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Time to update: Moving away from legacy IT in healthcare

Policy Hackathon

March 2021

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The benefits of using technology and the ability to harness the power of data in healthcare are undeniable – from better population health management to improving the early diagnosis of diseases. However, reaping these benefits can often be hindered by the prevalence of legacy IT – defined by the Cabinet Office as IT systems which are no longer supported.

Governments have long recognised the issue of legacy IT in the public sector. It has been consistently mentioned in public sector transformation plans as a barrier to the better use of data. The theme of legacy IT was also taken up in the Secretary of State for Health and Social Care's "tech vision" for the NHS in 2018 where he said that the NHS is "the world's most frustrating place to work for its IT".[1]

In a recent speech on digital transformation in healthcare, Matt Hancock highlighted how the pandemic has served as a crucial reminder of the importance that technology plays within healthcare. As "we've seen the opportunities… now is a really important moment to push on and drive the agenda forwards."[2]

Key to this will be helping healthcare organisations to move away from legacy IT. Building on the excellent work carried out by the Cabinet Office on legacy IT in the public sector, *Reform* carried out some further research including expert interviews to identify certain key challenges which prevent NHS organisations from successfully undertaking legacy migration projects.

On 10th March 2021, *Reform*, in partnership with Amazon Web Services, held a virtual Policy Hackathon on the topic of "Moving away from legacy IT in healthcare". Using as a basis the key challenges identified in the background research, *Reform* convened a group of senior public and private sector leaders, clinicians and innovators, to propose solutions to the specific challenges identified which prevent NHS organisations from updating their legacy IT.

This report presents a summary of the main solutions discussed by attendees. Hackathon participants were asked to work through specific policy challenges organised across three domains:

> **01 | Risk**
>
> **02 | People, skills and ways of working**
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> **03 | Value for money**

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[1] Rt Hon Matt Hancock MP, 'My Vision for a More Tech-Driven NHS', Speech at NHS Expo, Department of Health and Social Care, 6 September 2018.

[2] Rt Hon Matt Hancock MP, 'Driving Digital in the NHS', Speech at Digital Health Rewired Festival, Department of Health and Social Care, 18 March 2021.

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01 I Risk

POLICY CHALLENGE I – Caring about risk

Healthcare organisations understand clinical risk but struggle to understand the risks associated with the use of technology. They find it hard to express these risks – and the benefits of reducing them – as they can be intangible.

SOLUTIONS

- Chief Information Officers, Chief Clinical Information Officers and/or Chief Digital and Information Officers in healthcare organisations should seek to frame IT risk as a 'business understandable' risk such as patient harm, and clearly articulate the risk of remaining on legacy IT systems as well as moving away from them. This would help non-technically inclined healthcare professionals – particularly at board level – to understand the implications of technological risk in a way that speaks to them. It is important to express this using tangible examples of what would happen if things went wrong and how moving away from legacy IT would alleviate that risk.

- NHSX should create a dedicated page on its website with resources that health and care organisations could use in order to help them on their legacy migration journeys. These resources should include:

  - Detailed case studies of successful legacy migration projects in the NHS, anonymised case studies of unsuccessful migration projects with clear lessons about what not to do, as well as anonymised case studies of where underinvestment in IT has led to failures.

  - Relevant guidance from central government on IT, like the Technology Code of Practice created by the Government Digital Service, which "is a set of criteria to help government design, build and buy technology."

SUCCESS FACTORS FOR IMPLEMENTATION

Attendees reflected on the importance of making the language around IT risk less technical and more relatable so that it becomes everyone's problem and not something that is simply siphoned off to 'digital people'. IT risk needs to be expressed in a language that speaks to healthcare practitioners who are not technically oriented to ensure that it is integrated into business strategy.

Attendees also discussed the importance of expressing risk in terms of the opportunity cost of doing nothing. The more a legacy migration programme is delayed the further the impact on patient and healthcare practitioners in terms of missed benefits of digital transformation.

POLICY CHALLENGE II – Complexity of risk

Healthcare organisations struggle to understand the complexity of the IT risk they have to manage, and struggle to clearly articulate the set of risks they face. Organisations are generally faced with IT systems that have grown organically, creating a jigsaw of systems within organisations, and the interdependencies between these systems are poorly understood. Organisations have a poor understanding of their legacy estate which makes it hard to start properly evaluating risk.

SOLUTIONS

- Health and care organisations should map the legacy IT landscape in their organisation including shadow IT (i.e., applications or programmes that have been installed by frontline practitioners without the knowledge of the IT teams). This would enable organisations to have a better understanding of the complexity of their IT risk. A map could create further engagement on the issue at board level as it would open up and democratise the knowledge of IT risk within an organisation. Some attendees suggested that the Wardley Mapping technique could be used to consider the value chain and evolution of technology.
  - It was also suggested that legacy IT landscaping exercises could be undertaken in a stepwise process and first tried in one disease area or activity area of an NHS organisation before gradually scaling it.
- NHS Digital in collaboration with NHSX should provide tools for IT asset management to help NHS organisations understand how to understand and manage their IT risk.

