

Information Economics: "The disconnect between information communication technology and strategic intent."

by

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Abstract

The dynamic nature and rapid evolution of Information and Communications Technology (ICT) in the last decade (which is also referred to as the digital revolution or industrial revolution 4.0) has given little time for organisations to evaluate the nature of the technological change to their business. This research project aims to identify if there is a disconnection between organisational strategic intent and ICT use, such as, analyze ICT adoption and use issues from various perspectives concerning digital evolution, strategic outcomes and long-term objectives of the organisation, and report findings. The study also aims to identify the alignment factors for technology use with strategic intent. In today's digital age, the healthcare industry has been undergoing a transformational change in patient care pathways and patient safety with the help of digital technologies. Digital technologies such as electronic medical records, mobile applications, telehealth, assisted diagnosis, and prevention have been changing the ways healthcare services are being delivered to patients. But little success has been achieved in implementing these transformations due to the complexity of ICT requirements in healthcare. This challenge in achieving successful digital transformation has given rise to a knowledge gap requiring further research. Until now, a review of the literature reveals few studies have been undertaken to understand connections and disconnections between strategic intent and technology use in healthcare. Therefore, this study aims to understand if there is a disconnect between organisational strategic intent and technology used in the digital age. The primary audience for this research is senior policy and decision-makers in healthcare and senior ICT staff. This research is designed to understand the technology use and its impact on organisational strategic intent from the perspective of clinical staff, non-clinical staff, and executive management. The multi-stage mixed-method design has been used in this study. Chapter 1 discusses the rationale and significance of this study.

Chapter 2 conducts the literature review to identify the gaps in the literature.

Chapter 3 defines the research methodology.

Chapter 4 describes the multistage mixed-method design.

Chapter 5 examines the quantitative analysis of the survey data using basic statistical analysis methods such as mean and median value analysis.

Chapter 6 evaluates the qualitative analysis of the participant interviews conducted with clinical staff, non-clinical staff, and executive management. This chapter describes the facilitators and barriers quoted by the participants concerning technology use and strategic intent.

Chapter 7 is the convergent conceptual model from chapters 5 and 6. The quantitative strand from Chapter 5 and the qualitative strand from Chapter 6 are converged in Chapter 7. Following convergence, the conceptual measurement model is tested in this chapter, using the partial least square structural equation modelling for the statistical significance of the path coefficients. Statistical results are discussed in this chapter for the newly converged conceptual model. The study indicates that there is a significant impact of ICT use ($\beta=0.251$, $p < .05$) on the strategic intent of the organisation. There is also a significant impact on strategic alignment ($\beta=0.584$, $p < .05$) on the strategic intent of the organisation. ICT use and strategic alignment are statistically significant predictors of strategic intent. The model explains a 59% variance in ICT use and a 63% variance in strategic intent.

Chapter 8 synthesizes the analysis into a conceptual framework for healthcare sustainability, which is created from the combination of converged qualitative, quantitative analysis, and the verified conceptual model. This framework enables healthcare organisations to guide the implementation of future digital transformations.

Chapter 9 identifies the limitations of this study and areas for future research.

By adapting to some of the recommendations provided in the conceptual framework, the government, healthcare organisations, and patients will benefit as this study tries to improve the sustainability of healthcare through technology adoption and use. The findings indicate that technology should be part of strategic intent, and technology adoption should flow from the edge inwards. The findings will enhance the delivery of digital transformation initiatives in healthcare and enable more successful digital transformations with lesser technology adoption, and use issues. This conceptual framework will also encourage technology innovation and collaboration with patients, which is required for achieving long-term healthcare sustainability.

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This paper has not been submitted for an award by another research degree candidate (Co-Author), either at CQUniversity or elsewhere

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1 Introduction and rationale

1.1 Rationale

In recent years, the economic value of information has increased continuously, powered by information technologies. Information and communications technology (ICT) is a specific term that stresses the role of unified communications (Taylor & Hettick, 2006) and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information. The knowledge economy is a world in which people apply mental processes and with effective and optimum use of ICT to create a global competition by use of innovation rather than mass production (Ghosh & Ghosh, 2009). In the knowledge economy, investments are made in new technological concepts or means to create them rather than buying new machines, which creates an environment of rapid technological change. This rapid technological change has given rise to a new era in the information economy. Due to the increase in the economic value of information, a new dimension of an economy, which is the information economy is being born and is gradually redefining the way in which business is done.

