UCC
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Coláiste na hOllscoile Corcaigh

‘Empowering a culture of innovation in Irish hospitals’

A critical evaluation of three innovation methodologies.

Eimear Galvin, 120110995. Postgraduate Diploma in Innovation through Design Thinking.

"***Innovation is to make changes in something established, introducing new methods, ideas, or products. Any individual can practice and develop mastery of innovation skills, such as questioning, observing, experimenting, networking and associating***"

(Azar et al., 2021)

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Abstract

Health systems must constantly innovate. A new approach and way of thinking is required to keep the Irish system apace with global healthcare. This research provides a comprehensive understanding of three innovation methodologies. It examines application, level of use in healthcare and critically evaluates each in relation to the Irish health system. A systematic literature review collects and synthesises relevant research and publications to develop knowledge and facilitate theory development. Recommendations on the potential of these innovation methodologies to empower a culture of innovation in Irish hospitals are expounded. This is the first comparative review of these innovation methodologies, in the context of empowering an innovation culture in Irish hospitals: advancing knowledge, providing suitability guidance and recommendations for effective use.

Chapter 1 Introduction

1.1 Study rationale

Healthcare is contending with multiple challenges: increasing costs; changing patient demographics; evolving consumer expectations; complex health and technology ecosystems (Deloitte, 2019). The sector is in accelerated disruption with the Internet of Things (IoT) at its core and driven by consumers. Health systems must constantly innovate. In care delivery: responding to current, chronic and emerging disease burdens and rapidly ageing populations. In technology: use of emerging tools for diagnosis, treatment, management of previously fatal conditions. In new models of care: clinical, management, communications, data. Traditional leadership approaches of healthcare concentrating on operations and financial management will no longer suffice. Innovation is essential to shift the complex healthcare delivery system forward.

Healthcare innovation is a process that translates knowledge into products or services (Collins & Dempsey, 2019). Effective innovation is an organisation-wide endeavour that necessitates practice and processes for structured growth (Wylant, 2008). An innovative organisational culture has a shared vision for innovation and a shared belief system that permeates all aspects (Buchner et al., 2014; Huff et al., 2009). There is a strategic approach, experimentation and openness to new opportunities in a culture of innovation (Deloitte, 2018). A study in in the United Kingdom (UK) of senior management across 27 hospitals found that the employee/management dynamic is the principal predictor of innovation in these complex settings (McKee et al., 2019). An innovation culture is most likely to succeed when there is committed leadership, management support that encourages collaboration, a growth mind-set and participation from all teams, in an environment where failure is considered a learning opportunity (Deloitte, 2018; Buchner et al., 2014).

Globally, public investment in research and innovation is increasing to support an innovative citizen-centric approach to complex social and policy challenges. These difficult problems repeat in various guises unless the fundamental causes are addressed. This requires change and adjustment in thinking and approach (Yamuhci, 2014). Singapore's 'Public Service Division' comprising 145,000 officers across 16 ministries and 60 statutory boards has put an agile, entrepreneurial public service at the centre of a transformation agenda.

Crucial to government operations are teams skilled in human-centred design (Diaan et al., 2019). Use of new methodologies clarify the essential nature of a problem and change the approach to problem solving, resulting in solutions that are more effective. Finland, Norway, the UK and the United States (US) deliver policy innovation for more effective public services through cross-functional teams of design, digital and data. In late 2020, the Irish Department for Public Expenditure and Reform (DPER) published the inaugural public sector innovation strategy. One of its four strategic priorities is to embed an innovation culture across the public service (DPER, 2020, 11) -

> To create a culture of innovation where all staff are inspired, empowered and enabled to innovate. It is important that our people possess the capabilities, knowledge and mind-set to innovate every day. This includes possessing relevant skills, understanding and feeling inspired by leadership to apply an innovative lens to their everyday role.

The strategy, collectively developed by public sector agencies including health, was in response to a 2018 Deloitte report focused on enabling innovation in the Irish public service. Deloitte applied its own innovation assessment framework to review innovation maturity across five building blocks in Ireland's public sector. Novice is the lowest level of innovation maturity and expert the highest. Figure 1 details the current and target innovation maturity of the Irish public sector.

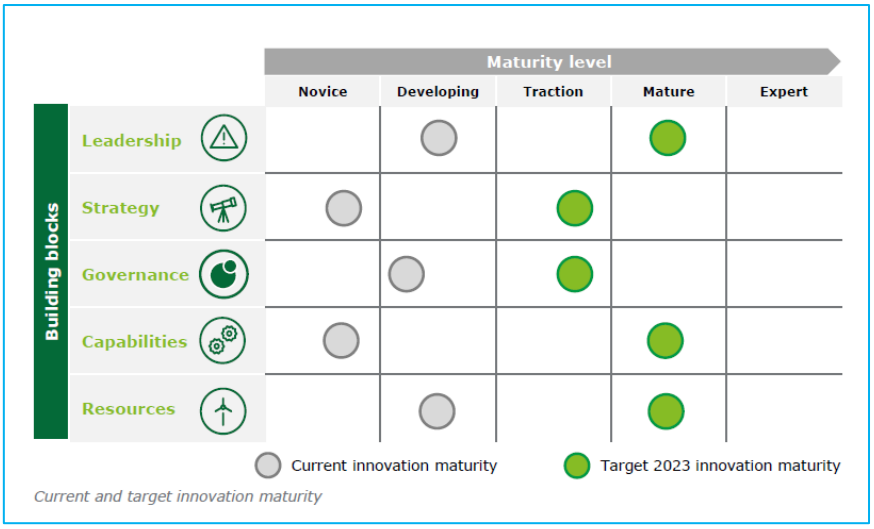


Figure 1: Current and target innovation maturity of the Irish public sector

Overall findings of the report include (Deloitte, 2018):

- Lack of knowledge and appreciation of innovation as a distinct discipline.

- Innovation leadership is not common in public service and middle management is seen as a barrier.
- Competency frameworks, recruitment, performance management, do not measure innovation.
- Individual innovation efforts go unacknowledged and fear of failure and resulting negative perception is prohibitive.

The Deloitte report (2018) is the first measurement of innovation within the Irish public sector. The resulting DPER strategy is encouraging but does not reach far enough to impact individual healthcare settings. There has been a massive shift in healthcare delivery globally and Ireland has remained largely static. With a small number of exceptions, innovation leadership and culture does not exist in Irish hospitals. Furthermore, there is a general lack of knowledge, discussion and understanding of healthcare innovation – mind-set, methods and potential impact - despite its rapid proliferation in global healthcare. This research proposes a critical evaluation of innovation methodologies and their potential to empower a culture of innovation in Irish hospital settings.

1.2 Objective of the study

Working in the area of healthcare innovation, the researcher is aware of some appetite for system change in Irish healthcare. This coupled with the current policy support to move innovation to a strategic function throughout the public sector makes it an opportune time for radical innovation in Irish healthcare. A European Commission report (2019) defined 'radical innovation' as supplanting configurations, workforce, processes, products, services and technologies, rather than an incremental shift. If a sustainable culture of innovation is to be created within the Irish healthcare system, then leaders and problem-solvers must be empowered and thinking converted into action. This research proposes a critical assessment of potential innovation methodologies as a starting point, to begin to create a framework through which hospital sites might achieve a tangible, measurable innovation culture.

1.3 Study Design

Mechanisms to shift attitudes and behaviours that drive a radical culture shift are challenging to implement. 'Theory U' is an innovation and purpose-led transformation methodology developed by Otto Scharmer at Massachusetts Institute of Technology (MIT). Theory U predicates on the belief that there are many ways to solve complex problems. The five movements of the U as depicted in Figure 4 apply to the macro level of change, innovation and group discussion and individual interaction, with an innovation eco system emerging (Scharmer, 2007). Observation and immersion are key with subsequent reflection. During this period of reflection, new knowledge and ideas can surface which have the potential for change. Prototyping and experimentation follow to reveal learning that informs a solution to progress.

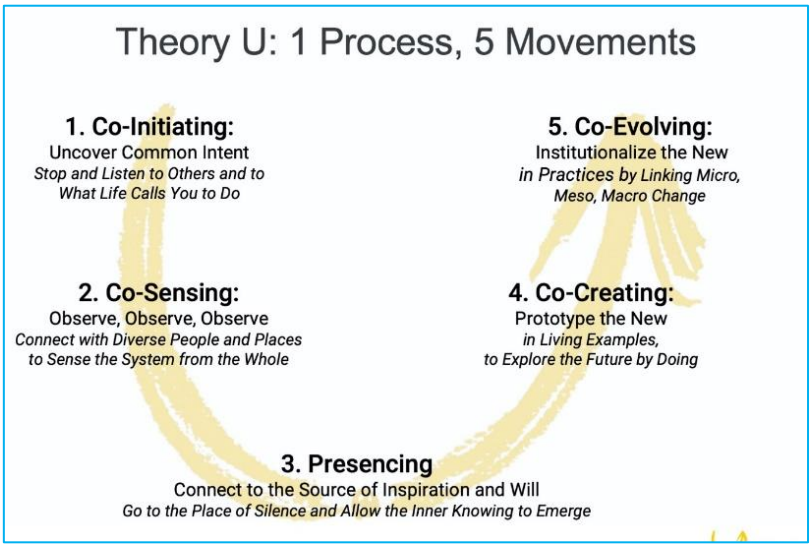


Figure 2: Theory U

Akin to 'systems thinking', Theory U solves complicated management problems through organisational systems insight and the attitudes and behaviours (mental models) of problem solvers (Yamuhci, 2014; Hassan, 2015). Innovation becomes the response to ongoing work rather than a crisis reaction. As a conceptual framework, Theory U is a useful guide. It reframes the problem by highlighting and resolving the overdependence on routine problem solving approaches, which hinder innovation (Scharmer, 2007). Cognisant of key elements of Theory U - observation, immersion, listening, learning, adapting, experimentation, stakeholder perspective, action - three innovation methodologies are identified for potential in empowering a culture of innovation in Irish healthcare. This research will critically assess Lean Startup, Design Thinking and Agile methodologies applied across various settings for innovative practice.

Increasingly, Design Thinking is applied for industry innovation facilitating strategic opportunities and fostering an innovation culture within organisations (Baker & Moukhliss, 2019). Design Thinking's open social interaction and conversation that encourages knowledge sharing can form an innovative culture (Liedtka, 2017). Experimentation, rapid testing, incremental redesign and early customer insight are features of Lean Startup (Breaud et al., 2020; Blank, 2013). Rapid change, learning and adapting are central tenets of Agile (Carlile et al., 2019; Kumar, 2018).

A systematic literature review collects and synthesises relevant research and publications to develop knowledge and facilitate theory development and recommendations on the potential of these innovation methodologies to empower a culture of innovation in Irish healthcare (Snyder, 2019). Chapter 2 defines the problem and challenges in Irish hospital settings. Chapters 3, 4 and 5 employ the Driscoll model of reflection, depicted in Figure 5 to examine each innovation methodology (Edwards, 2017).

