both parties who were interested to explore the tenets of self-determination theory in the context of whether the PocketMedic films could motivate people to make changes in their behaviour: Autonomy (they can do things based upon their own volition), Competence (they feel capable in

1: *A pilot service-evaluation examining change in HbA1c related to the prescription of internet-based education films for type 2 diabetes*. S. Rice, H. Cranch, K. Littlemore, J. Mortimer, J. Platts, J.W. Stephens. Published: March 10, 2017 DOI: <https://doi.org/10.1016/j.pcd.2017.02.002>

an activity), and Relatedness (they feel they're part of something).

Liam joined the project to evaluate the COPD films. Interviewing the study participants about what was driving them to make a change in behaviour. Exploring whether self-determination theory was useful for predicting motivation for people with COPD. The findings of his research were positive, showing that the PocketMedic COPD films "ticked all the boxes" for engaging, motivating, and encouraging behavioural change in those who viewed them.

The PocketMedic team was delighted with the findings which were a clear endorsement of what they were trying to do and saw a huge value in the results from an unbiased independent academic researcher. This research has not only supported the use of PocketMedic's COPD films but has also provided strong evidence for the wider roll out of PocketMedic's content to support the existing programme of pulmonary rehabilitation in partnership with the NHS across Wales. Liam's results and extracts from his research are being utilised to further PocketMedic's work in grant applications and pitches to potential buyers of the films.

Barriers

PocketMedic have potentially positioned themselves ahead of other health tech companies by developing their content based on psychological theory and principles, and by incorporating discussions and evaluation plans with academics early in the development of their content. Involvement of academia at the idea stage can help gauge patient appetite early-on, gather and analyse user experiences to shape and inform development. There is increasing opinion that academic input should be gained at the start, yet there are a number of barriers which prevent this being common practice. These include barriers such as grant application processes, lengthy research approval processes, and a willingness to act upon academic suggestions, all of which the PocketMedic team faced and overcame.

5.3.2 BabyMind App

Collaborators

Academic: Professor Elizabeth Meins, York University & Fionnuala Larkin (Postdoctoral researcher)

Health tech Company: Lee McLaughlin, IC Mobile

Funders: UK Research and Innovation (UKRI) Economic and Social Research Council (ESRC) Professorial Fellowship

Background

Over the last 20 years, Professor Elizabeth Meins, a developmental psychologist, has defined and led the research exploring "mind-mindedness" - a parent's ability to 'tune into' or 'read' their babies' thoughts and feelings. Research studies across the world found that early mind-mindedness is an important predictor of wide-ranging positive aspects of children's development. Given this positive impact, Professor Meins decided to investigate whether it was possible to use technology to intervene and teach parents how to become more mind-minded.

The Project

In 2013/14, Professor Meins applied for, and was awarded, an UK Research and Innovation (UKRI) Economic and Social Research Council (ESRC) professorial fellowship to explore how to implement the proven research and teach parents how to become more mind-minded. She discussed the feasibility and viability of using an app to implement the intervention with a friend-of-a-colleague, Lee, who was an app developer. They decided use of an app was worth trialling, due to the gradual increase in use of such tools as interventions for mental health and psychological disorders, despite it not yet being utilised for delivery of interventions in parenting.

At the time, parenting apps were being launched, but none had been trialled. Lee saw the ground-breaking potential of the project to develop evidence-based technology and "do good". Professor Meins and her Postdoctoral researcher, Fionnuala Larkin, wrote the content for the app based on the results of research on parents' mind-mindedness and things which had been demonstrated to help parents think more about their baby's experience/perspective. Lee developed the App, API and Dashboard software to meet the study design requirements that the team wanted to test. Over a period of 3 months, the original version was trialled and tested

by the academics, with issues/bugs fed back to Lee to fix and further develop the app software, prior to sharing with the trial participants.

This trial of the original version of the app was so successful that the team utilised the results to create a new version based on the trial results, which showed that the number of posts did not predict how mind-minded a parent was, rather it was whether they had the app and how much time per day they engaged with the app. These results enabled the removal of the resource heavy requirement for an academic to be actively responding to user's posts. The new version (BabyMind) includes automated daily alerts with snippets of information about babies' psychological development based on the baby's age and is now free to download on the app store.

Success

The success of this project was built upon good communication, clear division of roles and responsibilities, and complete trust between the collaborators. This ensured a willingness to rely on each other's expertise and give over control of the other's tasks.