Engelbrecht (2005) argues that the information economy should be part of the bigger agenda aimed towards the integration of information and knowledge and possibly a future proto discipline of a unified theory of information and knowledge. This digital transformation, with the combination of knowledge, information, and technology, which some have argued is as dramatic as the industrial revolution, is changing the way we work and live in our society. Sometimes generically called the information revolution (Veneris, 1990), it is driven by information through the integration of organisational business processes, enabling information technologies, disruptive technological changes, and radical innovations. The outcome of this digital revolution is relatively unknown. This is forcing conventional strategists to think differently from their traditional strategic thinking. This topic of interest is branching out into its own area of study called "Information Economics" where information underpinned by technology and knowledge is having a more significant economic value and is acting as a strategic driver and enabler, and as a part of corporate strategy in shaping the future digital economy. The conventional strategic planning is not proving worthwhile during this age of digital disruption of industries. This will require more than strategic analysis such as a very long-term strategic intent to survive the digital evolution. Morgan and Page (2008) state that

for some time it has been claimed that ICT provides the means for transforming the way business is conducted in many industries, but our understanding remains unclear how this form of change can be implemented and managed. Healthcare is still in its infancy stage of transforming patient care to digital processes.

Digital revolution has impacted every industry, including healthcare. Digital revolution has emerged as the fourth industrial revolution with new technologies such as Cloud, Artificial Intelligence (AI) and Internet of things (Pflaum & Golzer, 2018). Adopting digital transformation has become fundamental to the organisation's survival. Berghaus (2018) states that in the digital age, the organisation's survival will depend on its transformation capabilities. This need for digital transformation arises due to societal, technological, and industrial advancements (Kenney et al., 2015). Majority of the organisations lack this transformation capability (Gobble, 2018). Digital transformation through technology requires a fundamental change in technology and behaviour of people. This broad change which is needed creates socio-technical issues and challenges (Mahmood et al., 2019). Meskó et al. (2017) define digital health as a cultural transformation using disruptive technologies that provide objective data in a digital format to both patients and clinicians which leads to a balanced doctor-patient relationship with the democratisation of care and shared decision making. Technology advancement is becoming integral to healthcare, while healthcare ICT systems are becoming financially unsustainable. Many theories have been proposed for technology adoption, in which the Technology Acceptance Model (TAM) being the most prominent. TAM is widely used to explain technology adoption issues in healthcare and other industries. However, this should not be interpreted falsely as the maturity of TAM, but as an indication for the researcher to quickly explore new and emerging theories in IT adoption domain (Rad et al., 2018). A paradigm shift in the way technology adoption and use is handled in healthcare is becoming imminent due to the requirements for digital transformation. Technology needs to act as a strategic enabler for the organisation in their digital transformation journey.

In my domain of experience, I have worked for a multinational company which went under administration in 2009. In hindsight, the main reason for collapse can be attributed to data integrity issues within ICT systems and incorrectly aligned ICT processes to business processes. The intent of ICT was not to act as a strategic enabler but to provide operational support. This failure in long-term strategic intent from a technology perspective and poor strategic technology planning contributed to the collapse of the business which went under bankruptcy administration. The strategic intent perspective of technology adoption and use was

not very well explored. The business and ICT department did not communicate properly, and businesses assumed that ICT only added to their operational costs rather than enabling them from a business perspective. In hindsight, long-term strategic intent from a technological perspective, proper strategic planning, right strategic alignment, better use of technology and use of new technological innovations could have possibly prevented the company from going insolvent. There could also have been many other reasons, such as the slowdown of the economy, the global financial crisis, and cash flow issues for the company going to administration. However, it was apparent from the situation that, with all the data integrity errors, system failures, duplicate work orders and failure of ICT to support the business strategically in the long term, contributed to the company's failure. This contribution of ICT towards business failure is just assumed in this instance without research data to support the claim and will require further fact-finding through further research.