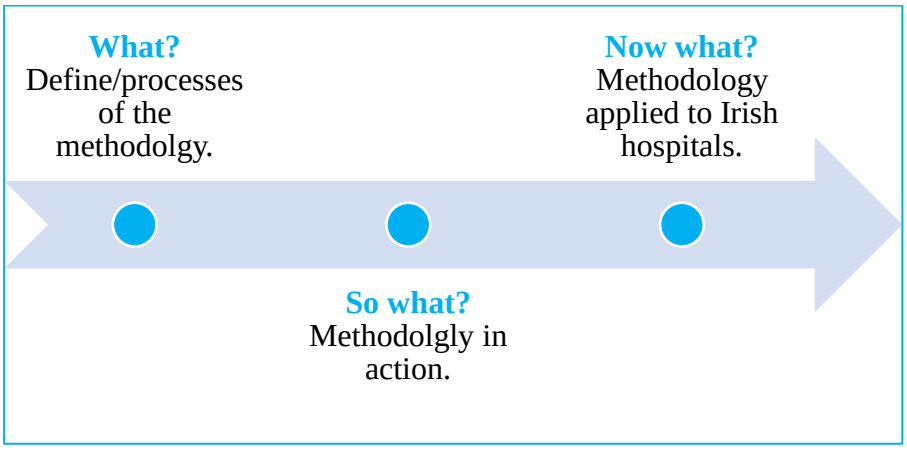


Figure 3: Driscoll model of reflection

The researcher spoke with some experts in the fields of Lean Startup and Design Thinking while gathering data. Through structured questions, a number of brief viewpoints were captured on these subjects and are shared in Chapters 3 and 4. A concept centric matrix in Chapter 6 identifies common themes in each methodology. A detailed comparison of the three, a critical evaluation of each in empowering a culture of innovation in Irish hospitals follows and key learnings are summarised. Chapter 7 condenses the principal findings and the implications of these along with areas for further study.

1.4 Key contributions

As the first comparative review of innovation methodologies, in the context of empowering an innovation culture in Irish hospitals, this research will:

- Build and advance knowledge in an under-researched area.
- Formulate recommendations for most effective use of these methodologies in Irish hospitals.
- Provide suitability guidance for application of each methodology in an Irish hospital setting.
- Suggest further research for Irish hospitals in healthcare innovation, a global imperative suffering a paucity of knowledge in the Irish health sector.

Chapter 2: Problem definition

The blueprint in Figure 4 outlines the evolution of the problem definition for this research.

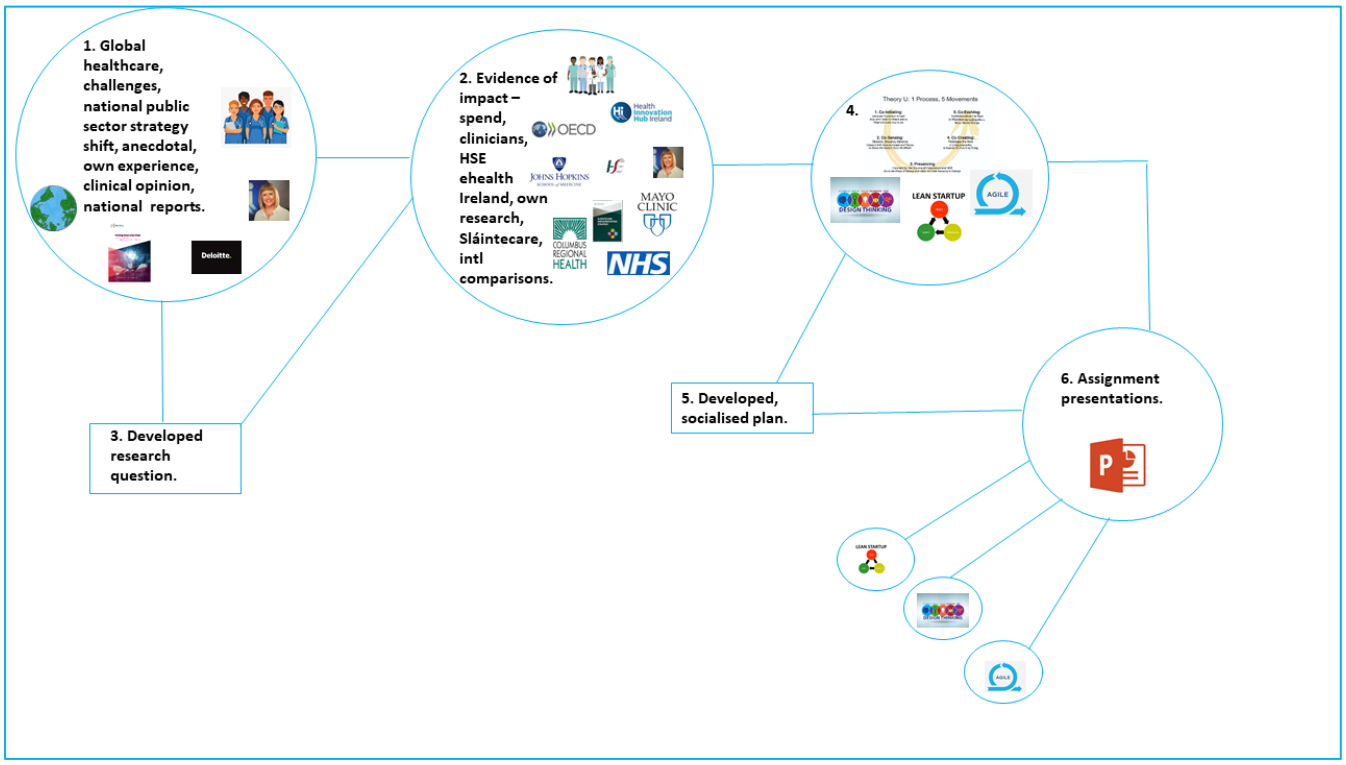


Figure 4: Research blueprint

2.1 Problem to be addressed

In line with the Deloitte (2018) findings discussed in Chapter 1, the Irish public health system is a slow adopter of innovation. It remains to be seen if reactive strides taken during Covid-19, largely in the areas of telehealth and remote patient monitoring, are sustained (Galvin, 2020). Ireland spends €4,706 per head of population on healthcare, one-third more than the average across 35 member countries of the Organisation for Economic Co-operation and Development (OECD) (Burns, 2018). National healthcare outcomes do not reflect this spend. The Irish health system delivers a mix of private and public hospital care. Ownership and funding of private hospitals are the business of the organisation. Health Service Executive (HSE) 'statutory' hospitals are wholly HSE owned, controlled and funded. 'Voluntary hospitals' receive some HSE funding, but are owned and run by religious trusts and have more autonomy (Mercille, 2018). A more progressive culture of 'doing' is perceived in these sites, which is likely to influence innovation efforts (Galvin, 2020). There was some national innovation encouragement from the HSE's 'eHealth Ireland' during the early to mid-2010s under former Chief Clinical Information Officer (CCIO) Richard Corbridge.

Initiatives included a national health innovation week, innovation challenges and idea accelerators (Cocking, 2016).

For a short period, the HSE Quality Innovation Corridor (QIC) digital innovation program aimed to open up innovation pathways, facilitate collaboration between clinicians, industry and academics to seek innovation seed-funding. The programme is no longer running and there are currently no plans to reinstate it (Galvin, 2020). In a study conducted by the researcher in 2020, eHealth Ireland ascribed the discontinuation of innovation activity to personnel change (Galvin, 2020). In the context of this research, it is worth noting that despite laudable aspirations, the activity of the early to mid-2010s did not result in a culture of innovation in Irish hospitals. Leading clinicians admit, "The healthcare system is in desperate need of new ideas and new solutions to deeply embedded problems" (Higgins, 2018). That innovation requires constant encouragement across all levels in Irish healthcare and a related measure should be included in performance reviews (Galvin, 2020). National performance management systems currently concentrate on efficiency; innovation does not feature (Arisha & Mesabbah, 2016). Sláintecare, a national ten-year change programme for Irish health and social care services, criticised the health service as being one that operates in silos (Sláintecare, 2018). All of the problems identified in the Deloitte report (2018), those decried by clinicians, identified in national strategy and independent research are recurring. To manage the innumerable health challenges posed in an ever-shifting environment, a new approach and way of thinking is required to keep the Irish system apace with global healthcare.

Government initiative, Health Innovation Hub Ireland (HIHI), drives collaboration between the health service and enterprise (Galvin, 2020). Delivering on-site testing and development for companies and offering clinical teams the opportunity to use innovative products. It also supports some innovation efforts in the health system. In 2019, HIHI ran a limited number of innovation workshops for frontline workers introducing Design Thinking and innovation practices, in which the researcher was involved. All of the workshops were oversubscribed, evidence of appetite for new ways of working within the system (Donnelly, 2020). Contrast this to efforts in the US and the UK driven by policy, national systems, individual site strategy and it becomes clear that workshops alone are not sufficient. The UK's national health service (NHS), most comparable to the HSE, has been pushing innovation as a strategic imperative and 'innovation action' as a core competency for over a decade (NHS, 2015; NHS, 2010).

Admittedly, there are differences between the US and Irish healthcare systems, not least revenue models, but there are important lessons to be learned there in the value placed on innovation culture. US Sites such as the Mayo Clinic and John Hopkins have made innovation methodologies an in-house skill and resource, central to management and care delivery (Allen et al., 2017; Neren, 2010).

In the mid-2000s the leadership team at Columbus Regional Health (CRH), Indiana, began a strategic approach to innovation (Berte & Narapareddy, 2018). Two champions led the initiative and benchmarked successes in similar organisations. A partnership with innovation consultancy IDEO developed the CRH 'Care Delivery Redesign' with Design Thinking at its core. A physical space - the Innovation Centre (IC) - offers training in innovative methodologies. A formal innovation framework was developed, detailed in Figure 5 upon which an innovation scorecard, detailed in Figure 6, delivers annual innovation measurement (CRH, n.d.).