SUCCESS FACTORS FOR IMPLEMENTATION

A couple of attendees reflected on the importance of having an audit of the legacy IT estate within health and care organisations as they pointed out that there is an overreliance on Chief Information Officers (or equivalent posts) as being the sole custodians of that knowledge.

POLICY CHALLENGE III – Operationalising risk

Organisations within the NHS can find it difficult to develop the appropriate methodologies they need to successfully manage IT risk. Organisations can find it difficult to develop the appropriate methodologies to understand how to rank various risk factors in a manageable way.

SOLUTIONS

- NHS Digital in conjunction with the National Cyber Security Centre should publish clear guidelines for assessing relative risk and how to rank and prioritise IT risk in healthcare. This would help organisations to identify and focus on the immediate risks they need to tackle.

- NHS Digital should create online resources including templates and examples of IT risk registers where risks are given an actual financial cost. This would help healthcare organisations to understand how to practically evaluate their IT risk. This guidance should also highlight that there is a degree of subjectivity in the evaluation of risk and that organisations should make use of their knowledge of the organisation and their professional discretion to make these decisions.

SUCCESS FACTORS FOR IMPLEMENTATION

Attendees reflected on the difficulties they see when trying to highlight IT risk in broader conversations about business risk, as the prevailing culture is to see IT risk as separate from clinical and operational risk. One of the key success factors for implementation is to express IT risk in terms of clinical risks, as discussed in the first policy challenge of this section.

POLICY CHALLENGE IV – Risk during migration

There are major complexities and risks involved when doing a legacy migration project in healthcare. Business as usual services cannot stop to wait for the migration to be done. Organisations can find it challenging to develop the appropriate methods to deliver the transition of IT systems whilst mitigating risks.

SOLUTION

- Health and care organisations should avoid having a 'big bang' approach to legacy migration projects, with a full switch off of an old system and turn on of a new one. Migration should always be carried out in incremental steps.

- There was a consensus that for the majority of legacy migration projects, health and care organisations would need to incur the costs of parallel running (i.e., running both the old and new system until migration is completed). Therefore, Chief Information Officers, Chief Clinical Information Officers and/or Chief Digital and Information Officers should approach suppliers beforehand to understand how they could support these costs. The NHS executives should also think carefully about these costs when planning, taking them into account to before a project to smooth them over time.

- With adequate planning and an integration of IT updates into day-to-day business plans, health and care organisations could avoid accumulating too much technical debt – where software has to be reworked – in the first place.

- Health and care organisations need to keep all health and care practitioners whose jobs should be impacted by the migration in the loop and updated about the progress of migration. They should be consulted to minimize any disruption caused to their day-to-day work.

SUCCESS FACTORS FOR IMPLEMENTATION

To successfully achieve a legacy migration, organisations need to think about it in terms of the broader organisational transformation, and not simply do a lift and shift of old structures. In addition, to ensure the success of the migration, attendees acknowledged that data cleaning is a key part of the process. It was also highlighted that it is the hardest part of a legacy migration project. Once the data is extracted from an old IT system there is a lot of data reconciliation work to make sure that the data that will be loaded onto a new system is accurate, valid and complete.

02 I People, skills and ways of working

POLICY CHALLENGE I – Skills Gap

Current initiatives to recruit and retain those with the necessary skills to carry out legacy migration have not been sufficient to meet demand. As is often the case with the public sector's digital teams,[3] pay scales place the NHS at a disadvantage with the private sector, increasing the difficulty of attracting the right skills. In addition, legacy systems sometimes rely on old programming languages which are no longer taught meaning that new recruits might not be technically equipped to deal with legacy migration.

SOLUTIONS

- NHS Digital, in collaboration with Health Education England (HEE), should create training materials and online courses for people to develop the skills needed for legacy migration – from change management to systems architecture. This training should be promoted to all health and care organisations. Additional mandatory training should be provided to NHS board executives to increase their levels of digital literacy and ensure they have enough understanding of IT to make sound budgetary decisions.

- NHS organisations should consider how their ways of working impact staff retention. Attendees reflected that the constant resetting and relaunching of long-term programmes contributes to high turnover in critical roles. Requiring legacy transformation projects to regularly recommit to their overall aims and objectives would ensure consistency of purpose, even if the leadership team changes before the project is completed.

SUCCESS FACTORS FOR IMPLEMENTATION

Tackling legacy IT will require constant review of staff competencies in NHS organisations. Attendees raised that there is a need for greater transparency of general competencies across the organisation by the leadership, before any large-scale IT projects are implemented. Those leading these projects should separate the workforce into three categories for a legacy migration journey: "sprinters", "joggers", and "bystanders".

