Health in the Digital Society

Digital Society for Health

DHSS Task Force 4- Digital Transformation

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1. Introduction

- Background and context of the project

As part of the Estonian Presidency of the EU Council, the Ministry of Social Affairs of Estonia and the European Connected Health Alliance have partnered to develop the Digital Health Society (DHS) - a multi-stakeholder initiative bringing together citizens, health professionals, policy-makers, companies and payers.

As part of this initiative, the Irish Health Service Executive are leading one of four DHS task-forces – this task force’s aim is to deliver a set of recommendations for implementing digital transformation & change management in health and social care organisations.

A lack of change management strategy within health care systems was identified at the outset of the DHS initiative as one of eight key challenges to the deployment of digital health. There are many theoretical approaches to managing change, implementing best-practice and spreading innovation in health care, and while these are useful starting points, we are seeking to also understand what practical methods and tools are being used to successfully implement change on the ground.

- Task Force 4 aims and objectives

The ultimate aim of the task force is to identify a set of methodologies and toolkits which can be used at a country/regional level or at a health and social care provider level to manage digital health change.

This report is a first step in that direction – it is a collation of reports, recommendations and experiences related to digital health transformation provided by the task force members.

It is in no way a comprehensive analysis of change management best-practice within healthcare, rather it is a snap-shot of the collective experiences of the task force. The aim is to build on this - to begin to identify and fill the gaps in the overall knowledge base and to work towards providing a framework for implementing digital health change projects which can serve as a practical and workable guide for those implementing digital health transformations.

- Task Force 4 members

Task force number four of the Digital Health Society programme is led by Richard Corbridge, Chief Information Officer (CIO) of the Irish Health Service Executive (HSE). There are a further twenty-one members of the task force from across the EU, representing a variety of health care stakeholders – from health care providers and academics to digital health SME’s and multinationals.

1 http://echalliance.com/
A full list of the task force membership is detailed in Table 1.

### Table 1: Task Force four members list

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2. Executive Summary

- **Overall approach**

The task force members were recruited in July 2017. Over the course of three conference calls organised by the ECH Alliance. Task force members were presented with the overall objectives of task force four and asked to contribute their experiences, tools and methods for managing digital health related change.

The Applied Research for Connected Health (ARCH) centre in University College Dublin were tasked with collating the information provided by the task force members into this report. Further to the group conference calls, the ARCH team contacted each task force member individually, and had one-to-one calls to gather their experiences and key learnings related to change management.

Within the European region there have been several key research programmes which have explored the specifics of change management as it relates to digital health specifically. These include the reports/studies outlined in Table 2 which have provided valuable insight for this report, allied with individual task force member contributions.

- **Key findings**

As outlined in Section 4, the collated input from the task force members suggests that there are four fundamental considerations which will drive and influence the success of any digital health implementation. These are money, technology, people and project management.

**Finance**

- There is no one-size-fits-all finance model for digital transformation. The choice of funding model requires consideration of the stakeholders involved, their needs, and the nature of the technology.
- State procurement policy needs to provide a transparent mechanism for financing digital transformation proposals.
- Digital health budgets allocated at the organisation level must include financing for both the technology and the change management.
- Financial incentives are powerful mechanisms for stakeholder engagement. At a minimum, any financial disincentives for engagement should be identified and removed.

**Technology**

- Health systems should build Open ICT Platforms, informed by international Standards and Regulations to ensure competitive procurement of innovative digital technologies.
- A user-centred design approach ensures that digital transformations are collaboratively developed by the vendor and the end-user, to meet the needs of the end-user.
People

- Stakeholder engagement needs to be managed throughout the life-cycle of a digital transformation. Mechanisms for stakeholder representation and communication must be established and maintained throughout.

Project management

- Digital transformation in healthcare is a complex change project, requiring skilled project management from the out-set (European Commission, 2016a; Health & Social Care; 2013; Philips, 2016).
- A dedicated project manager should be in place to lead and manage all aspects of the project.
- From a governance perspective, this project manager should have the responsibility and authority to scope, plan and manage the required resources of budget, people and technology.
Table 2: List of key contributions

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<th>Contributions</th>
<th>Description</th>
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Despite the focus on understanding how best to manage change as it relates to large-scale transformation within healthcare generally, and to digital health transformation specifically – the knowledge base remains at quite a formative stage. There are a lot of lessons learned and recommendations, but little in the way of practical guidance which could be transferred directly to different regions or organisations.

3. Change management and digital transformation

- Summary of key learnings from the literature

The field of change management within health care draws from several academic disciplines and from a wide body of research literature. Digital health transformations can leverage insights from across the fields of improvement science (drawing particularly on the practical and evidence-based tools developed by the Institute of Healthcare Improvement\(^2\)); implementation science (May, Mair, Finch; et al., 2009), human-centred design thinking (Lin, Hughes, Katica, et al., 2011) and traditional models of change management (Kotter, 2009; Lewin, 1951)

Figure 1: Academic disciplines which can add value to digital health transformations

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\(^2\) [http://www.ihi.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx](http://www.ihi.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx)
Digital health transformation requires change across the macro level (health care provision and financing policy) the meso level (at the individual organisational level) and the micro level (in terms of individual change to how health care professionals and managers provide care).

