

Digital Strategy Evaluation Report

Executive summary

Powys Teaching Health Board (PTHB) has over the last number of years been working together with NHS Wales organisations to ensure that information gathered while treating people is available right across Wales, so that patients can know that wherever they are cared for, the person treating them has appropriate access to their records, this now transcends paper-based access into digital. PTHB has much to gain from this approach as it is dependent on many other providers across Wales to contribute to our residents' health digital records. PTHB also need to ensure that it can interact in similar ways with English providers across the border.

PTHB covers a geographically large part of mid Wales. Much of the secondary care provision for the residents of Powys is provided by neighbouring Welsh Health Boards or by trusts across the border in England, such as Shrewsbury and Telford Hospital Trust or Wye Valley NHS trust. This is true for both elective and non-elective patient care.

The NHS Wales National Architecture is available in all NHS Wales Health Boards and includes national databases of clinical documents, blood results, Welsh GP records, and will soon include diagnostic images. However, these digital services are not currently available or visible to clinicians in NHW Wales for Powys patients treated across the border in England.

Where technology in PTHB is concerned, the organisation is not currently ready to provide a sustainable service regarding 4IR/5IR. Whilst the digital transformation strategy clearly outlines a push to make digital services available to the residents of Powys; and whilst work is on-going to achieve this, the core systems that host or support digital services are not fit for purpose and have become end-of-life, exposing the organisation to cybersecurity vulnerabilities, like the risk of denial of service (DDoS) attacks.

Whilst PTHB is accelerating in terms of utilising 5th generation technology, and it being over 50 percent through the journey, the organisation does not appear to be addressing clear issues regarding core network infrastructure and systems. This can only result in the lack of sustainability to digital services going forward. There is also pressure from the All-Wales Infrastructure Programme (AWIP), hosted by Digital Health and Care Wales (DHCW) for NHS Wales organisations to become compliant with the policies and procedures derived from DHCW. This means that PTHB as well as many other organisations will continue to remain on digital transformation journey as they will always in a situation where they are playing 'catch-up' as opposed to private sector organisations which may generate more than enough revenue to pay the best people in the country to formulate their digital transformation strategies, whilst having more than enough revenue to employ enough bodies to enable the organisation to digitally transform. As most are aware, the picture is very different in the public sector where funding is not as readily available, therefore pay for the same roles is not competitive enough, resulting in public sector organisations having to 'settle' for employees who may not be as highly skilled or possess the same experience as their counterparts in the private sector.

This appears to be a large counteraction of the digital strategy and business drivers. (Wordcount 525)

Business drivers

PTHB is a large organisation which employs over 2500 workers. Its main aim is to lead as a digital exemplar in community healthcare technology and support residential care in Powys resulting in improved outcomes for a generally healthier Wales. PTHB plans to enable this through new digital apps, introducing wearable devices and new innovative approaches where appropriate. It plans to use a universal approach to developing Powys residents 'use digital'; collaboratively, leading the way for community-based healthcare, from treating more people in their own homes to supporting an entire health and social care system, providing service leads with new ways of updating and re-designing care pathways with the 'art of the possible' in mind when it comes to digital capability.

PTHB wishes to empower the people of Powys and its workforce to feel confident and safe in any new technologies that are introduced and offer care and service processes by providing technology to support independence, whilst promoting well-being. Through its strategy, PTHB plans to facilitate digital inclusion and adoption, act on feedback, offer help, guidance, mentoring and support to maximise the opportunities available to strengthen its digital capability. This digital strategic framework outlines how PTHB will achieve its shared ambition; to enhance the quality of care through digital innovation. This will mean a redesign and upgrade of the core ICT infrastructure, and delivery model to support business change.

Achieving a modern digital infrastructure to support the ambition to lead as exemplar in community healthcare technology will be phased, in terms of design, build, deployment and subject to agreed priority areas. The model of delivery will be supported by business change and benefits realisation, with expert capability and capacity needed to empower the organisation to transform. Using data driven insights, PTHB plans to improve the clinical decision making and experience while transforming healthcare operations and outcomes.