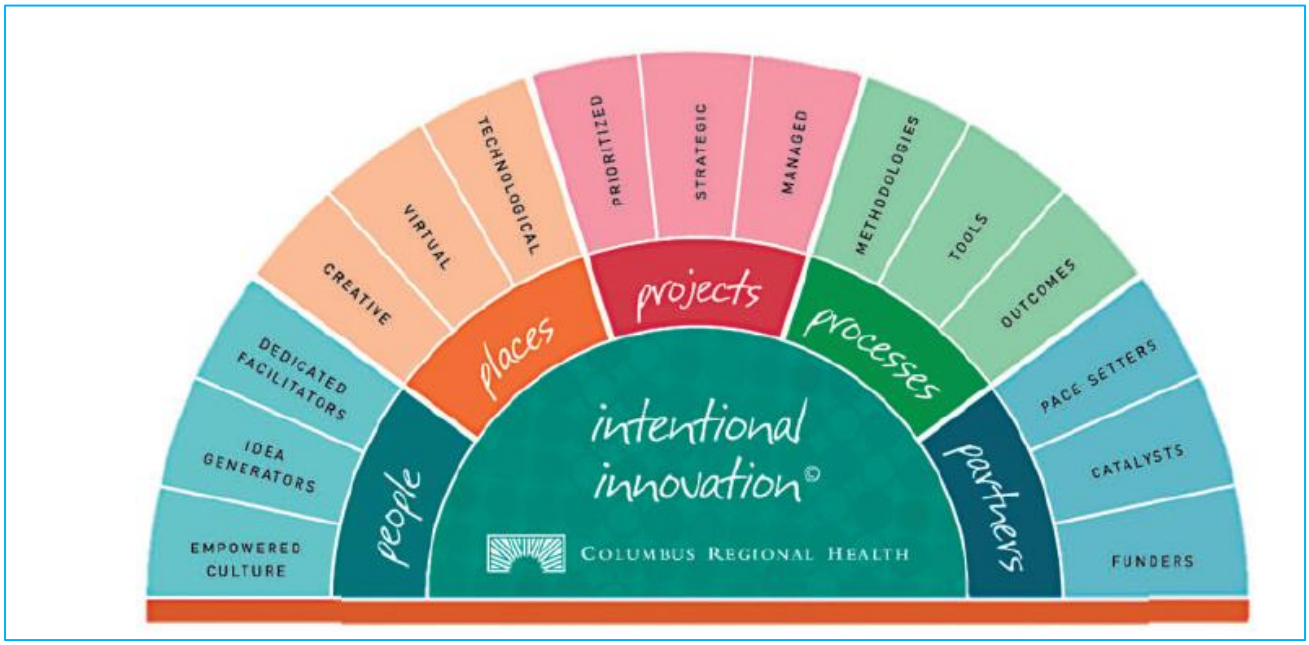
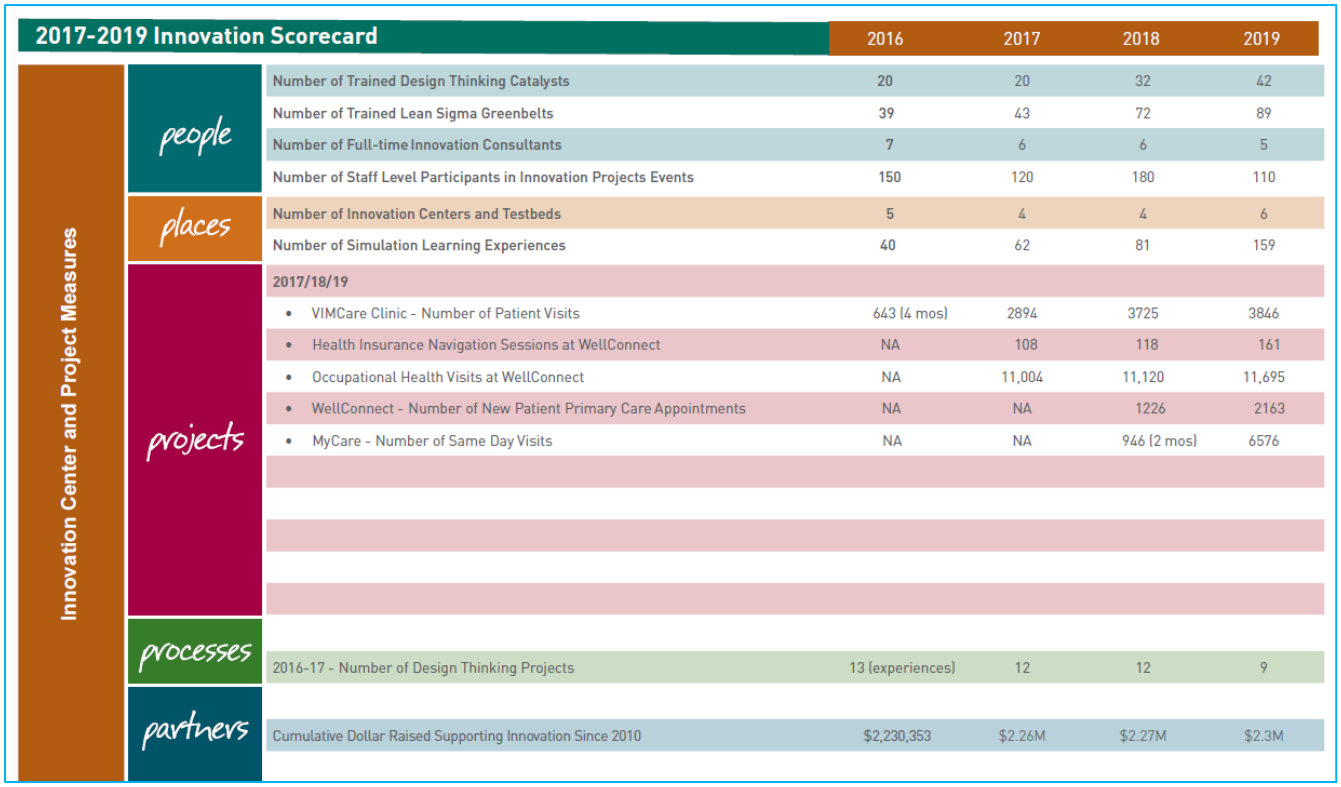


Figure 5: CRH Innovation framework



2017-2019 Innovation Scorecard		2016	2017	2018	2019
Innovation Center and Project Measures					
people	Number of Trained Design Thinking Catalysts	20	20	32	42
	Number of Trained Lean Sigma Greenbelts	39	43	72	89
	Number of Full-time Innovation Consultants	7	6	6	5
	Number of Staff Level Participants in Innovation Projects Events	150	120	180	110
places	Number of Innovation Centers and Testbeds	5	4	4	6
	Number of Simulation Learning Experiences	40	62	81	159
projects	2017/18/19				
	• VIMCare Clinic - Number of Patient Visits	643 (4 mos)	2894	3725	3846
	• Health Insurance Navigation Sessions at WellConnect	NA	108	118	161
	• Occupational Health Visits at WellConnect	NA	11,004	11,120	11,695
	• WellConnect - Number of New Patient Primary Care Appointments	NA	NA	1226	2163
	• MyCare - Number of Same Day Visits	NA	NA	946 (2 mos)	6576
processes	2016-17 - Number of Design Thinking Projects	13 (experiences)	12	12	9
partners	Cumulative Dollar Raised Supporting Innovation Since 2010	$2,230,353	$2.26M	$2.27M	$2.3M

Figure 6: CRH Innovation scorecard

By 2013, CRH had 25 individuals trained in innovation methodologies working across all areas. The following year the IC filed savings of approximately $2.8 million related to innovation projects (Berte & Narapareddy, 2018). There are only two examples of innovation positions in Irish hospitals. Tallaght University Hospital, Dublin and Cork University Maternity Hospital recently hired innovation leads. The shift in CRH can be described as 'radical innovation'.

2.2 Problem statement

Evidence abounds of the success in placing a culture of innovation at the core of public services – Singapore, EU, UK. In healthcare, locally led in hospital settings – Mayo Clinic, John Hopkins, CRH, NHS sites. The culture of these sites is formed through use of methodologies that reframe complex problems, offering new ways of thinking and approaches. It is necessary to implement radical innovation in Irish hospitals to move the system forward. A comprehensive assessment of three innovation methodologies in Chapters 3, 4, and 5 examines application, level of use in healthcare and critically evaluates the potential of each in Irish settings to resolve -

How might we empower an innovation culture in Irish hospitals?

Figure 7: Problem statement

Chapter 3: Lean Startup

3.1 Lean Thinking and Lean Startup

To understand Lean Startup it is necessary to understand Lean Thinking. Lean Thinking is a systematic approach to identify and eliminate waste through ongoing improvement (Adams et al., 1999). The Toyota Production System is the primary source of Lean Thinking (Rigby et al., 2016). The philosophy outlined in Figure 8 concentrates on adding value, improving quality, reduction of waste.

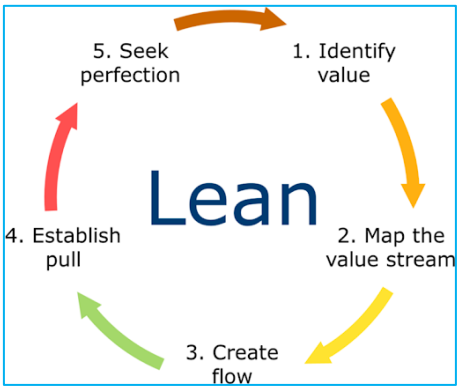


Figure 8: Lean Thinking

'Lean Healthcare' is the application of Lean Thinking ideas in healthcare, focused on reducing waste and continuous improvement (Lawal et al., 2014). In Ireland, The Mater Lean Academy (attached to the Mater Hospital, Dublin) offers programmes improving healthcare processes. In 2008, entrepreneur Eric Ries and financial advisor Steve Blank applied Lean Thinking to the creation of new products. The central tenet of 'Lean Startup' is that waste occurs if you develop something nobody wants, with five principles underpinning it (Blank, 2013):

- **Entrepreneurs are everywhere** – competitors are everywhere.
- **Entrepreneurship is management** – not just developing an idea, business management.
- **Build-Measure-Learn** – learn quickly and adjust.
- **Validated learning** - track feedback and performance.
- **Innovation accounting** – KPIs and milestones.

3.2 Lean Startup defined

Experimentation, rapid testing, incremental redesign and early customer insight to encourage failing fast and continuous learning, feature throughout the literature on Lean Startup (Breaud et al., 2020; Harms & Schwery, 2019; Mollick, 2019; Blank, 2013).

The literature contends that the difference between a company's vison and 'customer wants' can be resolved through use of Lean Startup tools. Iterative experimentation and customer insight explore an opportunity at an early stage (Harms & Schwery, 2019; Calado et al., 2013). Testing combinations of product and market through the Lean Startup methodology can result in product/market fit, demonstrating product demand with a viable solution to meet it (Mollick, 2019). The literature goes further to suggest that Lean Startup can create new meanings through co-creation of new business models with stakeholders (Bocken & Snihur, 2020). The iterative design that Lean Startup enables in place of 'big design up front' is valued throughout industry (Blank, 2013). Lean Startup is a methodology that can enable ongoing innovation through iterative experimentation, engaging stakeholders and rapid learning.

3.3 Lean Startup processes

There are three key steps in the Lean Startup process - the business model canvas, the minimum viable product (MVP) and the pivot. The business model canvas seeks to understand the assumptions behind an idea (Mollick, 2019). A one page visual focuses on strategic elements that will affect growth – presented in Figure 9. Used to visualise the building blocks required to develop the idea, it covers areas such as value proposition, customer segments, and resources. Criticism of the business model highlight a lack of framework to support development and testing of unique targeted theories (Bocken & Snihur, 2020).

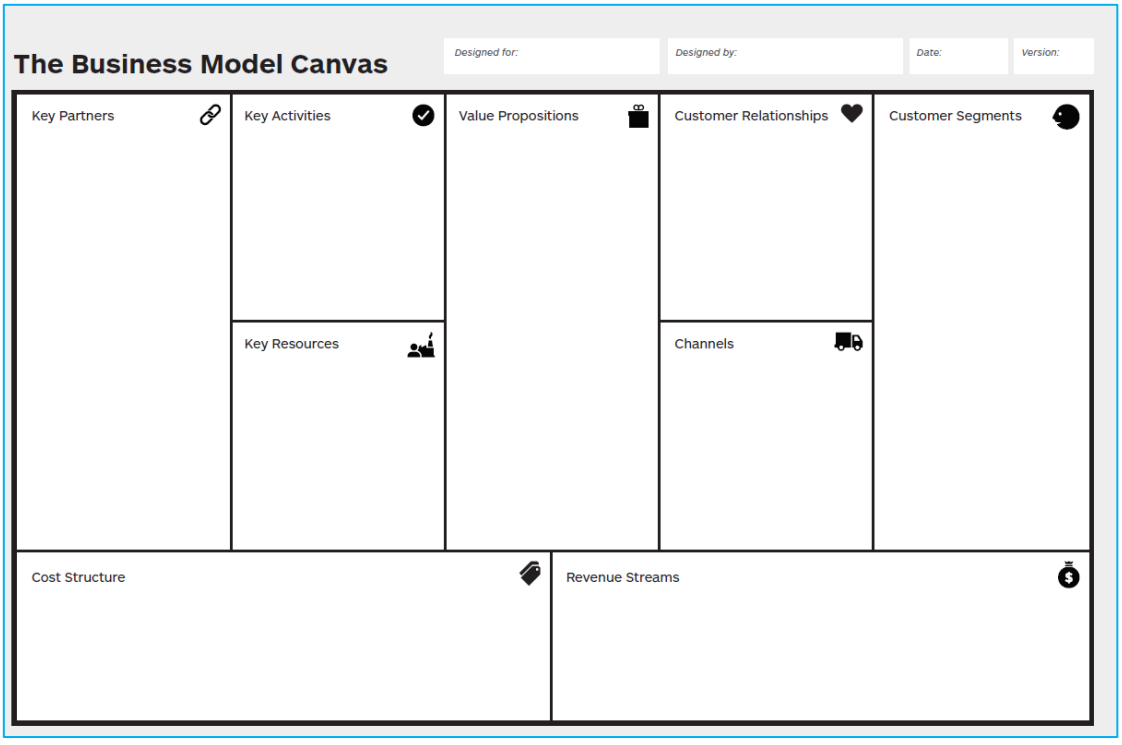


Figure 9: Business model canvas

The MVP is used to answer key questions on an idea or product. Rather than perfecting a market offer that may not meet demand, an MVP representing it can be built cheaply and tested. The feedback gathered can inform creation of the right offer (Ries, 2011). This early interaction and testing is a core advantage of Lean Startup saving money, time and resources (Blank, 2013; Ries, 2011). The ability to pivot, change and modify an offer until it meets demand is critical. Early feedback from MVPs and iteration with stakeholders can reframe and adapt a business model (Bocken & Snihur, 2020).