1.2 Healthcare ICT

The healthcare industry has been relatively slow to transform digitally as compared to other sectors such as banking and retail. Digital patient records have not been implemented in all hospitals, and clinicians are finding it challenging to use existing technology and adapt to new technological changes. The consumers have not widely accepted the implementation of My Health Record. Consumer-driven transformations which have occurred in other industries have not occurred in health, and we are flying blind (Srinivasan et al., 2018, p.5). Clinicians are practising without knowing the full context of their patients or their outcomes. Generic care is sometimes driving unproven interventions or of negative value (Srinivasan et al., 2018, p.5). Australian customers have minimal access to transparent data and evidence-based intelligence, which allows them to verify the appropriateness of the prescribed treatment, compare the quality and cost of care provided by their healthcare providers. When there is information asymmetry fairness and efficiency of the service is compromised. Health care costs in Australia are some of the highest in the world and costs have been increasing rapidly in the last ten years including out-of-pocket costs charged by the providers (Srinivasan et al., 2016, p.22). Within healthcare, clinicians operate in a separate clinical domain as compared to a technological domain. The technology domain and the clinical domain do not seem to collaborate very well. This begets an understanding of the technology's connection with the organisational strategic intent of healthcare providers because, without the alignment of technology to strategic intent, digital evolution in healthcare will not be conceivable.

Strategic intent is the long-term view of the organisation. The three attributes of strategic intent are direction, discovery, and destiny (Hamel & Prahalad, 1989). Information economy technology will play an essential role in an organisation's direction, discovery, and destiny through the adoption of technological innovations for long term sustainability. The technology currently supports most of the business processes and is driving many innovations in healthcare. Technology also assists in strategically enabling organisations and providing them with competitive and sustainability advantages. It also helps in improving the quality of care and reducing the cost of patient care. In order to realize the long-term goals and objectives of the organisation, technology must be strategically aligned and integrated with the business process and must achieve enterprise integration. Enterprise integration is the integration of processes across organisational and functional boundaries through the adoption and use of ICT. In healthcare, the process of achieving enterprise integration includes clinical and administrative information integration that enable cross-functional business process integration. Enterprise integration results in a customer-oriented structure with information systems that are formally linked to processes (Gulledge & Haszko, 1996). But the strategic intent perspective and technology use is less understood by most industries, including healthcare since most organisations assume technology supports the business operationally, rather than enabling them strategically through enterprise integration. World Health Organisation (2006) stated that it is difficult to envisage how the transformation of the healthcare system – with higher quality, patient-centric and cost-effective care - could take place without the capabilities that technology brings. Health information systems are essential for disseminating reliable and timely information on health determinants and health status (World Health Organisation, 2007). Technology is becoming an integral part of healthcare. Some healthcare organisations to some extent have already exploited the advance in ICT to achieve their goals and boost the quality and efficiency of the services provided to patients (Vaast, 2007); however, this percentage has been meagre. A lot of disparate ICT systems and applications continue to exist today in many individual health services without proper enterprise integration. The successful use of ICT for an organisation requires technology to be used effectively from various perspectives such as operational, innovative, process, and strategic. Technology also needs to relate to new organisational structures, culture, and governance frameworks that are brought about by the digital revolution. Most industries, including healthcare, fail to understand this connection between this long-term strategic intent and ICT use and to how ICT can contribute to their digital value chain. Therefore, it is required

to understand if there is a disconnect between technology use and the long-term strategic intent of the organisation, which will enable the healthcare organisations to transform digitally.

2 Review of literature

2.1 *Strategic intent*

Hamel and Prahalad (2005) define strategic intent as the essence of winning at all levels of the organisation, and it motivates personal effort and commitment with the organisation (Casselman & Sama 2013). Intent contains a conviction to attain a particular state of affairs in the future (Bratman, 1999). Strategic intent is different from organisation goals in being super-ordinate to it (Hart, 1992), long-term or very long-term (Burgelman & Grove, 1996; Hamel & Prahalad 1989; Hart, 1992), uncertain in its achievability (Burgelman & Grove, 1996), linked to core competencies and of high significance (Prahalad & Hamel, 1990). In the field of management, there exist several notions that are used by members to discuss such future-oriented behaviour (Mantere & Sillince, 2007) such as the vision statement.