As Weissman, Bailit, D’Andrea, et al. (2012) have noted, even if policy reform and payment structures are aligned to incentivise physicians to adopt new ways of working there still needs to be time, thought and effort put into transforming workflow and culture at the meso organisational level. The meso level of practice transformation within healthcare has proved exceedingly difficult to achieve (Mold, et al., 2011; Phillips, Kaufman, Lin, et al., 2011; Weissman, et al., 2012). According to Massoud, Nielsen, Nolan, et al. (2006), healthcare organisations face several challenges in spreading innovations, including the characteristics of the innovation itself; the willingness or ability of those making the change to try new ideas; and the characteristics of the culture and infrastructure of the organisation to support change.

In terms of what it takes to spread innovation within healthcare, several studies suggest the following ten elements to be key (Bodenheimer, 2007; Cass, 2013; Massoud, Nielsen, Nolan, et al., 2006; McCannon, Schall, & Perla, 2008; Nolan, Schall, Erb, et al., 2005)

Table 3: Ten key elements to implementing change within healthcare organisations³

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<tr>
<th>#</th>
<th>Key elements in healthcare organisation transformation</th>
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<tr>
<td>1</td>
<td>There must be leadership buy-in and support</td>
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<td>2</td>
<td>The project must be a strategic priority for the organisation</td>
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<td>3</td>
<td>There must be a successful demonstrator pilot of the innovation, with evidence of the positive benefits and outcomes to be achieved by the innovation</td>
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<td>The plan for roll-out of the innovation must be clearly communicated across the organisation, and a shared vision of the goal must be identified</td>
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<td>5</td>
<td>Those implementing the change must be given the resources of time, people, money, IT etc. that they need for the roll-out to succeed</td>
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<td>6</td>
<td>There needs to be credible champions of the innovation – who can share their best practice ideas and lessons</td>
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<td>7</td>
<td>Sites must be assisted in making the change – a clear plan to do this needs to be in place</td>
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<td>8</td>
<td>Ideally the new innovation will make life easier for those adopting it (and if not the change must have a burning-platform driver such as patient safety or regulatory requirement)</td>
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<tr>
<td>9</td>
<td>The financial business case must make sense for the organisation.</td>
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<td>10</td>
<td>While senior leadership must promote the change, or in some cases mandate it, they must also allow individual sites some lee-way regarding how they implement the innovation, essentially giving them the opportunity to ‘make it their own’ and thereby increasing the likelihood that the innovation is sustainable or ‘sticky’. (Including the use of Plan Do Study Act cycles etcetera).</td>
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Nutting, Crabtree, Miller, et al. (2011) add to this list that healthcare professionals must be aware that they will have to make long term commitments to change which may take three to five years of external assistance. In a study on how large health care providers in the US have managed complex change programmes, Quinlan et al (2016b) found there to be eight key challenges to implementing change in

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³ Source: summary of key factors within the literature taken from Quinlan et al 2016b
healthcare, including issues related to time, money and human resource capacity, coupled with a variety of issues related to how health care professionals and managers experience change as disruptive on a work practice and emotional level. As outlined in Figure 2, the study identified a variety of ways to support organisations and individuals operating within them, to overcome these challenges.

**Figure 2: Eight key challenges to implementing change in healthcare organisations (Quinlan et al, 2016b)**
4. Change management strategies for digital transformation

a) Fundamental considerations: Finance, Technology and People

Underpinning any digital health change project are the fundamental resource requirements of money, people and technology. As outlined in Figure 2, all three are multi-faceted and multi-levelled in terms of what is required at various phases of any digital health implementation; and in terms of who within the healthcare system can drive and secure these necessary resources.

This section outlines the key findings and recommendations drawn from the task force member’s input regarding these three fundamental considerations.

Figure 2: Financial, technological and people considerations

KEY FUNDAMENTALS CHECKLIST:

- **MONEY**
  - MACRO: Health Care financing approach supports digital health transformative objectives
  - MESO: Organisational-level budget in place to support IT & project/change management
  - INDIVIDUAL: Financial incentives to drive stakeholder engagement

- **TECHNOLOGY**
  - Build digital transformation with sustainability in mind - eg. on an Open ICT Platform to ensure issues of interoperability and future-proofing.
  - Good IT project management must be in place to ensure all IT procurement, infrastructure and systems-requirements are in place to support implementation

- **PEOPLE**
  - The people needed to carry out implementation are given the authority and resources to perform their functions in the project.
  - Inclusive stakeholder engagement – anyone who will be responsible for or affected by the change is included.
Financial Considerations:

Finance is an important factor and key consideration in successful implementation of digital-health related change. It is key on several levels throughout the life-cycle of any digital health implementation. For the purposes of this initial report, the task force identified three financial considerations which are key in terms of supporting successful digital health implementation:

1. Macro: Public policy financing approach which supports digital health transformation objectives.
2. Meso: Organisational-level budget needs to be place to support not only the purchase of any new IT products and services, but also to support significant project and change management spend.
3. Individual: Financial incentives to drive stakeholder engagement and work-practice change (or at a minimum no financial dis-incentives to change need to be in place).

Health care system financing

Public-policy must support the movement towards a more digitally-enabled health care system.