3.4 Lean Startup in action

Companies have developed sustainable business models through experimentation and iteration (Kaushik, 2020; Snihur, 2018). Table 1 details two companies that used Lean Startup to test assumptions, yielding radical innovations.

Company	Lean Startup
salesforce	Through experimentation and adjustments, Salesforce introduced a cloud-based subscription business model to the software market. The company identified capability gaps and filled these with its technology.
Dropbox	The target market had no experience of seamless file sharing. Dropbox created an MVP, a video demonstrating the capability of its tech. This had immediate impact and generated significant attention. This was interest validation in action – the Dropbox team being able to gauge the level of customer interest in their novel technology.

Table 1: Lean Startup company success

Process improvement is applied in many healthcare organisations, but few use methods like Lean Startup that generate small wins and promote quick learning from failure (Bhattacharyya et al., 2019). The IC at CRH, discussed in Chapter 2, adapted Lean Startup to transform financial performance and employee engagement through Rapid Transformation Cycles (RTCS) – Figure 10 (Breaud et al., 2020).

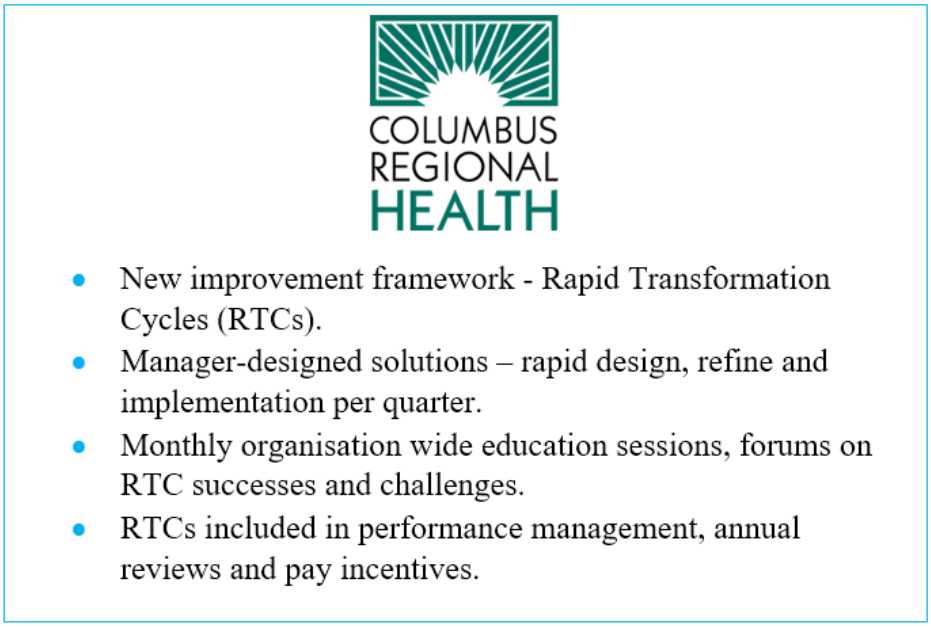


Figure 10: CRH RTCs

As part of a programme educating staff and students on the principles of commercialisation and entrepreneurship, Lean Startup is taught at the Mayo Clinic Office of Entrepreneurship. The office seeks to build a culture of innovation and entrepreneurship through a five-pillared approach outlined in Figure 11:

Figure 11: Mayo Clinic Office of Entrepreneurship

Part of the formal education offer is one module in a series of five entitled ‘Case studies in entrepreneurship’, defining the idea and value proposition via business hypothesis testing. Three other modules build on the idea through ‘financial business case’, ‘minimum viable product’ and a new module launching this summer (2021) to support funding applications.

Dr Maarten Rotman, Manager for Entrepreneurial Education shared some more detail with the researcher contained in Figure 12.

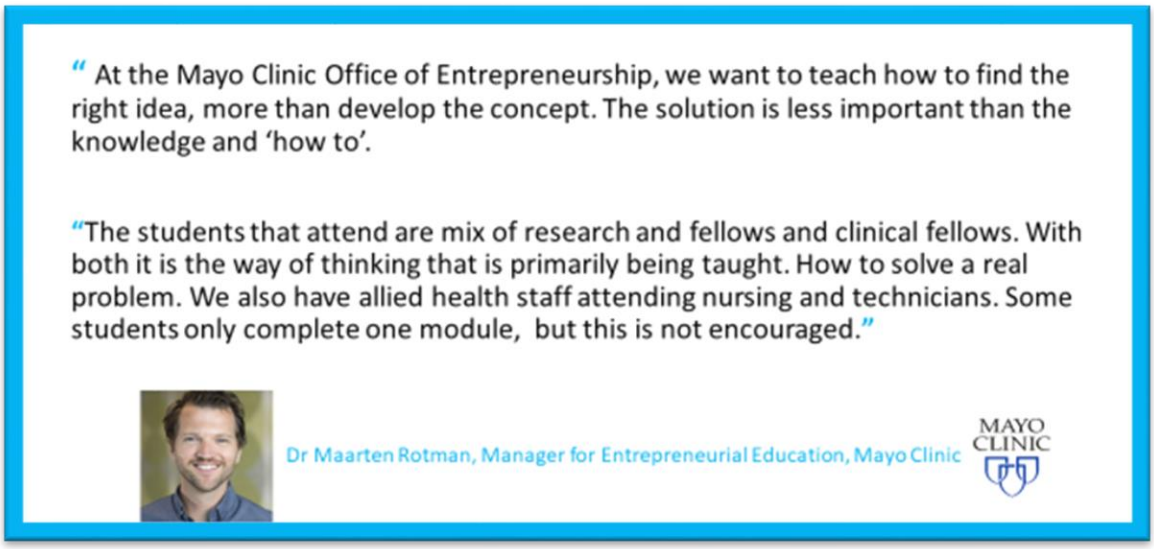


Figure 12: Dr Maarten Rotman Mayo Clinic

There are examples of Lean Startup in life sciences. In a programme that seeks to expedite findings and innovations in life sciences to market, Steve Blank teaches Lean Startup techniques - rapid assessment of intellectual property and regulatory risks - at Berkeley's Haas School of Business (Dhoul, 2019). Training offered to the US winners of Small Business Innovation Research grants (SBIR) focuses on moving technologies to market using Lean Startup tools (Annett, 2015).

3.5 Lean Startup as an innovation methodology in Irish healthcare?

Lean Startup's early interaction and testing with stakeholders can save money, time and organisational resources, all valuable to the challenging environment found in a hospital setting. The experimentation process encourages quick learning from failure and generates small wins - an impetus for change and innovation. Rapid identification of value creators and non-value-add activity could create efficiencies in a hospital culture. Conversely, the incremental feedback of Lean Startup could narrow the focus and stymie future innovative solutions. In that vein, Lean Startup does not focus on or support ideation. As highlighted in Chapter 2, Irish healthcare needs ideation. Lean Startup is not currently considered in Irish healthcare and Lean Healthcare is regarded as an improvement process. The Manager of the Mater Lean Academy, Aileen Igor confirmed this to the researcher, as per Figure 13.

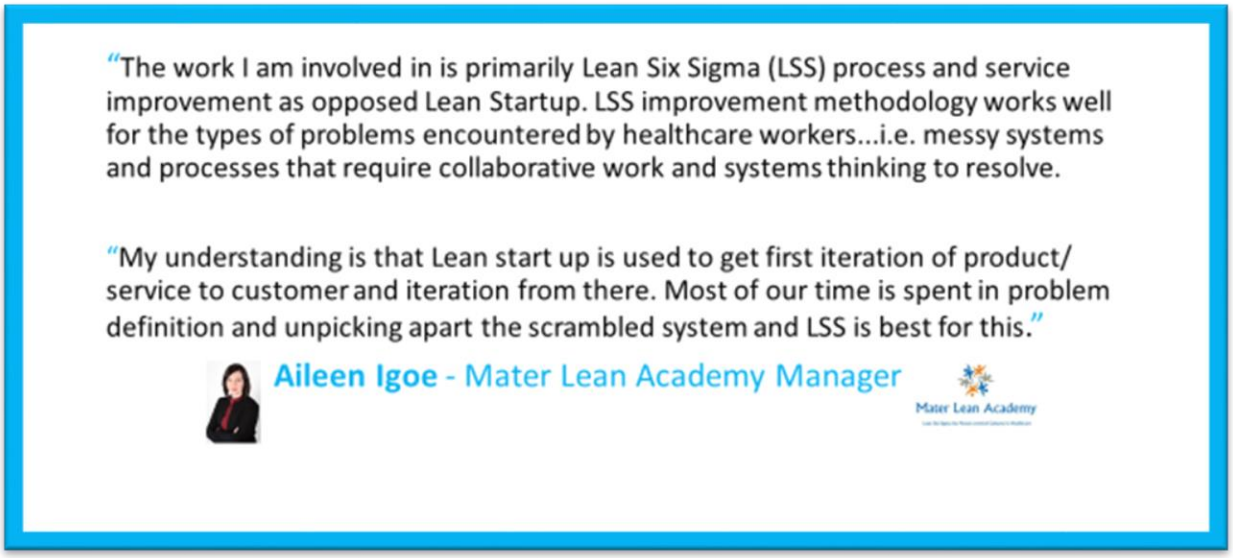


Figure 13: Aileen Igoe, Mater Lean Academy

In the Mayo Clinic and Berkeley, the potential of Lean Startup to shift mind-sets is recognised but as part of an education programme with commercial product success as its goal. There are obvious benefits to using it as an innovation methodology. As a tool for rapid development, testing and improvement, it works. However, there were few examples of Lean Startup in-use in hospital settings and so it remains largely untested in this environment. It has been applied successfully in one instance in CRH, proving efficacy in departmental function and process improvement. Lean Start up could be used as an innovation tool, in a non-linear adaption to support some innovation activity in a hospital setting. However, the strategic focus required to engineer a significant internal shift in mind-set and behaviours in a large complex organisation requires more.