The organisation's vision is defined as a set of desired goals and activities (Gardner & Avolio, 1998). Furthermore, like strategic intent, it goes beyond simple planning and strategy—by challenging organisational members to go beyond the status quo. Vision offers long-term direction (Nonaka, 1988). It infers encouraging strong corporate values in the strategy process (Conger & Kanungo, 1987) and is like strategic intent in its emotional effects. The most striking difference between vision and strategic intent is the degree of collectivity, as many authors ascribe a strategic intent as a phenomenon diffused at multiple organisational levels. Vision is more clearly a top management leadership tool (Kotter, 1995), often ascribed to a single visionary leader (Mintzberg & Waters, 1985). Definition of strategic intent is described by various authors as per Table 2-1 below:

Table 2-1 Definition of strategic intent

<i>Authors</i>	<i>Definition of intent</i>
<i>Burgelman (1994)</i>	Prophecy, foresight by CEO, Prahalad and Hamel (1990) have explained the success of companies such as Canon, NEC, and Ericsson in terms of the development of core competence. Their explanation depends to a large extent on strategic intent based on the chief executive officer's (CEO's) superior foresight. (p. 25)
<i>Burgelman and</i>	Top management decision strategic dissonance [mis-alignment between a firm's strategic intent and strategic action], strategic inflection point [the

<i>Grove (1996)</i>	change of one winning strategy into another], and strategic recognition [the capacity of top managers to appreciate the strategic importance of managerial initiatives after they have come about but before unequivocal environmental feedback is available] are the three interrelated key concepts that answer the question of how top management can decide on strategic intent in high technology industries. (p. 12)
<i>Hamel and Prahalad (1989)</i>	The shared obsession with winning. Companies that have risen to global leadership began with ambitions that were out of proportion to their resources and capabilities. But they created an obsession with winning at all levels of the organisation and then sustained that obsession over the 10- to 20-year quest for global leadership. We term this obsession "strategic intent". (p. 64)
<i>Hamel and Prahalad (1994)</i>	A dream, an emotion, a distillation of strategy, a goal, a mission. The dream that energises a company. Strategic intent is our term for such an animating "dream." (p. 129). As the distilled essence of a firm's strategic architecture, strategic intent also implies a point of view about the long-term market or competitive position that an organisation hopes to build over the coming decade or so. Hence, it conveys a sense of direction. It holds out to employees the promise of exploring the new competitive territory. Hence, it conveys a sense of discovery. Strategic intent has an emotional edge to it. It is a goal that employees perceive as inherently worthwhile. Hence, it implies a sense of destiny. (p. 129)
<i>Hart (1992)</i>	Mission (superior goal) for the organisation, the crafting of a long-term mission for the organisation—an articulation of strategic intent. This mission becomes translated into specific targets, either internal to the organisation (for example, develop capability) or external (for example, overtake a competitor), which inspires organisational members to higher levels of achievement. At Komatsu, for example, the mission is "Maru-C"—to encircle Caterpillar, its primary rival. (p. 337)
<i>Lovas and</i>	A statement of goals articulated by the top management. By "strategic intent," we mean those long-term goals that reflect the preferred future

<i>Ghoshal (2000)</i>	position of the firm, as articulated by its top management (Prahalad & Doz, 1987). (p. 884)
<i>Noda and Bower (1996)</i>	Top management viewpoint on business, "corporate context." Our field-based data provide evidence on the role of "corporate contexts" that reflects top managers' crude strategic intent in shaping strategic initiatives of business unit managers. (p. 159)
<i>Prahalad and Doz (1987)</i>	The goal for which one cannot plan, long-term goal, long-term orientation. "Intent" is used here to describe long-term goals and aims, rather than detached plans. Strategic intent is crucial for an organisation to aim for goals for which one cannot plan. It is important to separate that orientation (strategic intent) from strategic planning or strategies. Strategic intent allows for an organisation to build layers of competitive advantage painstakingly, to accomplish long-term goals. (p. 52)

The organisation adopts a course of action for achieving its goals and objectives by the allocation of necessary resources. This allows the organisation to coordinate its activities to maximize its value as established by its strategic intent (Beasley, Bradford & Dehning, 2009). Hamilton, Eskin and Michaels (1998) state that critical to the success of strategic intent is that employees at all levels of the organisation are aware of the goals and objectives and share a sense of obligation to deliver these challenges. Managers can be part of the process by:

- Communicating the goals and objective and the rewards to be gained by the achievement of the goals
- By empowering individuals to achieve these goals
- By maintaining awareness of strategic intent during resource allocation decisions.