In 2018, a parliamentary review into health and social care in Wales described the increasing demands and new challenges facing the NHS and social care, including an ageing population, lifestyle changes, public expectations, and new and emerging medical and digital technologies.

The ambition is for PTHB to enable the health and social care systems to work together, to help people live well in their communities, meet their health and care needs effectively and provide more services closer to home, so that people only need to use a hospital for treatment that cannot be provided safely anywhere else.

The plan describes four goals for the health and social care system in Wales, which is referred to as the Quadruple Aim:

- improved population health and well-being
- better quality and more accessible health and social care services
- higher value health and social care
- a motivated and sustainable health and social care workforce.

It also set out how digital technologies are key to achieving these aims and recognised the importance of digital systems in enabling fuller integration of health and care, setting out the priority for the PTHB and Local Authorities to implement the systems such as the Welsh Community Care Information System (WCCIS). (Wordcount 505)

Technology and Digital Transformation

The current network within Powys Teaching Health Board follows the standard Cisco architecture of a two-tier collapse core network on the Bronllys (HQ) site. The current core sites are using Cisco Catalyst 3850s network switches which will go end-of-life in four months' time. Along with this, PTHB has Cisco Firepower 2110 firewalls in place, with Firepower 1010 and 1120 models installed at the remote sites connecting back to the Cisco Firepower Management Centre in HQ, the estate is using a range of different flavours of Cisco Catalyst Switches, mainly Cisco Catalyst 2960-x and 2960-s models, where is no central management implemented for security patching, the latter model already being end-of-life, posing a cybersecurity risk.

The currently PTHB networking environment is a flat network, this meaning that all networking and sever device send broadcast packets across the entire network. This causes broadcast storms, when these occur when huge amounts of broadcast messages flood the LAN network, this creates excessive traffic and can degrade the networking performance. This also poses issues from a security point as any IP from a user to server can access any other IP address from any other user or server. In short this means users can access servers or networking devices of high importance with nothing in place to block them. To prevent this from happening I propose that we layer 3 IP address all networking and server devices along with creating smaller subnets per environment. Each site should have its own IP address range, within this the Management and Global/User traffic should be separated, this can be done using either networking segregation, this would negate the broadcast storms currently experienced on the network causing disruption to end users.

PTHB's current WiFi infrastructure consists of three Cisco Catalyst 5800 wireless Local Area Network (WLAN) controllers, two of these are a high-availability pair running synchronously to standby failover, these controllers are end-of-life, posing a cybersecurity risk. These controllers service most of the estate's wireless access points (wireless APs), running end-of-life firmware. There is also a Cisco Catalyst 9800-CL virtual WLAN controller which services one fifth of the estate's wireless APs. Although it is a current, up-to-date system, because it is a virtual WLAN controller, it runs on Microsoft Hyper-V server infrastructure which poses issues with interoperability. There are more than several WiFi blackspots across the estate as there is a lack of cabling infrastructure to many parts of various buildings where APs need to be to provide coverage.

Another interoperability issue is PTHB's Dell top-of-rack switches running in the HQ datacentre which have interoperability issues with the Cisco infrastructure, which makes configuration of the network and associated devices very complex and difficult. Those two switches are also end-of-life, adding to the current cybersecurity risk.

The HQ centre hosts over 200 servers, most of which are virtual. These host core integral networking systems such as Dynamic Host Configuration Protocol (DHCP), Domain Name Server (DNS), Print server and Group Policy, as well as servers hosting many multiple databases for back-end systems and internal application. The HQ datacentre consists of 2 Microsoft Hyper-V clusters (four and three node), one Hyperconverged Infrastructure (HCI) system (not yet operational) and several open-source servers for Voice over IP (VoIP) telephony and other smaller systems such as local Closed-Circuit Television (CCTV). The HCI system is set to take over the hosting of many current on-premise workloads for when the current Hyper-V clusters go end-of-life.