Chapter 4: Design Thinking

4.1 Design Thinking defined

Design Thinking presents a human-centred, prototype-driven process for use in product, service, and business design (Carroll & Richardson, 2016). In management literature, Design Thinking is applied for industry innovation and can positively impact strategy and system change (Baker & Moukhliss, 2019; Beverland et al., 2019; Windhal, 2017). Design Thinking can foster an innovation culture through open social interaction, encouraging knowledge sharing (Liedtka, 2017). Fostering team alignment builds trust and increases engagement, developing a 'social technology' for better conversations. Social technology can underpin the mind-set that helps achieve sustainable innovation objectives (Malcom et al, 2019). Design Thinking offers a well-defined and recognisable practice framework for the integration of creative, interdisciplinary and human-centred approaches to healthcare management, innovation and practice (Bent et al, 2016). The literature highlights the need for Design Thinking to be applied with a solid rationale for use in an organisation to avoid spurious application and that an agreed an agreed structure of skills should guide development of Design Thinking competencies (Beverland et al., 2019; Iskander, 2018).

4.2 Design Thinking processes

There are multiple Design Thinking process models including (Achala at el., 2019):

- Stanford d.school (The Hasso Plattner Institute of Design at Stanford, Stanford, California) - understand, observe, point of view, ideate, prototype, test.
- Double Diamond model - discover, define, develop, deliver.
- IDEO - observation, ideation, rapid prototyping, user feedback, iteration, implementation.
- Google (Mountainview, California) design sprints - understand, diverge, decide, prototype, validate.

Common to all the approaches are the iterative steps outlined in Figure 14. Empathy and understanding are key to defining the specific problem/challenge.

Conceptualising, ideating potential solutions, and finally, experimenting with prototyping to meet user needs.

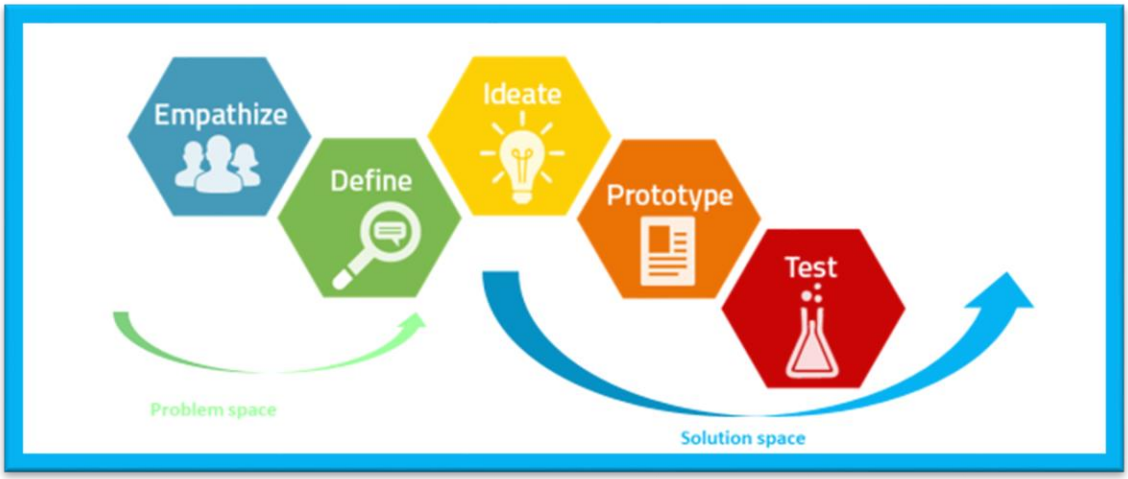


Figure 14: Design Thinking process

Frequent use of ethnographic research techniques is common - observation and interviews, journey mapping, jobs-to-be-done (JTBD); brainstorming and concept development techniques; visual tools of mind mapping and storyboards for prototyping; and solution test methods (EGFSW, 2020; Beverland et al., 2019; Buhring & Liedtka, 2018; Liedtka, 2017; Windhal, 2017). A relatively recent addition to Design Thinking is reflective journaling for deeper understanding and learning.

4.3 Design Thinking in action

Unlike Lean Startup explored in Chapter 3, many aspect of healthcare have embraced Design Thinking (Allen et al., 2017). Johns Hopkins Hospital actively uses the Design Thinking process to improve patient care. Focusing on the patient experience, a team of empathy coaches teach caregivers how to collaborate with patients. The Design Institute for Health, a collaboration between The Dell Medical School and the College of Fine Arts at the University of Texas-Austin, partners with healthcare sites for innovation through Design Thinking (Chenoweth, 2018). Philips healthcare consultancy use a multi-disciplinary iterative method to problem solve in healthcare with stakeholders – physicians, patients, healthcare management (*Design Thinking in Healthcare | Philips Healthcare Consulting*, n.d.). Figure 15 outlines a recent case study in Sweden.

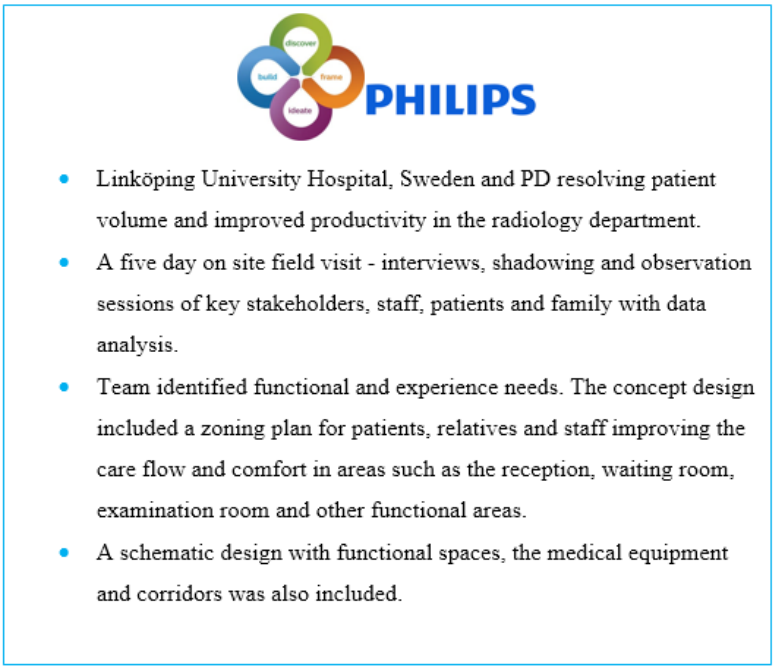


Figure 15: Philips co-create model

The department of obstetrics and gynaecology at Mayo Clinic used Design Thinking to reimagine prenatal care (Allen et al., 2017), detailed in Figure 16.

Figure 16: Mayo Clinic, obstetrics and gynaecology

Inspired by Stanford University's Stanford Biodesign, the National University of Ireland Galway (NUIG) launched BioInnovate in 2011. The one-year BioInnovate fellowship program centres on product innovation.

Using empathy to discover a therapy area problem through clinical immersion, primary and secondary research, and develop a commercial solution. In partnership with the National College of Art and Design (NCAD) both the Mater Hospital and St James's Hospital in Dublin, run an annual Design Week competition. Frontline staff submit challenges and NCAD students develop a needs-based solution to the top five entrants. As an academic exercise, it is extremely beneficial to the students to work on real life healthcare challenges. However, the competition does not seek to train or educate the healthcare staff involved in the principles of good design. A recent national HSE competition 'Design on the frontline' was a call to external designers to meet three specific healthcare challenges. For a competition that cites the need for innovation, creativity and change in Irish healthcare as its genesis, it is disappointing that it did not look inward for sustainable solutions through upskilling interested staff and system change.

4.4 Design Thinking as an innovation methodology in Irish healthcare?

Design Thinking has expanded from the past association of solely product to being a driver of cultural change in organisations. Undoubtedly, the human centred approach of Design Thinking - identifying a core problem, need and solution - can provoke change in a healthcare system. Ample evidence of successful application of Design Thinking in US healthcare exists from service to product design. However, much less so in Ireland, confirmed through three short interviews conducted during this research. Participants highlighted the value of Design Thinking, its success in product innovation and its potential in Irish healthcare sites. Through brief structured questions, three different viewpoints are captured outlined in Figure 17. Participants included:

1. Former Chief Physicist/Clinical Engineer Hospital, current Innovation Consultant (P1)
2. Professor in Operations Management, Irish University (P2)
3. Director Business Development, Creative Design Agency (P3)

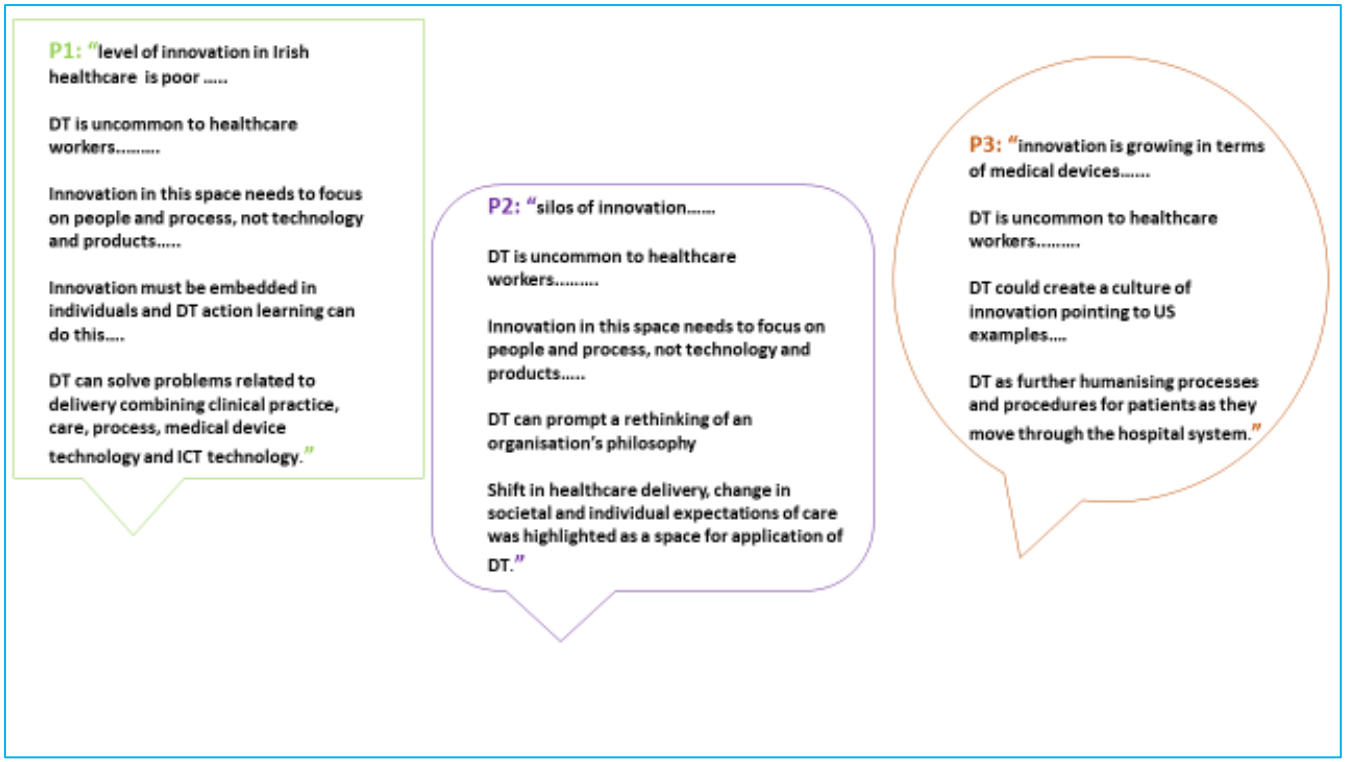


Figure 17: Participant responses

Through programmes such as BioInnovate and some consultancies, Design Thinking is in use in Ireland in product design. There is little evidence of its success in Irish healthcare organisation and management – the source from which a culture emanates. The questioning of biases, encouraging curiosity, upskilling through Design Thinking processes can build on site innovators. An organisation-inspired Design Thinking structure would prove most effective. The benefit of 'social technology' created from Design Thinking's processes – building engagement, trust and better conversations - has huge potential to engineer a culture shift. In fact introducing the concept in medical education for cognitive development could be valuable. It is never too early to learn 'social technology' and this would cultivate the mind-set prior to entry into a hospital setting.