The abilities and skills of an organisation are fundamental factors for achieving organisations' goals and objectives through strategic intent. Hamel and Prahalad (1990) stated that core competencies represent cumulative learning in the organisation, and without core competencies, it is not possible to achieve the strategic intent of the organisation. Core competencies help the organisation build a competitive advantage. Stalk, Evans, and Shulman (1992) argue that core capabilities are a more broadly-based concept encompassing the value chain than that of core competencies, which are expertise at specific points of the value chain.

Core capabilities are more useful for strategic analysis because they are a broader concept which encompasses core competence. They state that strategic intent is expressed through goals and objectives and focus on the resources and core capabilities of the organisation. Core capabilities are visible to the customer, whereas core competencies are rarely visible. Focus on organisation core capabilities and building the core capabilities is vital in achieving the organisation's strategic intent.

The projective aspect of an organisation's strategic action can be represented by strategic intent (Emirbayer & Mische, 1998). Strategic actions may be emergent (Mintzberg, 1994), yet some of the actions can be intended. As organisations consist of multiple members at different levels, strategic intent is sure to be collective to a degree. Strategic intent may either exist as collective intent in a top management team of a larger organisation (Denis & Langley, 2001) or as a combined collective intent in an organisation and to warrant each organisational member's knowledge of their organisation's role (Weick, 1987). Strategic intent has the potential to be also used as a rhetorical tool (Mantere & Sillince, 2007). Using strategic intent for a rhetoric purpose has little value in a dynamic environment and can be prone to ideological control from top management. Strategic intent should be used to achieve organisational goals by developing its core capabilities and core competencies at all levels with the organisation and less for rhetoric purposes.

But, according to Fawcett, Smith and Bixby Cooper (1997) part of the challenge with implementing strategic intent lies in the lack of coordination and consistency in the building blocks in which the organisation seeks to establish a competitive advantage, such as not being able to meet the customer's key requirements and not being able to understand what value they must deliver to their customers. Moreover, at the implementation level, they state that strategic intent fails due to the lack of coordinated effort within the organisation, lack of measurement capabilities, and information needed to enhance operational performance. The disconnection between expressed priorities, coordination, and measurement also explains some of the cynicism that prevails in many organisations that consistently adopt new management programs designed to value. Beasley et al. (2009) stated that the measure of strategic intent is to establish the signals that can be used to gauge strategic intent. The intent can be collectively measured at an organisational level using some of the cues such as:

- Strategic directions (goals and objectives)
- Engagement from the employees

- Enablement of the individuals
- Culture.

Therefore, considering human factors such as engagement and enablement of employees becomes vital for delivering long-term intent. Healthcare is a complex industry sector that requires sustained coordination at different levels between clinical and non-clinical staff to achieve the strategic intent in the everchanging digital landscape. In a dynamic environment where technology is always transforming healthcare service delivery, top management is finding it difficult to achieve sustained co-ordination to build the core capabilities around digital health. Understanding strategic intent to achieve the goals collectively and its impact on technology use could be the key to delivering strategic priorities that the top management in health services are seeking regarding digital technology.

2.1.1 *Dynamic strategy vs. strategic intent*

A dynamic strategy is sometimes confused with strategic intent. Strategic intent is different from a dynamic strategy. The dynamic strategy takes a resource-based view. Resource-based perspective is used for dynamic strategy formulation which inspects the economic returns of organisations' resources that they develop, acquire, or own. Barney (2001) states that for a resource to generate above-normal returns and be a source of competitive advantage, the resource must be unique, not perfectly imitable, and the substitutes should be rare. According to Connor (2002), a resource-based perspective has emphasized which resources will generate returns above average in an equilibrium state. The resource-based dynamic strategy which utilizes the dynamic capabilities of the organisation is very different from strategic intent, which focuses on building and sustaining core capabilities and has a certain degree of collectivity at all levels of the organisation. According to Lampel, Shamsie, and Shapira (2009), the dynamic capability of the organisation does not inevitably lead to better organisational performance. Wilden, Gudergan and Nielsen (2013) argue that the establishment of an internal fit with organisation structure, internal processes, and reconfiguring the organisation to align with external conditions are necessary for dynamic capabilities to work effectively. Strategic intent, unlike dynamic capabilities, enables the organisation to deal with dynamic changes by adopting a long-term approach.