PTHB is working to be compliant with ISO 27001 data standards, by formulating and using an Information Security Management System (ISMS) which is fit for purpose in this current time. PTHB

is moving to digital capabilities and business intelligence in decision making to enable value-driven choices, working closer with the people of Powys, and making its information open and accessible wherever, whenever. To also treat information from interpreted data as a key corporate asset that will enable improved decision making and resource allocation.

PTHB aims to:

- Create performance dashboards to monitor performance
- Integrate data with partners and solutions
- Improve our data integrity, ensuring high quality data
- Embed predictive analytics in our reporting systems
- Provide data that supports improved decision making
- Use information to put resources where they are most needed

PTHB adopts Public Cloud First as part of its strategy, the resilience and backups of the most cyber-aware and heavily invested accredited suppliers. Utilising Microsoft Azure Landing Zone for data harvesting, storage, analytics and management. This includes building a robust data storage solution using modern data technologies to ensure the highest digital standards are adhered to. A multi-layered Data Governance framework will be built to ensure that the flow of Data is mapped from start to finish while ensuring compliance with relevant legislation and data storage best practices. This will ensure that Data is available to those who need it at all levels while ensuring that the use of that data monitored.

A breakdown of the PTHB digital journey consists of:

- Agile working
- Increased use of Wales` national infrastructure
- Empowering staff to work digitally
- Supporting patient flow
- Virtual meetings and consultations
- Connecting patients and their families

There is currently a PTHB digital programme to facilitate the journey mentioned above. The main projects within the programme using the digital strategy are the Cross Border Pathway improvement project - this primarily will enable NHS Wales clinicians to access digital patient data stored on NHS England trust systems when elective and non-elective care of Powys residents takes place across the border in NHS England trusts. Print Management project – this rationalises printers across the PTHB estate, centrally managing the units essentially reducing the carbon footprint and improving cybersecurity and information governance. The Infrastructure Improvement projects – they consist of several workstreams to implementing HCI infrastructure to host servers/workloads, infrastructure cabling improvement across the estate where the availability of Cat6 cabling is non-existent, this in turn will enable PTHB to install wireless APs in areas, providing WiFi coverage and eliminating blackspots. To use Microsoft Autopilot for more efficient implementation of end-user devices. PTHB is investigating options to initiate a project to procure and install replacement network switches and the implementation of a system to central manage them like Cisco DNA Centre. (Wordcount 1,023)

Strategic analysis

Powys County Council (PCC) is the host organisation for Powys Teaching Health Board's (PTHB) ICT and Digital support; under a section 33 agreement between PCC and PTHB. A strategic analysis of Powys County Council's (PCC) digital strategy document has been undertaken as Powys Teaching Health Board's digital strategy document is unfortunately still in its draft phase and cannot currently be referenced.

PESTLE

Category	Factors
Political	• Welsh Government • National Wales Shared Service Procurement • General Data Protection Regulation (GDPR) • Network and Information Security (NIS) regulations • Brexit
Economic	• Employment rate • UK inflation rate • Funding of budgets
Social	• Population of demographic • Vulnerable people • Demographic of area • Employment
Technological	• Implementation of AI bots • Utilisation of mobile applications • Availability of Superfast broadband • Cybersecurity assurance • Level of innovation Automation of manual processes • Network performance
Legal	• GDPR • Information Governance • Health and Safety • Employment law
Environmental	• Achievement of carbon net zero for organisation • Reduction of organisation carbon footprint • Datacentre location • Recycling of digital/ICT equipment

SWAT

Strengths - Clearly defined areas of improvement for digital transformation - A succinct strategy document for the reader - A user interactive document	Weaknesses - Lack of high-level information regarding the strategy - Several gaps to elements that form a digital strategy - Lack of a clear roadmap encompassing all elements of the strategy
Opportunities - Peer-review milestones on the strategy roadmap to pass on achievements and lessons learned for external stakeholders and sister organisations - Peer-review the strategy to ascertain if it continues to be fit for purpose	Threats - Information missed in the strategy possibly resulting in elements of the digital transformation programme not being delivered - Digital transformation halted due to no strategy or mitigation where funding framework limitations are concerned