Chapter 5: Agile

5.1 Agile defined

In 2001, 17 US developers produced a 'Manifesto for Agile Software Development'. Work techniques facilitating faster adaptation to rapidly changing environments based on 12 operating principles, outlined in Figure 18 (Rigby, 2016; Gonsal, 2015).

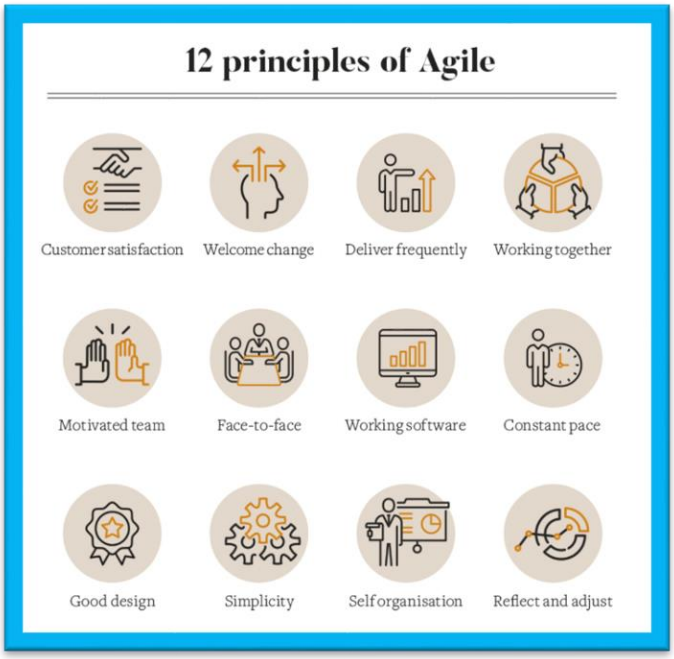


Figure 18: Principles behind the Agile Manifesto

The four values underpinning the principles are:

- people over processes and tools
- working prototypes over excessive documentation
- respond to change rather than follow a plan
- customer collaboration over rigid contracts

Since 2001, all development frameworks that align with these values and principles are deemed Agile techniques (Rigby, 2016).

5.2 Agile processes

As with Lean Startup and Design Thinking there are very distinct processes to Agile documented throughout the literature.

Rapid change is a common feature. Agile moves companies from detailed planning to one that embraces and expects change (Carlile et al., 2019; Kumar, 2018; Berez, 2016). Learning and adapting are central tenets of Agile and consequently the organisations that apply it as a methodology. Figure 19 compares the traditional workflow with Agile (*What Is Agile Project Management? A Comprehensive Guide*, n.d.).

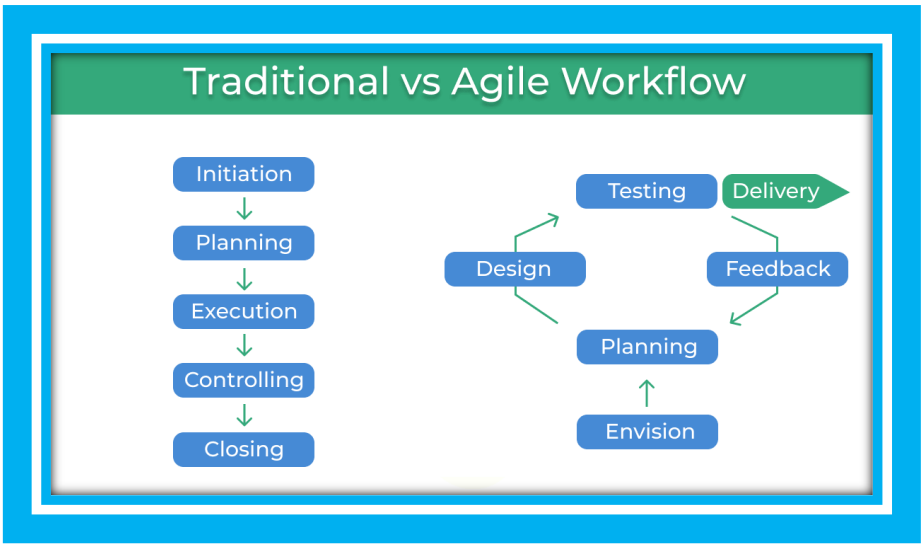


Figure 19 Traditional Vs Agile workflow

The most common technique through which Agile is implemented is known as 'Scrum'. A small cross-functional team that is self-managing and accountable for every aspect of agreed-upon priority tasks (Berez, 2016; Rigby et al., 2016). The iterative component to Agile directs the work, rather than a detailed plan. Scrum teams commit to a set of deliverables during a fixed time sprint to produce working solutions (Azar et al., 2021; Berlin et al., 2019; Kumar, 2018). Figure 20 contains the Agile Scrum Framework (Terry, 2019). Agile has been criticised as prohibiting reflection on needs, due to the speed of its processes (Bryar & Carr, 2021).

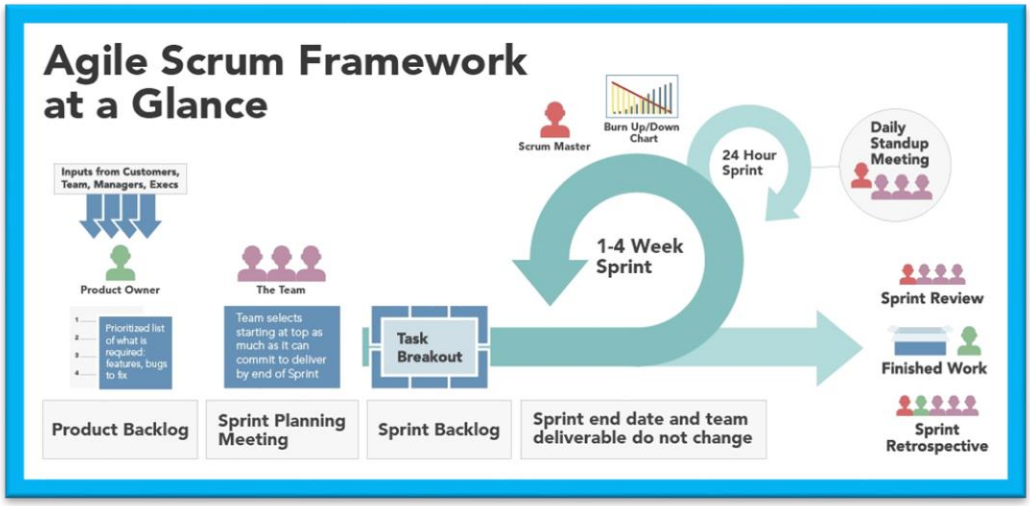


Figure 20: Agile Scrum Framework

Environments in which Agile can thrive are those that are subject to frequent change (Rigby et al., 2016; Brommels et al., 2015). Members of an Agile team retain their usual line management. The authority lies not in hierarchy, rather in decision making at various stages throughout the Scrum facilitating flexibility and speed (Berlin et al., 2019; Osmond, 2019). The participative way in which Scrums work promotes social interaction through the cross section of skills and disciplines collaborating (Carlile et al., 2019; Huff et al., 2009). By recruiting a cross-disciplinary team into a collaborative process, a broader organisational experience is shared and, similar to Design Thinking's 'social technology', trust and respect grows.

Agile methods can only proliferate and achieve success if there is understanding and buy-in from senior leadership. Many organisations executive teams continue to manage in ways contradictory to Agile principles and practices, undermining the effectiveness of Agile teams in units that report to them (Rigby et al., 2016). In one healthcare specific study, 80 per cent of healthcare leaders expressed enthusiasm for Agile, yet more than half are not familiar with the tools. Consequently, they are not using Agile in their companies (Berez et al., 2019). Coaching and teaching at this level could fortify application of Agile (Berez et al., 2019; Brommels et al., 2015).

5.3 Agile in action

As with Design Thinking, there are examples of Agile use in healthcare. Intermountain Healthcare in the US applied an Agile method to improve management strategy and communication across 23 hospitals, detailed in Figure 21 (Harrison, 2018).

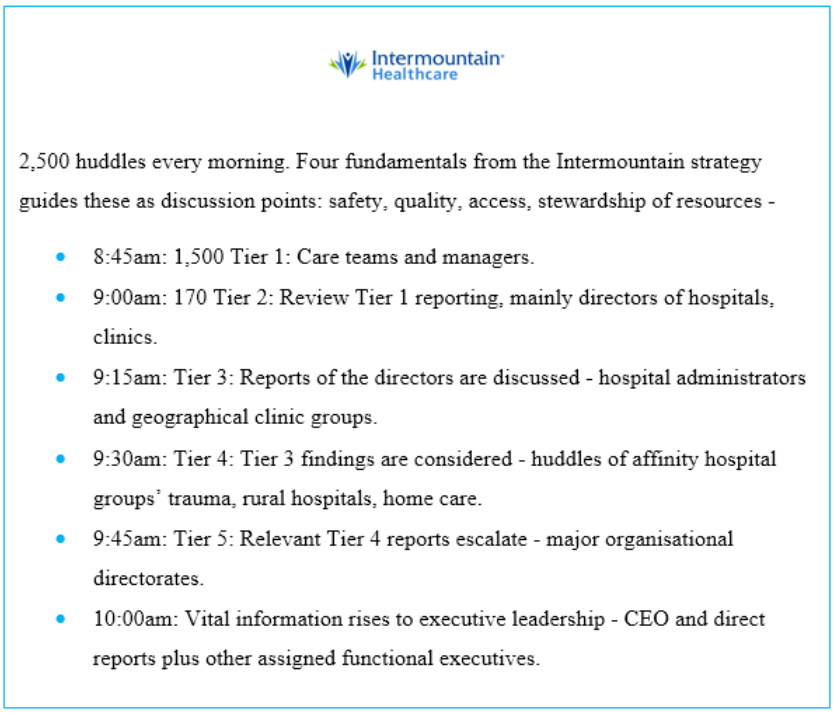


Figure 21: Intermountain Healthcare '15 minute huddles'

The 'huddles' connect Intermountain's overall strategy and performance goals. It grants responsibility and accountability to the frontline while keeping the executive team informed to empower this. It aligns strategic goals, resources and people. (Harrison, 2018). An Agile initiative at the Women's Hospital in Boston began using Agile to improve patient experience. An 'Agile Clinical Innovation Practice' reimagined annual wellness visits for patients. Led by a cross-disciplinary team, the redesign used prototyping techniques and role-playing with patient advocates (Carlile et al., 2019). Continuous testing with clinicians adapted and iterated the solution - a centralised, virtual pre-visit planning service that included patients in decision making on visits.

Although, there are similarities to Agile's cross collaboration Scrum and the multidisciplinary team (MDT) approach to certain patient care in hospitals - involving a cross-section of clinical expertise sharing information and evaluations to improve patient outcomes - current examples of Agile approaches in Irish healthcare are limited to technology. In early 2020, the HSE's Interim CCIO, Fran Thompson, shared his enthusiasm for moving towards an Agile process for software development with the researcher (Galvin, 2020). He advocated an Agile process that would depart from a traditional waterfall approach to "a more agile type process, to bring vendors in and create a sort of framework and get people in to work off of that." There is a saying that 'in times of crisis, necessity is the mother of all invention'.

