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Call to digital health leaders: test and leverage this guideline to support health information technology implementation in practice

Samantha Erin Harding ,[1] Karen Day,[2] Peter Carswell[1]

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[1]School of Population Health, The University of Auckland Faculty of Medical and Health Sciences, Auckland, New Zealand
[2]School of Population Health, University of Auckland, Auckland, New Zealand

Correspondence to
Samantha Erin Harding;
sam.erin.harding@gmail.com

ABSTRACT

Background Health information technology (HIT) is increasingly used to enable health service/system transformation. Most HIT implementations fail to some degree; very few demonstrate sustainable success. No guidelines exist for health service leaders to leverage factors associated with success. The purpose of this paper is to present an evidence-based guideline for leaders to test and leverage in practice.

Methods This guideline was developed from a literature review and refined by a set of eight interviews with people in senior HIT roles, which were thematically analysed. It was refined in the consultancy work of the first author and confirmed after minor refinements.

Results Five key actions were identified: relationships, vision, HIT system attributes, constant evaluation and learning culture.

Conclusions This guideline presents a significant opportunity for health system leaders to systematically check relevant success factors during the implementation process of single projects and regional/national programmes.

INTRODUCTION

Globally, there is an increasing pressure to implement health information technology (HIT) to transform health systems.[1] Some evidence suggests that HIT implementation can improve healthcare quality and safety,[2] while other research shows many HIT implementation efforts fail, with few achieving sustainability in practice.[3]

Health systems' complexity makes HIT implementation non-linear and unpredictable.[4] Managers and leaders are crucial in ensuring successful HIT implementation by aligning factors associated with success.[5] No guidelines exist to support managers or leaders to navigate uncertainty and leverage the factors associated with implementation success. Models, theories and frameworks vary in terms of terminology, generality and purpose, with no approach identifying the range of processes, or contextual or evaluative activities associated with HIT implementation success.[6]

The first author conducted a master's research study to answer the question: 'What are the factors deemed important for leading a successful implementation of HIT within healthcare organisations?' The outcome was a guideline to assist managers/leaders achieve HIT implementation success. The first author graduated in 2018 and worked for a consultancy organisation, providing implementation services to various health services. The specific focus of this article is the first author's experience leveraging the guidelines in a national programme leadership role in the New Zealand (NZ) Health System Reform. The question for this manuscript is 'How did the guideline and framework perform in practice?'

The NZ health system reform

In 2021, the NZ government announced a major health system reform. Under the Pae Ora (Healthy Futures) Act of 2022,[7] 27 publicly funded healthcare organisations were merged into one organisation called Te Whatu Ora Health New Zealand (HNZ).

Data and digital were identified as a core shift to enable the outcomes of reform. However, the national journey of digital transformation was complex, requiring consideration of differing technologies, roles and contexts of organisations merging into HNZ. The first author took on the role of programme manager for the data and digital team in interim HNZ, focusing on ensuring a smooth operational establishment and setting up the future system for success.