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[3] Matthew Fetzer and Eleonora Harwich, *Digital Public Services: What's Next?* (Reform, 2021).

POLICY CHALLENGE II – Competing Priorities

Legacy migration projects cannot obstruct the delivery of business-as-usual activities. However, IT modernisation programmes do take up a significant amount of time and manpower and can therefore sometimes be deprioritised in favour of other projects, especially those directly related to delivering care.

SOLUTIONS

- NHSX should provide NHS organisations who start a legacy migration project with additional funding for innovative technology. Legacy migration projects will give organisations greater capabilities in areas like data sharing. Using these capabilities to experiment with innovative technology can give the board a tangible benefit, encouraging them to see migration as a priority.

- When approached by clinicians with new technology ideas, those leading on digital within an NHS organisation should implement the "yes, if…" principle. Attendees stated that there is a tendency to say no to new innovative technology because it will require fixing the legacy estate which hasn't happened yet. Responding "*yes* we can implement this new piece of software, *if* these changes to organisational business practices occur", will help communicate the value of upgrading the estate and make it a priority in the mind of the workforce.

- Digital teams within NHS organisations should be mindful of the language used when communicating about legacy IT projects. It is critical they build a narrative in terms of positive clinical impacts the migration will have – especially on information flows within an organisation – in simple terms. This will lessen the divide that continues to exist between clinicians and digital teams.

SUCCESS FACTORS FOR IMPLEMENTATION

Attendees raised the need for decision-makers within organisations to understand the IT that underpins their organisation. Given the risks associated with legacy IT, it is not acceptable for leaders to remove themselves from decisions on upgrading infrastructure because they are not technology-savvy. Taking steps to understand infrastructure would also help to better inform decisions on prioritisation.

POLICY CHALLENGE III – Culture

Individuals who have been involved in the process of development and maintenance of legacy systems can sometimes act as barriers to legacy migration projects. They are attached to existing systems that they helped to create, and their knowledge of IT might not be fully up to date making it hard for them to feel engaged by digital transformation projects and understand newer systems.

SOLUTIONS

- Legacy IT projects should be required to have a "timeout" process to encourage collaboration. Anyone in the digital team working on the project can call a timeout if the individual has concerns that the current approach will not deliver the project's outcomes. This will then be brought to the leadership team of the project and assessed. Attendees agreed establishing this process will help introduce a culture where it becomes okay to fail and overcome some of the nervousness for those who are worried to try new things.

- The team carrying out the legacy IT project should commit to monthly "show and tells" with the wider digital workforce. This will bring people up to speed on what change is happening and give opportunities to raise any questions. One attendee commented this process helps to build trust between teams, and makes individuals previously resistant, more receptive to change. Requiring legacy migration timelines to have visible short-term goals that could then be demonstrated at the show and tells, would help build momentum for a project.

- NHSX should create clearer guidance on good change management practices for digital transformation projects in healthcare. The guidance should include clear, up front expectations for the project's goals and how they will be achieved. The guidance should encourage project teams to consider not only the new technology being implemented, but also how it will interact with existing systems and the structure of the procurement contracts.

SUCCESS FACTORS FOR IMPLEMENTATION

Universal support within an organisation for a legacy IT project is not required, especially if it places barriers to timely implementation. Because of the risk legacy IT poses to the organisation, participants warned against delaying a project when a small number of individuals are pushing back. Still, a clear communication strategy throughout the project should be in place to educate the existing workforce of changes and answer any questions that might be put to them.

POLICY CHALLENGE IV – Ways of Working

An NHS Trust has engaged in a digital transformation project seeking to replace part of its legacy systems. After having delivered the project and giving a number of training sessions to health and care practitioners in the organisation, they have found that the workforce is reverting to previous ways of working - meaning that the organisation is not realising the full benefits of the digital transformation project.

SOLUTIONS

- NHS organisations should create greater engagement between their digital teams and frontline practitioners by involving stakeholders in the design and implementation of new technology. Allowing stakeholders to test out products before they are implemented provides a safe space for feedback, increasing the likelihood of a product being correctly tailored to roles. Regular surveys after new technology is introduced should also be put in place to evaluate level of use and effectiveness of the change.

- Chief Information Officers, Chief Clinical Information Officers and/or Chief Digital and Information Officers should act as the digital champions in every NHS organisation. They should help promote the better use of data and technology.

SUCCESS FACTORS FOR IMPLEMENTATION

Digital teams in NHS organisations need to understand the value of successfully articulating risks in not carrying out legacy projects. Attendees raised the importance of digital teams understanding how IT is used by clinicians. This will enable them to communicate the importance of removing legacy IT by explaining the underlying risk of the IT failing, which could compromise the clinician's ability to do their job.