Technology enabled the parenting intervention developed to be delivered in a manner which was easily integrated into everyday life, encouraging parents to post photos and videos of their baby with the addition of developmental psychology education. The app removes the stigma often associated with parenting interventions i.e. that they need to go somewhere and have their "bad parenting" corrected. Instead, with this delivery platform, the intervention has become normalised and made more accessible to a wider audience. Without collaboration with the tech industry, it would not have been possible to access and help parents at the scale the BabyMind app is currently reaching.

Anecdotaly:

A younger mother had her first baby taken into care. When she had her second baby, she was part of initial trial group with the BabyMind app and told her health visitor that the app had "completed transformed her life". After using the App, when she was assessed, the baby was taken off the child protection register.

In response to this anecdote, Professor Meins said: "That makes it all worthwhile - if we can just help one person be a more effective parent in really difficult circumstances. Just think, WOW, we've helped

someone in the real world change the trajectory of that child and that mother's life. Without it being easily accessible on a phone, I'm unsure this would have been possible, as for this mother to have got to a face-to-face intervention, things would have had to get much worse first. Instead, the technology enables us to catch people early, especially because it's easy and fun."

Barriers

The nature of the ESRC professorial fellowship funding, which had the overarching aim to translate academic research into ways to help parents in the real world, was an investment in Professor Meins as an individual. This overcame potential funding limitations / issues around fixed deliverables / targets, instead enabling the natural progression of developing iterations of the app based on the results and feedback from trial users, midwives, health visitors and other specialists. The funding encouraged collaboration with non-academic partners, which lead to strong relationships with health visitors, perinatal mental health services and mother-and-baby units, which further helped ensure the intervention was relevant and accessible to those who needed it most.

5.3.3 COVID Diagnostic

Collaborators

Academic: Dr Daniel Rees, Swansea University

NHS: Local University Health Board

Health tech Company: Onkolyze Ltd

Consultancy: A respiratory health advice and research consultancy

Funders: Welsh Government SER CYMRU III- Tackling COVID-19 Grant

Background

Discussions between academics from Swansea University (SU) and Onkolyze Ltd, a MedTech company, who provide data driven solutions for diagnostics & prognostics in oncology, were ongoing prior to the COVID-19 pandemic. The pandemic led Onkolyze Ltd to repurpose their existing technology, which uses artificial intelligence (AI) to extract features, images and data from CT scans / ultrasounds / x-rays, to identify signs of COVID-19 from lung ultrasounds.

The Project

With an ongoing positive relationship between SU and Onkolyze Ltd during this period of repurposing, Onkolyze Ltd was able to reach out to their main contact at SU, Daniel Rees, who then utilised the university's ecosystem and external network to build an interdisciplinary team. This strong team were selected due to their pre-requisite skills of having the experience to enable this agile innovation to implement an evaluation study on the NHS frontline.

The "dream team" for delivering this project comprised of individuals who came together with a desire to do the same thing and were known to each other through the "close-knit community" of Wales. The 9 members came from: Onkolyze Ltd; a multidisciplinary team from Swansea University (SU) including social scientists, clinical researchers, legal, ethical and financial specialists; clinical staff at the University Health Board; and a respiratory health advice and research consultancy.

Academics from across SU faculties (School of Management and Medical School) were multidisciplinary in their approach with appreciation and experience in Research, Development & Innovation (RD&I), technology acceptance models, technology & knowledge transfer and innovation management in the Life Sciences Sector. There were 2 leads to this project; for the clinical aspect, a boundary-spanning clinical academic who worked within the university health board and Swansea University. For Swansea University, Dr Daniel Rees, an academic experienced in development and execution of multi-disciplinary RD&I projects across Life Science Sector.

Success

A successful application for a Welsh Government COVID-19 specific grant supported a 6-month project to prove the diagnostic capability. Testing looked at AI detect signs of COVID-19 and accuracy to predict severity of infection from an ultrasound image of patient's lungs captured with a handheld ultrasound device. Onkolyze Ltd created an AI algorithm which was trained using 80% of the longitudinal ultrasound images captured from 80-90 patients on a COVID ward. The remaining 20% of the images were used to "test" the AI's diagnostic ability which found that it could identify COVID-19 and classify severity from the ultrasound images with >96% accuracy. In addition, the AI technology developed through this study was capable of grading 'severity' of COVID-19 based on morphological features identified in ultrasounds

images sweeps.