- Ring-fenced funds dedicated to the purchase and implementation of digital health is required at a national level (European Commission, 2017).
- There needs to be an alignment of financial support/incentives and reimbursement mechanisms with connected healthcare philosophy. Value-based funding models are seen as key drivers and enablers of digital health care (Ibid).
- Reimbursement mechanisms need to reflect the transfer of care enabled by digital transformation (e.g. a shift to primary from acute care; a shift from hospital to remote home monitoring and so forth.) Outcome based reimbursement, which provides a payment envelope covering actions by all stakeholders in the care process and which penalises waste (e.g. readmissions, preventable adverse events), is more likely to incentivise integrated and digitally-enabled care than volume based reimbursement (European Commission, 2016a).
- Procurement at a national level must be competitive and standardised. A standardised approach to procurement allows for a more joined-up approach to purchasing, which supports interoperability. This standardisation must be balanced with a requirement for flexibility at a regional/provider level, in order to encourage and allow for innovation amongst health-care professionals and to take account of regional differences in terms of population health requirements (European Commission, 2017).
- This may be achieved via having an overall procurement policy which drives national level systems – e.g. EHR, coupled with a ‘fast-track’ procurement channel which while allowing for regional flexibility, ensures that any ‘fast-track’ digital health solution meets required level of standards in terms of interoperability and regulation] Procurement policy provides a transparent mechanism for assessing and financing proposals for digital transformation, at the national or regional level.

In terms of on-the-ground examples, a variety of potential approaches to financing digital health solutions have been employed within the European region. Due to the differences in healthcare policy approaches and funding models within the region, there is no ‘one-size fits all’ approach which can be recommended at this time. The following are examples of business and reimbursement models which
have proved successful in different European countries [drawn from the EIP-AHA report (European Commission, 2017)].

- Rental of the technology system rather than individual acquisition can facilitate the scaling-up (European Commission, 2017).
- The establishment of a shared risk model with a shared savings agreement (Public-Private-Partnership in investment) between the key participating stakeholders is seen as a promising option, e.g. between the healthcare provider and the IT provider, or between the municipality and the health insurer (Ibid).
- Performance-based funding and rewards is another approach that has been applied in a few cases; those doing well can be given extra funding (Ibid).
- It is seen that in some cases, remote care services have been financed in the same manner as traditional care by national health care insurance and private insurance companies. Health insurers have also issued special modules for e.g. “integrated care” to finance the care provided through this model (Ibid).
- Insurance companies and municipalities have also developed joint business cases to stimulate integrated and structural financing of integrated care models for older people living in the community (Ibid).
- Bundled payment schemes can also be considered in NHS type systems, linking a predefined part of the budget to shared objectives of different healthcare organisations such as primary care, hospitals and nursing homes (Ibid).
- The Blueprint report (European Commission, 2016a) recommends that new models of financing and investment bringing together public and private organisations involved in health and social care to support large scale deployment of innovation should be defined and introduced to the markets. It also recommends that funding for attracting innovative concepts and technologies should also support continuous innovation and scalability (Ibid).

Organisational-level budget - enabling the costly provider-level transformation

At an organisational level, any digital health implementation needs to be resourced properly in terms of financing the IT elements, as well as financing the significant project/change management requirements of the implementation.

In many of the reports on ‘lessons learned’ in digital health transformation projects which have been submitted by the task force members, a lack of resources (of time, equipment, people) is driven by a lack of money to invest in the overall project at the outset. This is in turn often linked to a lack of a dedicated project management approach to the implementation – which if in place, would define the scope of the project sufficiently to allow for a thorough understanding of the required financial support for implementation.

There is consensus amongst the task force member’s experience that healthcare transformation is costly requiring significant capital investment in the early stages. Provider organisations moving towards a more ‘connected’ patient-centric model of healthcare provision need the financial resources to enable
them to transform how they currently deliver care. Digital health is not an ‘efficiency play’ - at least not in the short-term, it is resource intensive to transform how healthcare professionals (HCPs) provide care.

Financial incentives to encourage uptake of digital health solutions amongst health care professionals

The implementation of digital health solutions can involve extra work on the part of health care professionals. They can also require them to provide care in new ways. This shift in how care is provided, coupled with the extra work involved in implementing any new digital health solution can be a cause of considerable stress and inconvenience to health care professionals. Financial incentives can be used to compensate and incentivise HCPs to provide care differently.

In cases where health care professionals are reimbursed on a fee-for-service basis, this can often serve as a dis-incentive to provide innovative forms of care. Similarly, where new models of care such as remote monitoring are introduced, reimbursements must be aligned with this new kind of service provision. There needs to be a re-alignment of reimbursement models so that they can support the movement towards population health management, which ideally includes more preventative medicine and less face-to-face contact.

Establishing the optimal payment model to support digital health is an ongoing process. The health care payment structures across the EU are complex, politicised and slow to change. Financial change must support the change in practice that is sought. Clinician contracts may be used to create incentives for behaviour consistent with project goals (Phillips, 2016).

On a more micro-level, financial incentives, as well as the provision of technical and organisational support, may help motivate stakeholders such as care professionals to participate in collaborative networks and eventually use the service. Some examples encountered in practice include the funding of IT equipment and data connections, and the payment of health care professionals involved in pilot digital health projects (European Commission, 2017).

Technological Considerations

Build digital transformation on an Open ICT Platform

A key technological consideration identified in task force contributions is the need for competitive models for the state procurement of digital solutions that can be adapted to fit local requirements without the state becoming locked-in to uncompetitive contracts with specific vendors. This issue arises if a decision is later made to scale-up a solution and only the original vendor can assure cross-system interoperability using that solution. Similarly, if additional functionality is required over-time but the originally procured solution is not interoperable with solutions emerging on the market, this creates a dependency on the original vendor to provide the enhanced functionality (European Commission, 2013).