Table 1 Link between the BIFHIT and the guideline action area

BIFHIT	Factors associated with success	Action
Implementation process		
Exploration and development	► Involve all stakeholders within development processes	1
Planning and preparation	► Plan for sustainability within implementation processes	2
Implementation	► Include a phase between initial and full implementation that allows for HIT to be adapted to the local context	4, 5
Evaluation and monitoring	► To illustrate the effect of an HIT to all stakeholders throughout the process of implementation ► To ensure that an HIT is fufilling the vision outlined for the implementation effoirt. The presence of a continuous feedback loop is cruical to learn whether an HIT was meeting the desired expectations ► Early feedback enables the opportunity to respond to factors that may inhibit implementation success ► Contextual elements should also be measured to improve the congruence of various implementation factors	2, 4, 5
Sustainability	► Integrate themes of a learning system, to be adaptive, dynamic and contextually sensitive	4, 5
Context		
Policy and funding	► HSMLs can influence the external environment in which organisations compete through developing positive partnerships ► Ongoing funding commitments need to be planned for within the vision	1, 2
Networks and communications	Interorganisational partnerships ► Accelerate learning ► Enable organisations to position themselves to receive contracts and funding ► Vendors should be viewed as strategic partners rather than 'salesmen.' Strategic partnerships involve elements such as trust, flexibility, responsiveness and collaboration Intra-organisational relationships ► Intraorganisational relationships are an antecedent to positive relational contexxts and communication of a shared vision throughout the organisation ► Clinical staff and consumers as fundamental to incorporating a user perrspective throughout ► Management staff to support and enable the solutions identified by clinical staff and consumers	1
Leadership and management	► Leaders that established and communicated a shared vision of change across all levels of the organisation is associated with successful implementation outcomes ► Leaders are cruical to influencing the organisational culture surrounding the change effort ► Positive organisational culture was found to increase the capacity of leaders to better predict and manage resistence against the change effort	1, 2, 4, 5
Organisational culture	Culture ► A positive organisational culture was associated with innovation sustainment in practice. A positive culture was described as open, responsive to change, tolerant of mistakes and possessed good support for teamwork, risk and creativity. Such an environment helps staff feel confident in their workplace. ► Leaders play an important role in the creation of an organisation's culture. The sustainment of an innovation was more likely if leaders faciliated a culture of psychological safety, team participation, openness and the ability to adapt to change. Climate ► A learning climate was emphasised as being cruical to faciliating implementation success. Change at multiple interacting levels made organisational learning an essential element to achieve innovation sustainably. ► Ongoing assessment and feedback loops were emphasised to enhance this learning climate. ► A learning climate faciliates an environment of psychological safety within an organisation.	1, 5
Organisational structure	► Organisational structure serves as a proxy for other variables. For example, larger organisations may have increased access to skills or knowledge within the organisation, theoretically increasing their ability to potentiate a successful outcome. ► One review study argued that staff retention and replacement should be planned for throughout all stakes of the implementation process, becoming a particular concern within the phase of sustainability.	2

Continued

Table 1 Continued

BIFHIT	Factors associated with success	Action
Feedback and Monitoring	► Required to illustrate the effectiveness of an HIT to all stakeholders throughout the process of implementation and ensure it is fulfilling the desired vision for the implementation effort. The presence of a continuous feedback loop is critical to learn whether it is meeting desired expectations. ► Early feedback enables the opportunity to respond to factors that may inhibit implementation success. ► Contextual elements should also be measured to improve the congruence of various implementation factors.	4, 5
Individuals		
Team Cohesion	► Teams with high internal cohesion were more likely to have a ready flow of information throughout the organisation. This is important to faciliate the internal communication of the HIT's value and the subsequent management of the interdependent relationships within the organisation.	1
Disruption to professional workflow/ worldview	► Innnovations that involve the input of multiple stakeholders are more likely to disrupt organisational routines and are less likely to be sustainable in practice ► It is important to clarify the roles of individual stakeholders and their importance to improve internal team cohesion.	1
Stakeholder inovlvement	► Continuous engagement of stakeholders through planning, adaption and implementation processes were shown to improve the 'notion of fit' and enabled more effective responses to emerging issues that prevent an innovation's sustainability in practice	1
Meaning	► Consistent meaning across all stakeholder levels is associated with increased assimilation in practice.	2
Self-effiacy	► Higher self-effiacy was associated with a higher indiviudal motivation to commit to implementing the innovation.	5
Innovation		
Adaptability	► The more an innovation is readily adaptable to the local environment, the more it is likely to be successfully implemented and sustained in practice. ► A set of standards at a macrolevel will support the implementation of technology at a local level.	3
Cost	► Innovations that were shown, or perceived to be cost-effective early within implementation processes, were more likely to be successfully implemented and sustained in practice. ► Given that HIT systems are incrementally built, implemented and evaluated over time, it is unlikely that the total cost associated with development and implementation can be accurately calculated in complete detail. However, it is important to estimate the most accurate total cost of ownership for implementing this technology from both a capex and opex perspective.	3
Complexity	► Innovations perceived by key stakeholders as being simple to use had more positive implementation outcomes and integration in practice ► Human-centred design increases useability, ease of learning, efficiency, user adoption, satisfaction and sustainability of the innovation in practice.	3
Legitimacy	► Innovations that possessed multiple forms of legitimacy were often in better stead to be successfully implemented and sustained in practice. ► Theoritical approaches illustrated that legitmacy may stem from a range of sources, including evidence of efficacy, intervention source and the design and packaging of the innovation. ► Legimacy is dependent largely on an innovation's trialability, relative advantage and compatibility with individual agents and the wider implementation context.	3

BIFHIT, Broad Implementation Framework for Health Information Technology; HIT, health information technology; HSMLs, health service managers/leaders.