There were several reasons this collaboration worked so well. Firstly, the people, who had a shared vision with willingness to work together in an agile, responsive manner to deliver the project quickly. Secondly, the tight timeframe – from the wider external drive to develop something to improve diagnostics and prognostics of the new virus, to the funding requirements to implement the project, producing analysis and reporting of results in 6 months. Finally, clinical staff who were and are champions for the technology; willing and able to use and promote use of the innovative technology.

Barriers

A potential barrier, which was overcome by the responsive boundary-spanning project team members, was a clear and deep understanding of the governance, process and finance requirements across each organisation within the collaboration. This helped to navigate potential miscommunications within organisations by ensuring clearly defined responsibilities and aligned communication pathways to prevent too many people trying to handle internal processes, particularly within the large organisations. Achievement of this required a focused project manager to ensure each step of the various processes were happening smoothly.

5.3.4 TiM on MyPathway

Collaborators

Academic: Health Psychology Researcher – Liam Knox at the Sheffield Institute for Translational Neuroscience at the University of Sheffield (SITran)

Health tech Company: ADI – Advanced Digital Innovations in Health

Funders: MND Scotland – Motor Neuron Disease Scotland & SBRI – Small business Research Institute

Background

Telehealth in Motor Neuron Disease (TiM) on ADI's MyPathway mobile and desktop app, is a clinical management system and digital health communication platform. TiM on MyPathway supports the carers of, and people with Motor Neuron Disease (MND) in a variety of ways, including virtually/digitally connecting them to

specialist MND Centres and complimenting their existing care. TiM on MyPathway collects a holistic view of patient reported data via questionnaires and is a space where reliable information can be found to support patient self-management, remote monitoring and waiting list management.

Academics at SITraN developed the initial version of TiM and wanted to further the research and expand its use within the NHS. The collaboration between SITraN and ADI arose when the university researchers identified the need for a technology company to help develop a service for people with MND. ADI, a health consultancy specialising in digital healthcare solutions, already delivered remote early intervention and support services for musculoskeletal (MSK) conditions in the Sheffield area so were the obvious choice partner. ADI had an existing platform called MyPathway implemented in the NHS as a communications channel connecting patients to clinicians.

The Project

SITraN and ADI applied for and were awarded a grant from MND Scotland to support the collaboration to develop, implement, and evaluate the TiM on MyPathway App within NHS centres in Sheffield and Edinburgh.

The social science contribution to the project was health psychology research focussed, led by Liam Knox. The research firstly reviewed the implementation of the App (completed), and secondly, it is looking to evaluate the effectiveness of the App from the perspective of people with MND, carers and healthcare professionals (ongoing).

When the COVID-19 pandemic hit, the 6-month development period was accelerated to just 6 weeks due to COVID-19 causing the whole model of care to change. The original hope was to conduct a lot of user testing and release a finalised version of the App into the centres. Instead, a more basic version was released and changes were made iteratively.

Additionally, the “COVID-19 Pandemic Rapid Response” funding enabled other specialist MND centres and academics to join the project. Including an implementation project in Ireland, which was led and evaluated by Trinity College Dublin, where TiM on MyPathway is actively being used by 30 patients to provide a link between hospital and community-based services, plan their clinic visits to align to their relevant issues and enable ongoing communication

with specialist nurses. The findings from this study will feedback into future iterations of the App and inform localisation requirements for future roll out in Ireland.

Success

Evaluation of technical capability as well as functionality of the App are ongoing but overall, the collaboration is working very well and there was a perfect match of attitude amongst people who wanted to make it work. Regular communication between Liam and ADI, was helped by ADI’s willingness to have ad hoc meetings. MND Scotland, who are funding the development and research, has enabled the team space to make modifications to the initial proposal, with their help available when needed.

In terms of IP, it is split. ADI own the background IP of their MyPathway platform, which TiM is built and runs within. Whereas the MND-specific clinical expertise is owned by SITraN. As a collaboration, this means that ADI receive valuable feedback on how to develop and refine the platform without running the risk of using inappropriate content or questions for the clinical condition.

Team cohesiveness has played a vital role in this collaboration: “by making sure everyone genuinely feels part of the same team and believes that each party is trying to do the best they can.”

Barriers

The main barrier was resourcing and delivering the ambition of the project, with costs that were more than the funding available. The MND Scotland grant money was spent twice over, fortunately additional funding from SBRI and Innovate UK was received to do beta trials. ADI were committed to making it work, but as a company other demands and priorities are time-consuming. The aim is to sustain the project post-funding in 2022 and transition to being a commercially viable platform. ADI potentially could offer the tool to new centres near enough at cost price, so centres would only need to purchase a licence fee and ADI’s long-term commercial outlook may result in long-term benefits for patients.