- Standards and Regulation in Procurement
Procuring only digital solutions which meet internationally recognised Standards and Regulations is recommended as a strategy for avoiding this uncompetitive procurement scenario. Open platforms together with widely adopted standards support innovators and SME’s in gaining entry into the market (European Commission, 2016a). Aligning national Cloud First policies and strategies with European Standards was also recommended for achieving economies of scale in cloud computing access Europe (Microsoft, 2016).

- See eHealth European Interoperability Framework (European Commission, 2013; 2015) (European Commission, 2016a)

○ User-Centred Design in Procurement

An ‘open governance model’ is recommended (European Commission, 2016a), whereby end-users are engaged from the beginning in a ‘collaborative definition of specifications’ for digital solutions before they are put-out to tender (European Commission, 2017). Vendors are then contracted to provide an ‘end-to-end managed service’ whereby they assume responsibility for building, operating and managing the service package within each of the deployment sites (Ibid). Under this approach, a ‘modular design’ approach is recommended to ease the integration of new software modules into a given solution. Strong interaction between the vendor and the management of the care centre (e.g. hospital) and its ICT services is at the core of this process as a means of optimising usability and interoperability (Momentum, 2014).

- See Continua Design Guidelines and IHE profiles (European Commission, 2016a)

IT and eHealth Infrastructure

Any digital transformation project will be either enabled or inhibited by the IT Infrastructure (e.g. broadband speed) and eHealth Infrastructure (e.g. Electronic Health Records) of the health system within which they operate (European Commission, 2017). The challenges and opportunities of a given site must be assessed at the outset to inform a realistic framing of the scope, time and costs of the project (Ibid).

Vendor – Organisation Relationship

The relationship between the organisation where the digital transformation is being undertaken and their chosen digital solution vendor will be critical for ensuring a successful transformation. On the vendor side, task force contributions highlighted the importance of the vendor having a dedicated resource onsite, whether that be a vendor staff member or an organisation staff member dedicated to maintaining a clear line of communication (Health Service Executive, 2017). This communication channel is needed to support active user involvement and an ongoing partnership between the vendor and the organisation to tailor the solution for maximum local adoption (European Commission, 2017). The organisation will then need the vendor to provide dedicated training and strong helpdesk support for troubleshooting issues as they arise, particularly in the early go-live phase (Ibid).

Stakeholder Engagement
The identification of key stakeholders is a crucial aspect of change management within the field of digital health. The type and number of stakeholders that need to be identified is dependent on the size and scope of the project. It is also necessary to identify when individual stakeholder groups need to be engaged in terms of the life-cycle of the implementation process.

In complex digital health implementations an effective working partnership between stakeholders is needed at all levels (national, regional and local). In the experience of the task force members, the formation of a multi-sectorial stakeholder alliance, under the leadership of a committed national or regional manager, is a mechanism for sustaining broad stakeholder engagement for large-scale digital health implementations (European Commission, 2017).

A collaborative approach is beneficial for establishing standards and treatment pathways that need to be agreed upon by all stakeholders. More importantly, this style of approach is also useful when it comes to stakeholder engagement as it allows partners to play an active role in decision-making and communicate their expectations surrounding service/project deliverables (European Commission, 2017; Lennon, Bouamrane, Devlin, et al., 2017). Furthermore, a mounting body of research indicates that stakeholder engagement is more probable when all parties are actively involved in project development and design, along with strategies regarding financing, implementation, evaluation and dissemination (The ACT Programme; 2015; European Commission, 2017). Finally, a Joint Governing Board or oversight group comprising all key stakeholders is a practical mechanism for facilitating stakeholder collaboration; initiating, promoting and maintaining engagement; as well as supporting the necessary policy framework and ensuring that the digital transformation delivers the expected outcomes (European Commission, 2017).

Change is a potentially stressful process for everybody involved as it disrupts organisational culture along with longstanding procedures and processes. As a result, engaging stakeholders and end users can be a difficult process (Department of Public Expenditure & Reform, 2015; Quinlan, 2016). The impetus to transform differs across stakeholder groups as the motivations differ across policymakers, clinicians, service users, and managers (The ACT Programme, 2015). However, evidence-based research indicates that there are a number of effective ways to successfully achieve stakeholder engagement using both standard and tailored approaches.

**Standard Engagement Pathways**

It is essential to identify committed leaders at all levels on commencement of the project (policy, clinical, patient). All leaders must be assigned clear roles and fully understand their responsibilities (European Commission, 2017; Momentum, 2014; Health & Social Care, 2013; Health Service Executive, 2017). In addition, champions and early adopters of organisational change should also be recruited. Identification of such change agents will not only empower others to embrace change, but will help to enhance and maintain engagement throughout the project (The ACT Programme, 2015; European Commission, 2017; Health & Social Care, 2013).

Stakeholders tend to be more inclined to engage in organisational change if they are given the opportunity to adequately articulate their core needs and trust that they will be addressed by participation in the project/service. It is also imperative that the expectations and goals of all partners regarding project/service outcomes and deliverables are aligned. If some stakeholders feel that their primary objectives for participation are being side-lined or that deliverables are not feasible they are
less inclined to engage. In a similar vein, highlighting the benefits of the project/service also has the potential to increase commitment from prospective stakeholders/endusers (European Commission, 2017; Momentum, 2014).