Thus, it seems with the rapidly developed and adopted digital contact-tracing app ‘Covid Tracker Ireland’ developed through a combination of Design Thinking and Agile.

Irish company Nearform.com collaborated with the HSE and set up virtual design-led workshops with the Department of Health (DoH) to outline scope and functionality of the app. A cross-disciplinary team: NearForm; HSE; DoH; Office of the Government Chief Information Officer (OGCIO); Garda Síochána, worked on data concerns for the app. A prototype with a full user journey and on-boarding sequence produced but privacy issues persisted (Malone, 2020). These were resolved with the help of Apple and Google. Nearform secured beta access to new technology, redesigned the user on-boarding flow and created a new prototype. Within three months, a secure, tested, user-friendly contact-tracing app was ready - Figure 22. More than 1.3 million people downloaded the app, making it the most successfully adopted contact tracing app launch in the world. The source code was made available and the ‘Covid Green’ software used as a base for rapid development by other countries (O’ Brien, 2020).

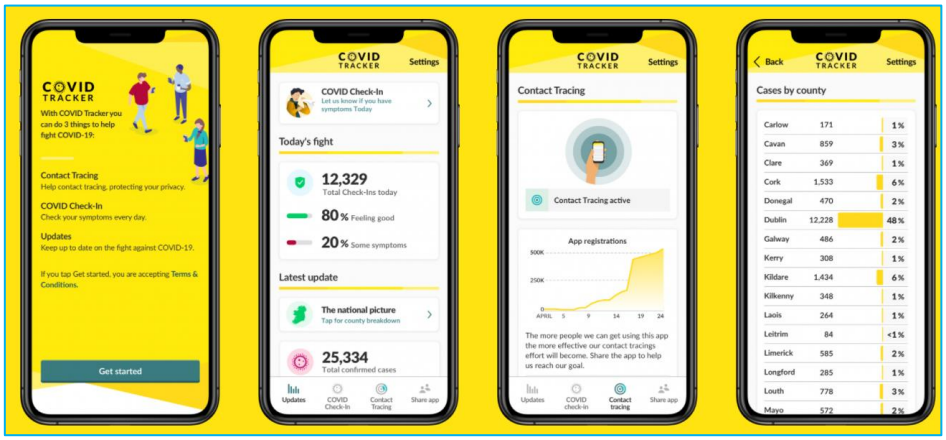


Figure 22: Irelands Covid tacker app

5.4 Agile as an innovation methodology in Irish healthcare?

The literature describes environments in which Agile can thrive as those ranging from frequently changing to highly unpredictable. Healthcare fits these parameters, with the only certainty being change. This research has shown that there is evidence of cross-functional Agile teams successfully innovating digital health technology, patient experience, clinical and management work practice. The absence of hierarchy in Agile, so ingrained in Irish healthcare, is empowering - self-managed teams can succeed. The regular feedback and constant improvement available through Agile can be highly successful in the hospital environment, as with Intermountain Healthcare. The risk of Agile prohibiting needs reflection could be mitigated by using it in combination with a reflective methodology, such as Design Thinking.

A core area of Agile that would benefit the Irish healthcare service is the transparency and accountability to be achieved in both clinical and non-clinical areas through the Scrum approach. The complexity of healthcare - medical, administrative, managerial and an increasing dominance of technology all working together demands new planning and management processes. If Irish healthcare needs to shift, and it does, then embracing change being a central tenet of Agile poses it as a very useful methodology.

Chapter 6: Comparing three innovation methodologies - findings and discussion

6.1 Concept centric matrix

There are common themes and elements that are unique to each methodology from the previous three chapters. Equally, differences and variances exist in terms of application in healthcare. A concept matrix is applied in this chapter, as a content analysis method to distinguish common themes. Through this system of review, information is coded, identifying the frequency and emphasis of themes and patterns running throughout the research of the three methodologies. Inductive reasoning condenses specific observations into broad generalisations under seven identified themes for discussion. Table 2 details the concept matrix.

Literature	Common themes						
	Change	Innovation	Team performance	Process	Product	Iterative development	Organisational culture
Design Thinking							
Baker et al., 2020	X						
Carbon, 2019					X		
Beverland et al., 2019							X
Liedtka, 2017		X	X				X
Malcom et al., 2019			X			X	
Windahl, 2017						X	X
Allen et al., 2017		X				X	
Bühring et al., 2018			X	X			
Lean Startup							
Harms et al., 2020; Calado et a., 2013				X		X	
Breaud et al., 2020	X						
Mollick, 2019					X		
Bocken et al., 2020		X					

Blank, 2013				X			
Breaud et al., 2020							
Agile							
Berlin et al., 2019; Osmond, 2019	X		X				
Carlile et al., 2019		X					X
Brommels et al., 2015	X						
Rigby et al, 2016		X	X				
Azar et al., 2021		X				X	
Gonsal, 2015					X		
Bryar et al., 2021				X			
Harrison, 2018							X

Table 2: Concept centric matrix

6.2 Common themes

Both Agile and Lean Startup work well in environments of change and uncertainty (Bhattacharyya et al., 2019; Rigby et al., 2016; Brommels et al., 2015). Similarly, design practice can be advantageous for system change within an organisation (Windahl, 2017). This reflects positively on each, as the healthcare sector is in constant flux. Increasingly, Design Thinking is used for industry innovation (Baker et al., 2020). Lean Startup can innovate through co-creation of new business models with stakeholders and Agile moves companies to ones that can embrace innovation (Bocken & Snihur, 2020; Carlile et al., 2019; Kumar, 2018; Berez, 2016). There are instances of all three applied in a variety of healthcare settings to innovate products, services, practice, management. Each methodology has specific processes and was first used in product design. Lean Startup was conceived to identify what product to develop and this remains its foremost area of application, unlike Design Thinking and Agile that are applied beyond product. Areas of application notwithstanding, an iterative component is common to each methodology (Harms & Schwery, 2019; Kumar, 2018; Allen et al., 2017; Windhal, 2017; Calado et al., 2013). Early and fast prototyping features in Lean Startup, Design Thinking and Agile. Delivering feedback, making adjustments and at times rapid failure, facilitate developing the right solution. Personal biases or organisation stance, can be challenged though iterative experimentation and customer insight to explore an opportunity fully at an early stage. Thus, saving time and resource, both valuable commodities in healthcare.

Two themes from the research in which Lean Startup does not proliferate are ‘organisational culture’ and ‘team performance’. Lean Startup certainly affects the culture in start-up companies. However, this research is seeking wider impact, in large established hospital settings. There are simply not enough examples of Lean Startup success in such an environment. The literature states definitively that Design Thinking can foster an innovation culture within organisations (Beverland et al., 2019; Liedtka, 2017). Design Thinking’s open social interaction and conversation encourages knowledge sharing, positively influencing individual and team performance. The social technology of Design Thinking can underpin the mind-set that helps achieve sustainable innovation objectives in a culture (Malcom, 2019; Liedtka, 2017). Correspondingly, the flexible and participative way in which Scrums work, empowers people and promotes social interaction - trust and respect grows (Carlile et al., 2019; Huff et al., 2009).

For a culture that largely functions in silos, a social technology that builds better conversations, trust, and collaboration through shared organisational experiences is of indubitable value to the culture in Irish healthcare.

6.3 Comparing methodologies

Traditional quality improvement systems in hospitals fail to innovate, as they are oriented to efficiency and reducing complexity rather than innovation and adapting to need (Azar et al., 2021). Lean Startup, Design Thinking and Agile are solution-oriented methodologies. The loop in these methodologies - from idea to feedback to revision, is essential in innovation environments (Ries, 2011). Design Thinking aims to change how a problem is solved, by fully understanding the end user, to add value. In contrast, Lean Startup allows the market to determine value. By rapid testing, Agile looks for value in how a product or service works. Design Thinking is most useful early in the innovation process when ideation is required, whereas Agile works best if problems and potential solutions are less abstract. Although in varying forms, both Lean Startup and Design Thinking use research and experimentation to create solutions. Agile meanwhile supports these solutions by applying discipline to scale through effective implementation. Health care challenges are highly complex, with multiple stakeholders and uncertain outcomes (Achala et al., 2019). For continuous improvement and waste reduction, the popularity of Lean Healthcare in these settings was discussed in Chapter 3. However, the complexity of multi-stakeholder healthcare challenges demand more to innovate.

Design Thinking provides a framework for identifying solutions to large complex challenges. Empathy research and understanding user needs can produce disruptive outcomes. Design Thinking focuses on end users throughout the entire process, with significant emphasis placed on understanding the user, prior to ideation. The processes in Lean Startup and Agile leverage data continuously but without the same in-depth user focus. Preceding Lean Startup with Design Thinking ensures a deep understanding of needs. Subsequently, Lean Startup can iterate solutions and Agile can further develop and implement. A combination of all three methodologies could be complementary - innovation occurs through fast, structured implementation of a scalable risk-tested solution, which answers a genuine need.

6.4 Application in healthcare

The combination of these three methodologies can be complimentary but it is not suitable to empower a culture of innovation in Irish healthcare.

There are obvious benefits to using Lean Startup as an innovation methodology.. Lean Startup was absent in two themes found in the literature as central to empowering innovation – organisational culture and team performance. Despite one success found in CRH, adapting Lean Startup for a departmental and management function, there are scant examples of it in a hospital setting. Even in the Mayo Clinic, Lean Startup is part of an education programme with commercial product success as its goal. Another challenge with applying Lean Startup as an innovation methodology to empower a culture of innovation in Irish healthcare is that it does not support ideation. Lean Startup does not present a viable strategic approach to achieve a fundamental culture shift in large organisations

The strategic focus required to engineer a significant internal shift in mind-set and behaviours in a large complex organisation requires ideation. To create a successful innovation framework, similar to that found in CRH, Design Thinking can support an examination of the entire context - function of the hospital; how internal systems work together or against each other, workflow and stakeholder needs. Subsequently opportunities are identified, problems and challenges are mapped, solutions are ideated, prototyped and tested. Employing Agile can put these solutions into practice. Risk of execution failure is minimised as each solution has come through the full iterative rigor of the Design Thinking process. User-centred design has clarified the problem and produced potential solutions that meet user needs. Agile then evaluates the solutions and moves towards implementation. The collaborative elements of both methodologies emphasise people over process and build confidence. Design Thinking unlocks creativity and new ways of thinking. Management benefits of trusting employees in Agile teams is empowering. The regular feedback and constant improvement through Agile resulted in wide scale success in Intermountain Healthcare, a large complex health network. There are multiple examples of Design Thinking and Agile being applied successfully in hospital settings and even one in Irish healthcare in the Covid Tracker app.

As discussed in Chapter 2, many management techniques currently employed in Irish healthcare are out of date. The American academic and expert on Design Thinking Jeanne Liedtka advocates creating ‘minimal viable competencies’ (MVCs) per an organisation. Identify the innovation gaps - areas that require attention - set MVCs that can begin to meet these. Use Design Thinking as a mind-set to develop the MVCs and empower innovators (HPI School of Design Thinking, 2020). The research shows that cross-functional Agile teams successfully innovate patient experience, clinical and management work practices.

The accountability, transparency and self-management offered through Agile practice is empowering.