METHODS

Four steps were used to develop and test the guideline and the associated Broad Implementation Framework for HIT (BIFHIT).

1. Literature review to identify existing conceptual theories, frameworks and models in the implementation science literature and develop a draft framework.[8]
2. A set of semistructured interviews with senior health information system managers and leaders in NZ, to discuss the draft framework and add missing components, refine existing components, and discuss adjustments.[8]
3. The data were analysed thematically with the addition of memos as the researcher synthesised and developed the guideline and the BIFHIT.[9]

4. The first author tested the application of the BIFHIT framework and associated guideline in a national programme leadership role from July 2021 to June 2022. She used the BIFHIT guideline and table 1 as a memory aid throughout the process (see online supplemental file).

RESULTS

The literature review identified eight key themes within conceptual theories, frameworks and models, namely, clinical leadership, executive commitment, relationships and communication, vision, evaluation and measurement, funding constraints, human factors, and an Agile approach. Through the interview process, these themes were refined and updated. This formed the basis of the BIFHIT conceptual framework (see online supplemental file).

From the refined BIFHIT, the first author thematically drew out five key action areas, which form the basis of the guideline. Each action item has questions for health service managers/leaders (HSMLs) to systematically check to support the congruence of factors associated with HIT implementation success (see online supplemental file).

The five actions are as follows:

1. Involve and develop positive relationships between stakeholders early within implementation processes.
2. Establish and ensure a consistent vision for HIT success within the organisation.
3. Consider the attributes of the HIT system.
4. Ensure evaluation and feedback are iterative in approach.
5. Create a learning culture for implementation activities.

Table 1 highlights the links between key action areas and the BIFHIT.

Specific reflections of the first author in her national leadership role are as follows:

- Action 1: The implementation of large-scale digital transformation is dependent on bringing together various stakeholders to redefine the future collectively. HSMLs must have strong skills to build relationships, cocreate and execute HIT implementation across a mosaic of stakeholder groups. Leading relationally and including relevant voices early in conversations reduced regrettable decisions and created buy-in to the cocreated vision.
- Action 2: Vision is critically important to implementation success. It was vital to articulate the minimum 'must-do' actions to satisfy the collective vision. This prioritised the focus onto action and minimised the noise that inevitably arises from a large transformation effort. Communicating the vision and key updates was the most important thing to get right, but was challenging to continually ensure stakeholders had timely and relevant information. Communication is critical to retaining and attracting talent, as teams will feel particularly vulnerable during times of change.
- Action 3: Attributes of data and digital technology are crucial for successful implementation. Leaders needed to ensure that new technology procured was modern, adaptive and aligned with the strategic direction of HNZ. Cost considerations of the technologies (both capex and opex) were also vital. Proactive engagement with other business units and go-live contingency planning is vital to identify requirements early and manage risk.
- Action 4: Early and iterative feedback mechanisms are vital to ensuring the implementation effort remains true to the cocreated vision, while enabling timely responses to factors that may later inhibit implementation success. Agile methodologies can support this approach.
- Action 5: Embracing the opportunity to learn and grow through change is vital at all professional levels. HSMLs play a crucial role in developing this learning climate, namely one that tolerates failure, challenges the status quo, supports collaborative working and enables the exploration of innovative solutions.

DISCUSSION

The purpose of this article was to investigate how the guideline and framework performed in practice, leveraging the first author's experience in a leadership role in the NZ health reform. Her experience re-enforced the utility of the BIFHIT framework to bring awareness to the range of factors associated with implementation success, with the guideline and associated checklist supporting action-oriented application in practice.

A common theme through these reflections is that the success of digital implementation efforts has less to do with technology and more to do with people. For successful transformation at scale, HSMLs must have a learning mindset, extend outside their comfort zone and use skills to build relationships, cocreate a shared vision and execute across a mosaic of stakeholder groups. These findings are supported in the literature,[6 10] with Tagscherer and Carbon stating that digital transformation success depends on leaders who are visionary, embrace change and risk, and continually promote collaboration, relationship-building and teamwork.[10]

CONCLUSION

The BIFHIT framework brought awareness of the range of factors associated with implementation success, and the guideline enabled action-oriented application in practice. HSMLs are invited to test and leverage this guideline as a tool to navigate the uncertainty associated with HIT implementation and improve the congruence of factors associated with success.

Twitter Karen Day @KarenJDay

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ORCID iD

Samantha Erin Harding http://orcid.org/0009-0004-9077-4399

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