Tailored Pathways to Stakeholder Engagement

Clinical Staff & Managers
The commitment of clinical staff and managers to organisational change is dependent on a number of factors. Firstly, they must fully understand the aims and potential benefits of the programme for both their own practice and their patient’s outcomes (The ACT Programme, 2015; European Commission, 2016a; Quinlan 2016). Secondly, specialised training must be provided (The ACT Programme, 2015; Quinlan, 2016) and any changes to roles and responsibilities clearly defined (Phillips pop health management). Thirdly, stakeholders should be treated as ‘decision-makers’ and allocated some form of power and control over the implementation of the proposed change (European Commission, 2016b; European Commission, 2017). Finally, a communication loop must be established and maintained so that feedback regarding insights into programme development and maintenance can be articulated (The ACT Programme, 2015; Health & Social Care; 2013).

Patients
Research suggests that patient engagement is increased when there is a single point of contact and a clear communication pathway to facilitate feedback and questions (The ACT Programme, 2015). Additionally, patient empowerment is critical in a health care change and can be achieved by involving patients in making decisions about their care, encouraging them to take more responsibility and ownership of their health, and facilitating mastery when it comes to using technology (The ACT Programme, 2015; Lennon, Bouamrane, & Devlin, 2017).

The Crux of Engagement

A review of the task force input and overall literature reveals that the following strategies/mechanisms are useful when it comes to engaging policymakers, clinicians, managers and patients. Namely;

- Facilitating empowerment and decision-making,
- Assessing needs and expectations,
- Initiating and maintaining communication pathways,
- Identifying needs,
- Providing specialised training, and
- Highlighting the benefits of participation – particularly through the provision of evidence of the clinical and economic case for the change.

Finally, it is of the utmost importance to understand that stakeholder engagement in an ongoing process which should be a priority throughout a project- from identifying key stakeholders through to monitoring, evaluating and maintaining change (The ACT Programme, 2015; European Commission, 2017; Quinlan, 2016).
b) Implementation management

The following section outlines the more granular considerations which the task force members have identified as key to successful implementation at an organisational level. The planning, implementation and evaluation stages are key elements of successful digital health transformation projects. The following section provides an overview of key considerations within each stage.

Figure 3: Stages and interdependencies of digital transformation projects
• Project Leadership

Due to the number and diversity of stakeholders involved in a digital transformation in healthcare, project leadership is required to engage and sustain commitment to any given project. As outlined earlier in this report, there must be executive leadership capable of securing the resources necessary to implement the change.

Digital transformation in healthcare is a complex change project, requiring skilled project management from the outset (Health & Social Care; 2013; European Commission, 2016a; Philips, 2016). A dedicated project manager should be in place to lead and manage all aspects of the project. From a governance perspective, this project manager should have the responsibility and authority to scope, plan and manage the required resources of budget, people and technology.

At a local implementation level, allied to the project manager and the project management team, clinical and IT champions must be identified with the ability to enlist their colleagues to support the digital transformation (Momentum, 2014) and more importantly, to help anticipate and overcome resistance to change (Quinlan, 2016). These champions must be clear on their roles and responsibilities within the project (Health Service Executive, 2017).

- Human Centred Change Management:
  - Mechanisms need to be established to encourage clinicians to champion their success stories and disseminate good practice (European Commission, 2017). For example, staff workshops; story-telling; video-ethnography (Kaiser Permanente, 2009; Quinlan, 2016)
  - A Project Champion serves as a dedicated contact person for stakeholders to seek clarification on the project or have their concerns heard (The ACT Programme, 2015).
  - Visibility of project champions, both IT and Clinical, is especially important at the ‘Go-Live’ phase of a digital transformation (Health Service Executive, 2017).

The importance of resourcing the digital health change project appropriately cannot be stressed strongly enough. The requirement for dedicated project management expertise and resources is highlighted repeatedly in ‘lessons learned’ from digital health implementations.

• Plan:

Each deployment site for digital transformation will have its own resource constraints (Quinlan, 2016), which must be assessed at the outset to inform the scope, timeframes and the objectives of the project (European Commission, 2016a).

**Organisational/innovation readiness**

Assessing organisational readiness is an integral part of the pre-implementation phase of a digital health implementation. Organisational readiness for change is dependent upon stakeholders and end users
having the capabilities to adopt a new project/service and on the organisation having the resource capacity to implement it.

A review of the literature reveals that there are three levels of innovation readiness, all of which must be considered if organisational change is to be successful (Commission of the European Communities, 2004; Lennon, Bouamrane, Devlin, et al. (2017).

1. Individual Stakeholders

On an individual level, readiness for change has been described as the extent to which a person accepts the rationale for a change, has the intellectual skills to embrace change and is prepared to adopt a particular plan to alter the status quo (Rafferty, Jimmieson, & Armenakis, 2013).

2. Cultural

Cultural readiness within a healthcare system/organisation is a set of beliefs and perceptions that influence the establishment of priorities, attitudes that determine behaviour including decisions, ideas and practices that determine how a person, organisation, society will respond to the environment. (Momentum, 2014; Phillips, 2016).

3. Resource Capacity

On a resource level, readiness for change may be described in terms of an organisations capacity to facilitate transformation. Key indicators that need to be assessed in this space are staff resources (skill sets, adaptability, and training) institutional resources (office space, IT systems, compatibility & interoperability), and organizational climate (clear vision and goals) (Lehman, Greener & Simpson, 2002).