Unforeseen delays were a challenge for the project team, difficulties in predicting how long technical issues would take to rectify were taxing when collaborating with somewhat inflexible NHS systems and schedules.

5.3.5 Delta Wellbeing CONNECT

Collaborators

NHS: Hywel Dda University Health Board (HDUHB)

Health tech Implementation Organization:

Delta Wellbeing

Health tech Company: Tunstall

Local Authority: Social Care Departments in Ceredigion, Carmarthenshire and Pembrokeshire County Councils

Academics: Aberystwyth University

Background

Delta Wellbeing were one of the recipients of the Welsh Government Transformation Fund¹, to implement and evaluate whether their CONNECT project could improve health and social care services. The Delta Wellbeing CONNECT project seeks to transform the way social care is delivered, implementing a new model of self-help and proactive care by offering flexible support packages, tailored towards an individual's specific needs, to improve wellbeing, helping people to stay independent for longer and reduce demands on long-term or acute health and social care. It utilises Technology Enabled Care (TEC), such as red button lifelines, fall detectors, GPS tracking devices, door sensors and medication dispensers.

CONNECT focuses on supporting prevention and wellbeing through a technological and digital approach providing a wrap-around service to clients which includes; Pro-active wellbeing calls, digital support and TEC packages, keyworker support, guidance & wellbeing plans and access to 24/7 Community Welfare Response.

Through the pro-active wellbeing calls Delta Wellbeing are able to check on the client's general wellbeing and identify any significant changes in their circumstance as well as identify possible triggers for crisis. The regular calls can focus on their wellbeing plan or can follow guided, specific questions from clinicians to identify patterns or trends linked to health conditions.

The 24/7 Response service is a non-medical emergency team to support with non-injurious falls, welfare support, non-response from sensor activations and many other non-medical requests for assistance. This service supports clients who do not have family/contacts, those where their contacts are unable to attend or where

medical intervention is not required to stop inappropriate requests for ambulance teams to be dispatched.

The NHS is under ever increasing pressures to improve care and support for patients with long term conditions, integrating TEC where possible to increase the ability to provide good quality care and support at home. The necessity to provide care out of the clinical setting increased exponentially with the COVID-19 pandemic. This has significantly contributed to an increased willingness to use technology to support independent living, home care, and replace clinical interventions when possible.

Technology Enabled Care (TEC) has changed a great deal in the last 5 to 10 years. From a reactive service being able to tell when something has happened to a client, to a true proactive service where trends and equipment algorithms can predict a down turn in a client's health. The use of TEC and sharing information gathered by TEC and other health and social care platforms, Delta Wellbeing should be able to keep clients safer at home, return client home at the earliest opportunity after a hospital and use the data to support a client before they enter an acute setting.

The Project

The transformation fund enabled Delta Wellbeing CONNECT to expand and become more proactive, not only responding to emergencies but utilising additional technology to support the changing needs of people living independently at home. This service became part of the Hywel Dda University Health Board (HDUHB) NHS digital portfolio, where social care meets health, with 5 key strands:

1. Monitor compliance – i.e. are patients completing their prescribed exercise / monitoring their glucose levels etc.
2. Monitor the frail elderly population with basic measurements (including gait, hydration, temperature) taken using technological tools, enabling proactive risk stratifying of the population.
3. End-of-life care – monitoring basic measurements to detect deterioration earlier and reduce admissions into A&E / clinical settings.
4. Supported discharge from hospital, with technology placed into the home to support rehabilitation and monitoring.

¹: The Welsh Government Transformation Fund aims to improve health and social care services by funding the additional costs associated with introducing new models of care, replacing and reconfiguring existing services.

5. Unlock the potential to proactively prevent hospital admissions by creating a framework to predict the patients at greatest risk of attending A&E in the imminent future.

Directors in HDUDB, including the Director of Finance, Huw Thomas, recognised the opportunity to monitor people's health and wellbeing through Delta Wellbeing's technology and decided to directly invest in a number of pilot projects to fully evaluate the potential. One of these pilot projects incorporates interventions which align with existing services for patients with COPD, focusing on encouraging and monitoring patient's ability to exercise effectively.

Success

All organisations involved in the collaboration are fully engaged and keen to develop TEC to support better health and social care, enabling individuals to remain living independently and out of hospital with good health, wellbeing and support.