2.1.2 *The rise of digital*

Senge (1990) introduced the notion of the learning organisation and extended it. The underlying theory of learning organisation is the organisation's ability to collect, analyze and use the information for the organisation's success. Senge (1990) claimed that a learning organisation would need to be designed such that:

- Staff can continuously expand their capacity to learn and be efficient in the digital age,
- New patterns of thinking are nurtured for problem solving and technological use,
- Shared ambitions are encouraged, and
- People are encouraged together to see the whole picture.

Peter Senge stressed the importance of technology in a learning organisation to foster problem-solving ability and discover breakthroughs. Evans and Wurster (1997) stated that industries with a high ICT component were getting transformed and were becoming more effective in how they operate, whereas the ones that fail to transform perished. The authors, as an example, also cited Encarta's annihilation of the Encyclopedia Britannica (sales had fallen 80% since its peak of \$650 million in 1990). Encarta's reign was brief, and it was overtaken by collaborative encyclopedias like Wikipedia that were operating at a meagre marginal cost. Encarta's service was later turned into an online service and was dropped at the end of 2009. Evans and Wurster (1997) also stated that the music industry was also desperately seeking new business models with the tape industry slowly winding down with the rise of the internet age. The upstart information savvy organisations, unburdened by cumbersome physical assets, were changing the competitive landscape, redefining market segments, and disintermediating regular channels. Organisations must undergo digital change using ICT in the way they operate and evolve to deliver value to their customers. If the organisations fail to evolve, then they will be superseded by the organisations that will have a technological advantage.

Drucker (1999) back in the 1950s had theorized the rise of "knowledge workers". He described that more workers would be applying their minds and fewer doing physical labour. Since 1990 many authors including Quinn (1992), Jarillo (1993), Castells (1996), Stewart (1997), Sveiby (1997), Probst, Raub and Romhardt (1999), and Shapiro and Varian (1999) have argued the strategic importance of information. Data will primarily drive the digital future of the organisations, and the companies that managed information well can obtain an intellectual advantage.

Intellectual capital is described as the investment an organisation makes in knowledge and information (Stewart, 1997). Intellectual capital consists of customer capital (knowledge of the customers), structural capital (knowledge and information that resides in the company) and human capital (knowledge of the employees). Adrian (2008) also describes intellectual capital in an information economy as information and knowledge within an organisation. Intellectual capital should be the focus of strategic enablement to gain competitive advantage. Technology provides the foundation level support for intellectual capital. Intellectual capital cannot be driven forward without technology adoption and use. Chieh- Min (2011) argued that an information-based view of the organisation suggests that information and technology are one of the most critical resources for the organisation. The organisation could be a leader, innovator, efficiency player, or a follower in their domain depending on how they plan to take competitive advantage of ICT. Clemons, Dewan and Kauffman (2006) stated that ICT could assist organisations in hyper-differentiating their products and better monetizing their products and services by emphasizing the degree to which the customers are informed about the products and services which could be through internet reviews or social media. Khavul, Peterson, Mullens and Rasheed (2010) state that new ventures in emerging economies can use strategic intent for developing dynamic capabilities through leveraging technological resources for customer-focused innovation.

In an information economy, intellectual capital is sustained by ICT to expedite business processes, transform service delivery, optimize cost, and drive radical innovations for transformative digital change. Phannaphatr, Uthai and Chidchanok (2011) argued that post-2008 economic crisis, radical innovation by entrepreneurs was required to recover the situation significantly. Wang and Mao (2012) stated that accelerating development in the service industry using technology had become the focus of national development for the Chinese economy, post-2008 global financial crisis. This had led to the emergence of technological innovations, which included social networking applications, cloud computing, mobile devices, and mobile applications. This also led to the service industry, integrating technology into their processes. It was about taking advantage of new systems, new types of operation, and new service approaches to transform the traditional service industry. This transformation of the service industry created demand, better consumption of services, and provided services of high value and high quality.