A number of survey based tools have been developed to establish these various elements of innovation readiness – these include;

1) Telehealth Readiness Assessment Tool (Commission of the European Communities, 2004)
2) TCU Organizational Readiness for Change (Lehman, Greener & Simpson, 2002).
3) Digital Maturity Self-Assessment (National Health Service, 2015)
4) Readiness for Change Questionnaire. (Holt, Armenakis, Harris et al 2009)
5) Organizational Readiness to Change Assessment (ORCA) (Helfrich, Li, Sharp, & Sales, 2009)
6) Practice Capacity for Change (PCC) (Bobiak, Zyzanski, Ruhe, et al., 2009)

In addition, interview-based/qualitative tools have also been employed throughout the healthcare sector (see: Cunningham, Woodward, Shannon, et al. 2002; Lennon, et al., 2017). For a more detailed review of the methods/tools available for assessing organisational readiness for change please see Appendix A.

Achieving a culture of readiness for digital health

Research conducted throughout the EU reveals the importance of using the expertise of each partner within the change ecosystem to analyse local needs. Functional groups where stakeholders and end users (doctors, nurses, patients) can highlight specific requirements are an effective way to achieve this.
Subsequently, service developers need to ensure that the needs and wishes of end users (clinicians and/or patients) are reflected in the service design. Having a digital health solution founded on rigorous participation by a wide range of stakeholders allows for a high degree of readiness to make the required changes (European Commission, 2017).

An inclusive approach must be undertaken in the planning phase (Philips, 2016) to ensure that a compelling need (Momentum; 2014) is identified for the participation of all key stakeholders.

**Risk and ethical considerations**

Before embarking on a digital transformation, consideration must be given to legal, policy and regulation requirements for digital healthcare. Ethical considerations surrounding digital health are predominantly focused on ‘privacy awareness’ (Momentum, 2014). Ethics are an important part of any project/service which involves human data, especially health data. EU data protection law imposes strict security, confidentiality, training, compliance and accountability obligations on data controllers and processors. These obligations apply to all processing of health data, whether or not cloud computing platforms are used. In addition, the European Standards on Confidentiality and Privacy in Healthcare state that “Healthcare professionals should respect the following three key principles of healthcare confidentiality:

1) Individuals have a fundamental right to the privacy and confidentiality of their health information.
2) Individuals have a right to control access to and disclosure of their own health information by giving, withholding or withdrawing consent.
3) For any non-consensual disclosure of confidential information, healthcare professionals must have regard to its necessity, proportionality and attendant risks.”

Concrete methods/protocols must be identified and developed to monitor who can access patients’ data, especially when third parties are involved in the management of a new programme (European Commission, 2016b; Health & Social Care, 2013). Data protection laws should be followed rigorously in order to adhere to legal and ethical obligations (Ibid).

Having a dedicated project manager and project management methodology in place at the outset will ensure that the project is fully-scoped in terms of the required resources, risks and mitigations. It will also ensure that all issues associated with digital-health related risk and ethical considerations are given due attention.

- **Implement:**

Implementing a digital transformation requires that a Project Team are adequately resourced to complete their agreed roles and objectives within the project (Health Service Executive, 2017). It is recommended that more resources are made available during the deployment period than has been estimated as necessary on an ongoing basis (Momentum, 2014). Training and capacity building may be necessary (European Commission, 2016a) to inform and enable changes in workflow and Standard Operating Procedures (Health Service Executive, 2017). Specially trained practice-facilitation support
agents (PEAS) have been used successfully to assist healthcare organisations to plan and manage change effectively (Quinlan, 2016).

It is crucial to conduct small scale piloting before rolling it out on a wider scale [Health & Social Care; 2013; Quinlan, 2016]. Findings reveal that piloting by way of Plan Do Study Act (Institute of Healthcare Improvement, 2006) cycles and other mechanisms serves a variety of functions.

1) They can give birth to a set of champions and early adopters in the pilot locations, which not only helps with engagement but can facilitate a snowball effect for the larger deployment of services in other locations (European Commission, 2017).

2) They provide change agents with the opportunity to demonstrate the benefits of the service/project to stakeholders/end users (European Commission, 2017; Quinlan, 2016).

3) They allow participating stakeholders to get a sense of what real-life deployment of services will look like (Ibid).

4) They assess the service/projects’ applicability to a number of potentially diverse interventions, target groups, and geographic domains, and provide suggestions to further improve its generalisability (Ibid).

5) They facilitate early evaluation of a tool/system/service, which is beneficial on a number of levels. Namely, to estimate health and economic outcomes; get a sense of clinical feasibility and highlight any issues regarding training, staffing and technology (interoperability/compatibility) (European Commission, 2017; Health Service Executive, 2017; Quinlan, 2016).

- **Evaluate & Learn:**

A performance management strategy must be designed at the outset (European Commission, 2017), and monitored throughout to actively identify barriers to the digital transformation (The ACT Programme, 2015). Task force contributions cautioned that the effort of data collection (Ibid) and meaningful use of that data must be strategically planned and resourced (European Commission, 2016a). Where the scale of digital transformation permits, it is recommended that Learning Networks should be established across sites to ensure that learnings are reflected upon and shared (European Commission, 2017).
5. Conclusions

Implementing and managing change in healthcare is a complex and challenging process which requires dedicated resources and effective planning from the outset. Figure 4 aims to give a summary of the conclusions drawn from analysing the inputs from the Task Force members. Ensuring that the necessary financial, technological and engagement strategies are in place across the various macro, organisational and individual levels throughout the life course of the implementation is integral for a successful change project. Best-practice project management tools are then needed at the organisational level to ensure that the project can be successfully scoped and delivered.