The combination of Design Thinking and Agile as an innovation framework was recently explored in US healthcare practice. A group of US researchers and doctors examined the use of Design Thinking, Agile and behavioural sciences to achieve sustained innovation in healthcare through the 'The Agile Network'. According to Azar et al. (2021, 61):

> while innovation is a noun that can be defined as "the action or process of innovating," the active verb tense (innovating) can be defined as follows: To make changes in something established, especially by introducing new methods, ideas, or products.

The agile network framework employs three processes: innovation, implementation, and diffusion. 'Agile Innovation' is an approach to achieve rapid, systematic, customer-centred development and testing of innovative interventions, refined through experiments in diverse healthcare organisations (Azar et al., 2021). The foundations for Agile Innovation lie in Design Thinking and Agile. Steps include deep contextual and problem understanding, ideation, iteration and prototyping solutions. Agile principles are employed for development - teams working over short cycle sprints to test solutions. The eight steps in Agile Innovation are outlined in Figure 23 - four for planning and four for execution.

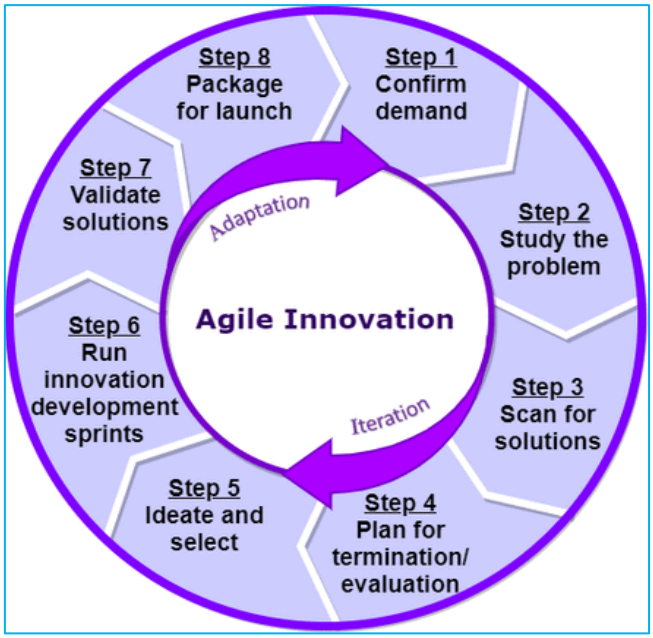


Figure 23: The eight-step Agile Innovation process.

Azar et al. (2021) argue that healthcare organisations that master Agile Innovation can become ones where innovation is at the centre of how it functions, rather than the bearer of occasional success. Challenges to implementation are acknowledged with resource being primary. Although very recent, 'Agile Innovation' and 'The Agile Network' are inspiring radical proposals that merit further testing in real life settings, to assess suitability as an organisation-wide practice in healthcare settings.

Implementing Design Thinking and Agile as innovation methodologies to empower an innovation culture in Irish hospitals would not be without challenges. There must be strong leadership with full support of the organisation-wide shift to one with innovation at its core. A new way of working requires commitment, training, encouragement and re-orientation. Efforts seem unlikely to succeed unless there is strategic focus, investment and dedicated resource – individual and steering group - to develop, implement and grow the innovation mind-set internally. Measurement and evaluation are also critical to success to show impact, learn what works, what does not and why. For effective measurement and evaluation, Agile and Design Thinking must be applied strategically. The use of these methodologies and the goal must be clear. An innovation audit could encourage leadership and employee involvement to co-create organisation-selected innovation objectives (Hallgren, 2009). The audit would also add value by measuring the level of current innovation practice, identifying gaps and successes. These gaps could be met through developing MVCs, and application of appropriate methodologies. While successes identified provide the foundation for further wins, areas ripe for innovation mind-set growth and 'innovation champions' can emerge.

6.5 Key learnings

This research shows that strategic use of innovation methodologies can build a culture of innovation and both Design Thinking and Agile specifically could empower a culture of innovation in Irish hospitals. Key learnings discussed throughout Chapter, 3, 4, 5 and 6 can be summarised under the 'contribution headings' from Chapter 1 as

- **Build and advance knowledge in an under-researched area.**
  - Lean Startup, Design Thinking and Agile are solution-oriented methodologies that work well in environments of change and uncertainty.
  - Lean Startup does not focus on or support ideation, required in Irish healthcare.
  - Lean Startup does not provide the strategic focus for a shift in mind-set and behaviours in a large complex organisation.

- The human centred approach of Design Thinking can provoke systematic change in a healthcare system.
- The benefit of 'social technology' created from Design Thinking's processes could support a culture shift.
- There may be value in introducing Design Thinking in medical education for cognitive development.
- The absence of hierarchy in Agile is empowering - self-managed, cross-collaborative teams can build organisational trust.
- Regular feedback and constant improvement available through Agile can support an adaptable, responsive hospital environment.

- **Formulate recommendations for most effective use in Irish hospitals.**
  - Strong leadership.
  - Strategic focus, investment and dedicated resource to develop, implement and grow the innovation mind-set.
  - An innovation audit is a valuable first step, measuring the level of current innovation practice, identifying gaps and successes.
  - Gaps could be closed through developing MVCs and appropriate application of methodologies.
  - Successes identified, highlight areas ripe for innovation mind-set and 'innovation champions'.
  - Measurement and evaluation are critical to track implementation.
- **Provide suitability guidance for application of each in an Irish hospital setting.**
  - Design Thinking can support an examination of the entire context. The function of the hospital; how internal systems work together or against each other, workflow and stakeholder needs
  - Agile works best if problems and potential solutions are less abstract.
  - User-centred design clarifies the problem, produces potential solutions that meet user needs and Agile evaluates the solutions and moves towards implementation.
  - Lean Start up could be used as an innovation tool, in a non-linear adaption to support some innovation activity in a hospital setting.

Chapter 7: Conclusion

This research is the first comparative review of Lean Startup, Design Thinking and Agile in the context of empowering an innovation culture in Irish hospitals. It adds meaningful knowledge to an area that is under-researched in Irish public health. Particularly, the potential of innovation methodologies to shift the healthcare system forward in line with global healthcare. A concentration on operations management and finance that has underpinned health systems no longer meet the demands of a constantly shifting environment, predicated on new models of care delivery, technology, evolving health challenges and consumerisation. The current healthcare model in most Irish hospitals is required to solve complex problems across areas and at a pace for which it was not designed. This research contends that therein lies the source of much of the current frustrations and challenges identified in the Deloitte report (2018), by clinicians, national strategy and independent research. Incremental innovation efforts that have occurred contrast starkly to the strategic, policy driven, locally delivered innovation frameworks in the UK and US. In examining these models, the need for innovation and a radical shift in the Irish system is further emphasised.

The potential of a portfolio of innovation methodologies in empowering an innovation culture in Irish hospitals are analysed in this research. Lean Startup can validate preliminary commercial assumptions very well but will not facilitate the radical shift required in Irish hospitals. Design Thinking can frame innovation challenges and fundamentally understand system needs. It can empower innovators to see and think differently to improve organisational outcomes. The transparency, accountability and lack of hierarchy afforded to cross-functional teams through Agile can shift an organisation's culture. Both Agile and Design Thinking can support leadership, empowering teams to actively engage in the innovation process. Hospitals can accelerate the adoption of new ideas by employing user-centred design for problem clarification and potential solutions. Agile teams are empowered to collaboratively develop the prototype and test implementation. This combined approach can provide a rigour to ongoing site innovation and learning in action, which builds confidence and comfort with change and failure. Methodologies can be adapted to suit leadership styles and the types of problems that a particular site is facing.

There is a palpable shift at Irish policy level with the DPER public service innovation strategy. To feel the effect universally on the ground in hospitals, particularly statutory sites that are centrally controlled, innovation must become a competency, an annual measurement. This lies with the DoH and the HSE. Local strategic delivery of innovation can still be achieved successfully with committed leadership and voluntary hospitals have more flexibility to realise this. Designing a framework that identifies the needs and competencies (MVCs) that require attention in a particular site, developing measurable outcomes and tracking these through the application of innovation methodologies can be delivered locally. Hospital sites must engage with a wide group of stakeholders, embrace different perspectives, new ways of working and commit additional capacity to deliver an innovation agenda that will shift the internal culture.

Common to all successful programmes examined in the research – Mayo Clinic, Intermountain, John Hopkins, NHS, CHR – are dedicated resources to drive an innovation culture forward. This manifests in various ways: innovation centre, an innovation unit or team, individual innovation committees for specific areas of delivery. It is clear that investment in resources is required for success. Distinctive in all of these programmes are strategic focus; strong leadership; training and education on innovation methodologies; tracking and measurement. Effective measurement and tracking of progress demands prior knowledge of desired outcomes. This necessitates a planned, strategic application of innovation methodologies. The problems must first be diagnosed and then the methodologies prescribed. An organisation-wide innovation audit gives ownership to all and can identify areas that require attention from multiple perspectives. Current innovation activity can be built upon, opportunities mapped and problems highlighted. The audit data can form part of the basis for the initial strategic approach/framework to innovation. Innovation frameworks can lead the system-wide response to change, to one that is no longer reacting or ‘firefighting’ but quickly adaptable and creative.

Limitations and areas for further study

Healthcare innovation is a growing area in both practical and academic terms. Demonstrated by the fact that approximately 75 per cent of literature reviewed for this study was published in the last six years. This research is exploratory, rather than comprehensive, and accepts that innovation methodologies are not limited to the three discussed.

The research recommendations centring on Agile and Design Thinking remain untested in an Irish setting. Nonetheless, this research provides a robust foundation from which to explore a radical shift in Irish hospitals. Building upon the recommendations of this study – implementing an innovation audit, development of an innovation framework and tracking delivery across identified site areas in a real-life setting – would assess viability of the approach. Systematic studies or organisation reports to assess the sustainability of innovative frameworks, highlighting failures and successes are necessary to benchmark, build expertise and knowledge sharing in the Irish system.

Further study on the application of Agile Innovation through 'The Agile Network' could offer potential for a radical shift in hospital culture. A new way of working requires reorientation of an entire system, which demands strong leadership. The application of Theory U in successful leadership transformation is proven in complex areas. Testing its guided application in a hospital site, would be an interesting area of further study. Mentioned in Chapter 2, is the potential of introducing Design Thinking in medical education. The divergent thinking encouraged though ideation and the convergent approach incorporated for solution implementation could be a powerful addition to the clinical arsenal. As argued, in this study, the current dominant healthcare model was not designed to solve complex problems or react at the speed required in modern hospital settings. Perhaps, this is also true for part of the current model of medical education. A shift in this model to incorporate an innovation methodology could bear fruit in the hospital setting.

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Appendices


UCC
Innovation
Eimear Galvin,
Health Innovation Hub Ireland
'Empowering a culture of innovation in Irish hospitals'
A critical evaluation of three innovation methodologies
Health systems must constantly innovate. A new approach and way of thinking is required to keep the Irish system apace with global healthcare. This research provides a comprehensive understanding of three innovation methodologies, examines application, level of use in healthcare and critically evaluates the potential of each. This is the first comparative review of these innovation methodologies, in the context of empowering an innovation culture in Irish hospitals: advancing knowledge; providing suitability guidance and recommendations for effective use.
Eimear manages HIHI (TCD), based in St James' Hospital. Her primary area of expertise is supporting the development and commercialisation of connected health solutions. Developing networks to engage health professionals, start-ups and expanding healthcare companies is central to her role. Eimear also leads delivery of the HIHI Knowledge Network, a national initiative putting innovation at the centre of Irish healthcare.