Analysis

The Welsh Government currently funds Powys Teaching Health Board's digital improvement programme and ICT projects through its Digital Priorities Investment Fund (DPIF). One significant weakness in the PCC digital strategy in relation to DPIF is that funds will not be available for projects that may need to be undertaken at certain time. Capital and revenue funding is managed by the Welsh Government, a statement from the Welsh Government's draft budget document states "*the DPIF supports digital and data transformation at the all-Wales level, through revenue and capital funding, aligned to Ministerial priorities. It is managed by Welsh Government as a portfolio of digital programmes and activity. Funds are awarded to NHS Wales organisations through a scrutiny process.*" [1]. This results in the capital and revenue allocation funding being awarded once in the financial year, specifically the month of December when all capital and revenue bids have been submitted by the September/October deadline. The Welsh Government stipulates that the funding must be spent by the end of the financial year; in effect, giving all NHS Wales organisations three to four months to spend the money on any projects within the digital improvement programme. The problem is that business requirement for certain projects may crop up at any time within the year, meaning there may be no money available at the time to initiate such projects, resulting in a large gap where digital availability to members of the Powys community is concerned.

All NHS Wales Organisations, including Powys Teaching Health Board are subject to the National Wales Shared Service Procurement (NWSSP) framework. There is a limitation that affects the digital strategy in the sense that if the health board's requirement to procure digital equipment or services from a supplier not on the NWSSP framework, this can end up delaying projects as procurement off

the framework takes a significantly longer amount of time.

Regarding the General Data Protection Regulation (GDPR), the PCC digital strategy mentions “*Safe and Secure*” [2] as being one of the organisation’s four key principles. However, a weakness in this strategy is that there is no plan or roadmap demonstrating where the organisation is regarding data, information and cybersecurity and how the organisation plans to improve in these areas. There is also no mention of how the organisation plans to achieve compliance or remain compliant with the UK Government’s Network and Information Systems regulations (NIS).

Brexit is yielding an adverse effect on funding for public services, though a strategy and breakdown to cover this is included in the Welsh Government’s DPIP document, there is no reference to this in the PCC digital strategy document.

The strategy includes certain measures of success, two of which include a programme to equip the workforce to achieve digital capability of bronze and gold standards for general staff and managers respectively, this is a strength.

With the UK inflation rate currently at an all-time high, there is no mention in the strategy of how the organisation will overcome this issue to deliver digital services in this current time.

Two of the strategy’s future aspirations concentrates on the use of Artificial Intelligence bots, atomisation of processes and mobile apps to aid the population of Powys to access public services and healthcare, this is a strength of the strategy, especially as Powys has the largest demographic in Wales, with residents being sparsely populated.

The availability of superfast broadband is an issue in Powys, it has the lowest access out of all counties in Wales. PCC notes this in the strategy as an area to improve so residents can have ready access to public services and healthcare. Whilst this is a strength, what weakens it is no high-level explanation on how providing the residents of Powys better access to superfast broadband will be achieved.

Another statistic of the Powys demographic is the number of vulnerable people who live in Powys, mainly elderly. Whilst certain the themes of the of the strategy mention the improvement of digital services, making them readily available to residents along with the plan to increase the current availability of superfast broadband in Powys, the strategy lacks any plans or ways to deal with the improvement of digital skills for vulnerable residents in Powys. For example, if a resident who was born in the baby boomer generation, lacks the digital skills to access public services and healthcare as they never ‘grew up’ with technology, they may well struggle with it and may end up isolated due to the fact.

The strategy also fails to mention plans or a roadmap on how core network systems in Powys Teaching Health Board will be improved over the next five to ten years. As most people are aware, core network systems are to backbone to the availability of digital services and ICT; for example, WiFi now being an essential utility in any given public building or workspace. As identified in the Technology and Digital Transformation section of this assignment, core network systems are currently in a very poor state. Another weakness of this strategy is the failure to mention how this is going to be addressed.