Figure 4: Phases and interdependencies of implementing change in healthcare
TOOLKIT FOR DIGITAL HEALTH IMPLEMENTATION

KEY FUNDAMENTALS CHECKLIST:

- **MONEY**
  - MACRO: Health care financing approach supports digital health transformative objectives
  - MESO: Organisational-level budget in place to support IT & project/ change management
  - INDIVIDUAL: Financial incentives to drive stakeholder engagement

- **TECHNOLOGY**
  - Build digital transformation with sustainability in mind - e.g., on an Open ICT Platform to ensure issues of interoperability and future-proofing.
  - Good IT project management must be in place to ensure all IT procurement, infrastructure and systems requirements are in place to support implementation.

- **PEOPLE**
  - The people needed to carry out implementation are given the authority and resources to perform their functions in the project.
  - Inclusive stakeholder engagement - anyone who will be responsible for or affected by the change is included.

KEY COMPONENTS OF IMPLEMENTATION MANAGEMENT:

<table>
<thead>
<tr>
<th>MACRO (Governance)</th>
<th>ENGAGEMENT</th>
<th>FINANCES</th>
<th>TECHNOLOGY</th>
<th>RISK &amp; ETHICS</th>
<th>READINESS</th>
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<tr>
<td></td>
<td>Government</td>
<td>Public Policy</td>
<td>Procurement Standards</td>
<td>EU &amp; National Regulations</td>
<td>Commitment &amp; Buy-In</td>
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<td>Policy Makers</td>
<td>Health Care System Financing</td>
<td>National Digital Health Strategy</td>
<td>(Data Protection)</td>
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<tr>
<td>MESO (Organisational)</td>
<td>Implementation managers/ leaders</td>
<td>Organisational budget</td>
<td>E-health Infrastructure (e.g., EHR)</td>
<td>Organisational Policies &amp; Procedures</td>
<td>Resources in place</td>
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<td></td>
<td>Champions</td>
<td>Project budget</td>
<td>IT Infrastructure</td>
<td>Ethics Boards</td>
<td>Adaptive Reserve</td>
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<td></td>
<td>Early Adopters</td>
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<td>INDIVIDUAL (End-users)</td>
<td>Patients</td>
<td>Financial Incentives</td>
<td>Usability</td>
<td>Informed Consent</td>
<td>Adoption</td>
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<td>Clinical Staff</td>
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<td>Training</td>
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<td>Motivation</td>
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<td>Managers</td>
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<td>Access</td>
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Produced by Dr. Maria Quinlan, Dr. Marcella McGovern, and Dr. Louise Rooney

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TECHNOLOGY CENTRE
ENTERPRISE IRELAND
SQA IRELAND SUPPORTED
6. Bibliography


7. Appendix A: Organisational Readiness for Change

<table>
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<tr>
<th>Tool/Theory/Study</th>
<th>Construct</th>
<th>Core Concepts</th>
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Of 103 articles on ORC, 77% used some variant of the term ‘readiness for change’ e.g. change acceptance, change commitment, attitudes toward change, reactions to change, and agency capacity.  
46% defined ORC as an individual construct, 55 % defined it as an organisational (collective) construct.  
Weiner (2009) argue that how employees appraise change and the ways in which they appraise change are dependent on the three aspects of implementation capability: task demands, resource availability, and situational factors. If changes are to happen employees must assess all of the above and the reasons to change need to be more attractive than the original state. |
| Rafferty, Jimmieson, & Armenakis (2013).         | Readiness for Change                           | ORC – Definition  
Readiness for change is the extent to which an individual inclined to emotionally accept change (emotional readiness), have the intellectual skills to embrace change (cognitive readiness), and are prepared to deliberately adopt a particular plan to diligently alter the status quo (intentional change). |
It measures: motivational readiness (e.g., perceived need for program improvement, training needs), institutional resources (e.g., office space, staffing resources), staff attributes (e.g., adaptability, growth, efficacy), and organizational climate (e.g., clarity of mission and goals). |
| Holt, Armenakis, Field, & Harris (2007).         | Readiness for Organisational Change            | Authors propose that readiness for change collectively reflects the extent to which an individual or individuals are cognitively and emotionally inclined to accept, embrace, and adopt a plan to purposefully alter the status quo. They developed an instrument to measure ORC at an individual level. (see http://journals.sagepub.com/doi/pdf/10.1177/0021886306295295)  
Their findings suggest that readiness for change is a multidimensional construct influenced by beliefs among |
employees. Namely that: they can implement a proposed change (change-specific efficacy), the proposed change is appropriate for the organization (appropriateness), the leaders are committed to the proposed change (management support), and that the proposed change is beneficial to organizational members (personal valence).