The COPD pilot is running successfully so far, with all partners aligned. The location chosen for the pilot was a region of deprivation with an industrial past which has left a legacy of lung related issues, providing an opportunity for the TEC trial to make an impact. Additionally, there is support from a GP in the region who is keen to incorporate new technology to improve care.

To identify and choose the right technology for this pilot, and other TEC services, HDUHB and Delta Wellbeing are in an ongoing dialogue with the health tech company Tunstall. They are looking to understand what technology options are available, what it can be used for and determining which would be most effective in supporting various conditions.

The COPD pilot will be evaluated by health psychology academics from Aberystwyth University who have a depth of experience in researching interacting with technology effectively. HDUHB has collaboration agreements with universities located in the region, including Aberystwyth University, University of Wales Trinity St David, and Swansea University. These agreements are the legal backbone of the ongoing conversations and positive relationships between the NHS and academia in the region. This ongoing dialogue is essential for each side to better understand what the other does and over time get to a space where you know each other's strengths and weaknesses.

Barriers

Understandably the NHS need to prove cost effectiveness to widen implementation of any new service, however prevention of events or admissions is a challenge to capture – how do you capture the numbers of what you have stopped from happening? This creates a potential limit on the use of new technology within the NHS due to rapid innovation in the technology industry outrunning the ability to prove value, especially for interventions that have preventative, holistic aims of keeping people in their own homes and living independently.

TEC pilots within the NHS have strict regulatory and governance requirements. Such protocols are of course reasonable barriers to ensure patients wellbeing remains top priority. Ethical issues can be a barrier when running pilots within the NHS which have the potential to lead to inequities of care between patients in the pilot versus those on the regular pathway.

Finally, it is extremely important that the patients and the wider multidisciplinary team, involved in their care and management, are on board with the technology. They need to be able to see potential benefits before they are proven and be willing to test a new approach, which may require additional training and time to implement and monitor effectively.

7. Conclusions

This report has explored the barriers and benefits of collaborations between social sciences academia and health tech industry, concluding that there are great advantages to be seen within and as a result of these type of collaborations. These include, increasing accessibility to robust evidence-based interventions; delivery of independent credible analysis and evaluations; and linking the development of health tech with potential users.

However, there are also significant barriers to navigate and overcome. These include, managing mutual expectations; clear understanding of process, governance and politics within each partner in the collaboration; limitations and restrictions on funding; and inconsistent language defining social sciences field.

The advantages are worth navigating potential barriers for, by clearly communicating expectations, process outcome requirements, funding restrictions and proactively pursuing an open, trusting relationship. Relationships between individuals within the collaboration were stated as the most important factor for a successful project by everyone we interviewed.

The diverse nature and differences amongst the 5 case study exemplars shared in this report highlight the wide variety of potential drivers for collaboration, funding routes and points of entry for social sciences into projects. This ranges from the point of entry being proactively with the stakeholder, such as in the BabyMind App case study, where academics engaged directly with the health tech industry as the tech provider and developer. In total contrast to this, the Delta Wellbeing CONNECT case study demonstrates the opportunity for academic engagement with some of the multiple stakeholder's who were involved a large and complex project where industry, the local authority and NHS are working to develop and implement technology together. This variation in exemplars reinforces that social sciences academics should never discount any potential routes for collaborations, they can exist even where not obvious on first sight. Of course, this makes collaboration an even greater challenge when there is not always an obvious route and where funding streams and expectations will differ depending on the specific approach and drivers of each collaboration.

Currently, the greatest challenge to overcome in encouraging new collaborations is that the majority are built upon existing relationships between social sciences and industry, or introductions via word-of-mouth recommendations. Further, with the move to virtual conferences instead of in-person events, opportunities to informally network are limited. This puts an increased reliance on individuals to be proactive and already connected into organisations such as ASPECT, ABPI, MediWales, etc.

The hope is that this research and report will contribute to increasing the awareness of existing collaborations, the benefits to be gained from both perspectives and the barriers to be considered and overcome. Additionally, the huge diversity shown across the 5 case studies presented demonstrates the different types and approaches to these collaborations. We recommend regular sharing of the many and varied ongoing and past successful collaboration projects through reports, case studies and webinars to encourage discussions and spark innovative ideas.

About Aspect

Aspect (A Social sciences Platform for Entrepreneurship, Commercialisation and Transformation) is a network for organisations looking to make the most of commercial and business opportunities from social sciences research.

Supported by Research England's Connecting Capability Fund, Aspect members sit at the epicentre of discovery, imagination and progress in the social sciences. We draw together pioneering academics with innovative industry leaders to tackle the most complex societal challenges of our time.

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