Adhering to Health and Safety protocols in the workplace is an absolute must for any organisation and its workforce. This is an integral element in the delivery of digital services, failure to cover this in the strategy document is another weakness. ICT and digital services departments work very

closely with the organisation's Property and Estates departments to adhere to Health and Safety protocols. If digital transformation and ICT departments do not work collaboratively, there is a risk that digital and ICT projects may be held up due to the lack of communication and red tape that people working on the projects may face.

Health and Safety affects many elements of employment law. In turn, the strategy fails to lay out any information on how changing laws may affect the organisation's workforce or the way in which it operates. Elements that tie into this will have ramifications on the way the digital strategy and the way it is delivered.

There is a massive drive in the UK and across the world for corporations both private and public to accomplish net zero carbon emissions by the year 2030. Specifically, the Welsh Government in their net zero strategic plan states *"This Net Zero Strategic Plan brings together evidence and thinking from across the Welsh Government to outline our priority decarbonisation initiatives out to 2030. Implementing them successfully will be required to reach net zero as an organisation and support the wider public sector to achieve a collective net zero."* [3] Unfortunately, the PCC digital strategy fails to even mention decarbonisation as an integral element to the delivery of digital transformation for public services and healthcare. Also, there is no mention or reference to any departmental drive to aid the organisation in the reduction of its carbon footprint. Digital Transformation and ICT departments contribute massively to the organisation's carbon footprint, in terms of ICT equipment that use power/electricity –

- Network switches
- Servers
- Printers
- Desktop computers
- Laptop computers
- Other mobile devices
- Monitors/screens
- Video conferencing units

These are some pieces of equipment which will impact the organisation's carbon footprint. It would have been a strength of the digital strategy if it had mention plans to mitigate this, for example, the plans to refresh the estate with centrally managed, efficient printers and refresh of devices that consume less power than the current. Another element would be the rationalisation of data and applications hosted in the cloud environment that the organisation uses. The more data and applications that the organisation uses, means the more it contributes to cloud service provider's carbon footprint as they will need to run bigger datacentres that increase their carbon emissions. This is a contribution to carbonisation by proxy.

There is no mention in the strategy on how the organisation plans to contribute to the organisation's decarbonisation programme by reviewing the life cycle process of ICT equipment and how it is recycled. Whilst digital and ICT departments within organisations will generally organise for a third-party company to collect end-of-life ICT equipment to recycle, there is no mention on how the Digital Transformation team plans to work with the Environment and Sustainability department to review the current process, conduct research on which companies are further along with compliance to Government net zero policy, if Powys Teaching Health Board could get those companies onto the NWSSP framework and use them for the disposal of ICT equipment. Also, brainstorming what ICT equipment could be used in the future to help reduce the organisation's carbon footprint, for example, using equipment that holds longer by perhaps being upgradable as opposed to disposed of

when the equipment end-of-life date approaches. The fact that the PCC strategy document mentions nothing of this, or no reference to it is quite a big weakness.

As covered in the Technology and Digital Transformation section of this assignment, the Powys Teaching Health Board's main datacentre is in place which is prone to flooding (waterworks on the floor above) and is on a part of the electrical grid that is prone to damaging the datacentre equipment due to the fluctuation in power.

In conclusion, the use of PESTLE has highlighted that the strategy lacks a vast amount of information that backs up how the organisation plans to digitally transform. Whilst the information should be kept as high-level as possible, it simply does not exist. Though there are some strengths regarding the what the organisation values and specific elements of digital transformation journey that the organisation plans to tackle, for instance the use of AI bots, apps and automation. (Wordcount 1,659)

(Total wordcount 3,712)

References

- [1] “Ministers' written evidence to Senedd scrutiny committees on allocations within each MEG.” Welsh Government *gov.wales* | *gov.wales* (2021). Available at: <https://www.gov.wales/>.
- [2] *Read our Digital Strategy - it's interactive!* - Powys County Council (no date). Available at: <https://en.powys.gov.uk/article/8236/Read-our-Digital-Strategy---its-interactive>.
- [3] *Welsh Government Net Zero strategic plan* | *GOV.WALES* (2022). Available at: <https://www.gov.wales/welsh-government-net-zero-strategic-plan>.