**Holt, Helfrich, Hall, et al. (2008)**

**ORC Assessments**


1. **Organizational Readiness to Change Assessment (ORCA)** by Helfrich, Li, Sharp, & Sales (2009)
   - Focuses on structural/organisational factors
   - Developed for Health care Organisation

   - Focuses on individual/psychological factors
   - Developed for management- has been used in healthcare field

**Cunningham, Woodward, Shannon, et al. (2002)**

**Psychological Correlates for ORC**

**Predictors of ORC**

Authors measured individual perceptions of benefits/risks of organizational change, individual contributors to readiness for organizational (change Self-efficacy, the perceived ability to manage change successful), and workplace contributors to readiness for organizational change (employee skill set, job empowerment, perceived career enhancement.

Results revealed the following factors as robust predictors of ORC: openness to job change, active approach to problem solving, having a demanding job role, and feeling job empowerment.

Workplace/organisational factors (as opposed to individual factors) were the strongest predictors of ORC.

NB: perceived improvements in patient care, staff relations, staff competence, were not significant predictors for ORC
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<td>Stage 1) Training exposes program staff to the new concepts or techniques, Stage 2) organizational leadership with input from stakeholders promotes employee decisions to adopt the technology and try the technique, Stage 3) implementation- feasibility and practicality of the intervention is tested. If successful, the innovation will be institutionalized, Stage 4) becomes routine clinical practice.</td>
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<tr>
<th>Fuller, Rieckmann, Nunes (2007) [Quant study]</th>
<th>Organizational Readiness for Change (ORC)</th>
<th>Investigation of ORC in healthcare organisation. (Predictors of ORC)</th>
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<tr>
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<td>Results:</td>
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<td><em>Motivation for change</em>- perceived need for system changes were predictive of ORC</td>
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<td><em>Institutional resources</em> - perceived improvement of tools/resources were predictive of ORC</td>
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<td><em>Staff Attributes</em> - adaptability, perceived ability to influence peers, perceived opportunities for professional growth were predictive of ORC</td>
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<td><em>Organisational Climate</em> - organisational stress was predictive of predictive of ORC.</td>
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<td>NB: <em>staff autonomy</em> was negatively correlated with ORC</td>
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<td>Measured Clinician Perceptions of ORC:</td>
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<td>ORC predictors = change appropriateness, vision of clarity (recognize and accept that a change is needed), change efficacy, he presence of an effective project champion, organisational adaptability, collective self-efficacy.</td>
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<td>Non-predictors of = Organisational context (history of change, political climate)</td>
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| European Health Readiness | Telehealth Readiness Assessment Tool |
**Critical success factors for a deployment strategy**

- Ensure that there is cultural readiness for the telemedicine service.
- Ensure leadership through a champion.
- Come to a consensus on the advantages of telemedicine in meeting compelling need(s).
- Pull together the resources needed for deployment.

**Critical success factors for managing organisational change**

- Address the needs of the primary client(s).
- Involve healthcare professionals and decision-makers.
- Prepare and implement a business plan.
- Prepare and implement a change management plan.
- Put the patient at the centre of the service.

**Critical success factors from a legal, regulatory and security perspective**

- Assess the conditions under which the service is legal.
- Identify and apply relevant legal and security guidelines.
- Involve legal and security experts.
- Ensure that telemedicine doers and users are “privacy aware”.

**Critical success factors from an ICT perspective**

- Ensure that the appropriate information technology infrastructure and eHealth infrastructure are available.
- Ensure that the technology is user-friendly.
- Put in place the technology and processes needed to monitor the service.
- Establish and maintain good procurement processes.

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<td>Thematic analysis revealed readiness issues Identified at 3 levels:</td>
<td><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5334516/figure/figure1/">link</a> (good diagram)</td>
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</table>
**Macro:** infrastructure, political readiness (policy), market complexity, market readiness, level of clinical endorsement, perceived risk & liability, and interoperability.

**Meso:** Collaboration, Competition, and Co-design (intensive consumer engagement needed); industry readiness, health service readiness, stability of Organisational culture (i.e. management/ CEO turnover), resource availability.

**Micro:** workload and professional confidence, accesses to digital resources, public digital literacy and access; level of patient engagement; patient trust in technology. Guarantee the technology has the potential for scale-up.

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<td>The Digital Maturity Self-Assessment is an online survey which measures how well secondary care providers in England are making use of digital technology to achieve a health and care system. This tool allows individual organisations identify key strengths and gaps in provision of digital services at the point of care and provides insight into how well the country is doing as a whole.</td>
<td>Comprised of 179 scored questions.</td>
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<tr>
<td>Section</td>
<td>Sub-sections</td>
<td>Description</td>
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<tr>
<td>Readiness</td>
<td>• Strategic alignment &lt;br&gt;• Leadership &lt;br&gt;• Resourcing &lt;br&gt;• Governance &lt;br&gt;• Information governance</td>
<td>An assessment of the organisation’s ability to plan, deliver and optimise the digital systems it needs to operate paper-free at the point of care</td>
</tr>
<tr>
<td>Capabilities</td>
<td>• Records, assessments and plans &lt;br&gt;• Transfers of care &lt;br&gt;• Orders and results management &lt;br&gt;• Medicines management and optimisation &lt;br&gt;• Decision support &lt;br&gt;• Remote and assistive care &lt;br&gt;• Asset and resource optimisation &lt;br&gt;• Standards</td>
<td>An assessment of the digital capabilities available to that organisation and the extent to which those capabilities are available and being optimised across the organisation as a whole</td>
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<tr>
<td>Enabling Infrastructure</td>
<td></td>
<td>An assessment of the extent to which the underpinning infrastructure is in place to support delivery of these capabilities</td>
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References