03 I Value for money

POLICY CHALLENGE I – Ways to allocate funds

Historically, funding for IT in the public sector has depended on capital budgets (CapEx). This has hampered the ability for organisations to purchase Software as a Service (SaaS) products as these would be financed through operational expenditure budgets (Opex). This encourages organisations to keep their IT spending patterns unchanged, by entering into multi-year multi-million-pound contracts. Once a capital investment is made, organisations cannot replace the technology until the contract runs out and are therefore locked into the contract even if the technology becomes out of date.

SOLUTIONS

- Health and care organisations should become informed buyers. This will help them build informed multi-year plans with full knowledge of what suppliers can actually do to help solve problems. Attendees reflected that it is worth investing time upfront to talk to SaaS suppliers about how they structure licenses. In practice, becoming an informed buyer means:
    - Asking suppliers for discounts. Attendees reflected that despite contracts being clear on pricing, most suppliers would offer discounts if asked.
    - Asking existing suppliers what they can do to help transform legacy IT. Attendees reflected that many suppliers could offer their help when asked about what they can do to help move away from legacy.
    - Having open conversations with suppliers about contract length and break clauses. Attendees shared experiences about the importance of having these discussions to avoid lock-in situations simply because people did not ask about length of contracts or break clauses, as these can often be taken as a given.
- Health and care organisations should inspect their IT contract carefully as many of them will have "terminate for convenience" clauses which will allow them to dissolve a legacy contract before the end of its terms. Attendees reflected that there is some myth-busting to be done around true contract lock-in.

- Given existing constraints around capital budgets and operational expenditure, attendees reflected that health and care organisations should think differently about change and digital transformation. Organisations should avoid thinking in terms of big, programmatic change delivered in one chunk and instead favour change programmes that are delivered in smaller chunks with iterative funding.

SUCCESS FACTORS FOR IMPLEMENTATION

In this breakout session, attendees discussed what could be done given the constraints in the way funds are allocated. The conversation tended to gravitate around 'financial wrangling' mechanisms. However, one important element for Government to consider is how it could change the way it allocates funds to public sector organisations so as to not hamper digital transformation projects. Attendees also noted that there is often a reluctance on behalf of health and care organisations to review contracts – which translates into slow rates of decommissioning legacy – because of a sunk cost fallacy.

POLICY CHALLENGE II – Building a business case

Health and care organisations can find it difficult to successfully articulate business cases for legacy migration projects. Many organisations do not have the 'know-how' to successfully use the Treasury Green Book. In addition, the Green Book requires being able to predict costs and benefits over a five-year period as accurately as possible (the Green Book has an accuracy threshold and does account for optimism bias). It can be difficult to measure costs and benefits with a high degree of accuracy at the beginning of a project. This leads to unrealistic business cases being put forward.

SOLUTIONS

- NHS Digital should create a repository of case studies of how NHS organisations have managed to successfully use the Green Book for legacy migration projects in order to share their know-how.

- NHS Digital should also develop a cost-benefit-analysis toolkit for legacy IT in healthcare to help organisations understand the costs and benefits of a legacy migration project. It should include guidance on how to express benefits in terms of risk avoidance and award some optimism bias to the benefits (maybe unforeseen) of unlocking the value of healthcare data by migrating onto a new system.

SUCCESS FACTORS FOR IMPLEMENTATION

Successful business plans for legacy migration are often built on a business problem that could be solved through the migration. This creates a 'burning platform' for organisation to do something about legacy. This allows organisations to increase the buy-in of boards and frontline practitioners.

POLICY CHALLENGE III – Procurement

The procurement of technology in healthcare is fraught with difficulties – from the barriers to procuring technologies as a service to buying systems instead of solutions. Crown Commercial Service Frameworks are often not fit for procuring Software as a Service (SaaS) solutions. This, alongside the complexity of disaggregating current contracts, means that organisations will often stay in long-term contracts which can entrench legacy IT.

SOLUTION

- NHS Digital in conjunction with the Crown Commercial Service should rationalise the number of commissioning frameworks in IT as it creates too much complexity within the procurement of technology.

POLICY CHALLENGE IV – Understanding the return on investment

Health and care organisations can find it challenging to articulate the return on investment (ROI) of legacy migration projects. A central focus of any public sector investment strategy is whether a solution will save money. Given long-term legacy transformation projects are often for the purpose of de-risking an organisation – as opposed to direct cost-savings – they are largely overlooked.

SOLUTION

- NHSX should add information on how to articulate the ROI of a legacy migration project to its dedicated website on legacy IT case studies. These case studies should include examples of how organisations have managed to express the net present value of future benefits that will accrue from legacy migration projects.

SUCCESS FACTORS FOR IMPLEMENTATION

Attendees reflected on the importance of factoring in the value that will be accrued by unlocking data within and between heath and care organisations.