ICT has transformed existing infrastructure such as the internet to bring innovation and economic value to the society and the environment. Greengard (2008) stated that ICT

technologies such as wireless and mobile devices had ushered profound social changes beyond phone calls, messaging, internet access, and the ability to share data, that ripple into banking, retail, and healthcare. Ussahawanitchakit (2011), in his research, had concluded that strategic flexibility is positively related to corporate innovation. Moreover, the organisation's performance had a positive impact on organisation sustainability. Besides, technology change had an outstanding positive effect on individualized and organisations' considerations. There is an interlacing of strategic flexibility to technology change to organisational performance and sustainability (Ussahawanitchakit, 2011). Technology adoption and use seemed to improve organisation performance and sustainability. While some industries have adapted to the digital change quickly, others have lagged like the healthcare industry. ICT is, however, slowly transforming healthcare by enhancing service delivery, improving patient care, improving patient management, reducing cost, and better-enabling healthcare research. The healthcare industry should also ultimately evolve digitally to provide a better quality of care and service to patients.

2.1.3 *Corporate strategy and ICT*

Corporate strategy is the highest of the levels in management, applying to all parts of the organisation - while also incorporating the most prolonged time horizon. It gives direction to corporate values, corporate culture, corporate goals, and corporate missions. Under this broad corporate strategy, there are typically business-level competitive strategies and functional unit strategies. Corporate strategy refers to the overarching strategy of the diversified organisation. Such a corporate strategy answers the questions of "which businesses should we be in?" and "how does being in these businesses create cooperation and add to the competitive advantage of the corporation as a whole?" Business strategy refers to the aggregated strategies of a single business organisation or a strategic business unit (SBU) in a diversified corporation. According to Porter (1991), an organisation must formulate a business strategy that incorporates either cost leadership, differentiation, or focus to achieve sustainable competitive advantage and long-term success. Business strategies of SBU's must be aligned to the corporate strategy of the business. Strategic intent is different from the corporate strategy, which is the vision, mission, and goals of the organisations determined by senior leadership. Strategic intent is more of a collective approach. Technology change is challenging conventional strategic thinking. ICT is beginning to play a vital role in the organisation's strategy formulation and strategy implementation.

With recent developments in ICT and how it is being used digitally within the organisation, there must be a change in thinking from being an operational focus to a more strategic focus for ICT. ICT also provides improvement to service quality, cost savings, enhanced servicing capability, and innovation for an organisation, allowing it to be more agile to respond to changes. Due to the rapid growth and digital transformation of industries using ICT in the last ten years, very little research has been conducted in the field of ICT and its impact on the organisation's long-term goals and objectives. ICT can radically change organisations, but the extent and the rapidity of this change are not entirely understood (UNESCO, 2003). In an information economy, healthcare organisations are currently unable to position themselves (structurally transform) with evolving technology. This leads to the question, has ICT strategy been placed high enough on the strategic agenda of the healthcare organisation?

Furthermore, has the strategic intent and the corporate strategy of the healthcare organisations encompassed technology? As the technology diffusion process unfolds, it will become difficult to contain the digital evolution. Without a proper understanding of this process, it may bring undesirable consequences to healthcare, such as increased cost of care, patient dissatisfaction, failed technology transformation initiatives, and other significant organisational impacts.

2.1.4 *Strategic intent and ICT*

Organisational challenges stem from analyzing the foreseeable pattern of industry evolution. Strategic intent assures consistency in resource allocation, organisational sustainability, and radical innovation over the long term. In the medium term, it helps articulate organisational challenges to focus the effort of individuals and incremental innovations in the short term to reduce risk. Hamel and Prahalad (1989) argued that this consistency in the long term, focus in the medium term, and inventiveness and involvement in the short term provide the key to pursue ambitious goals for the organisations. Hamel and Prahalad (1989) also claimed that strategic intent is not about an unfettered ambition, but it is about providing new operational definitions as circumstances change and using intent consistently to guide and transform the organisation in the long term. Strategic intent lengthens the organisation's attention span, and it provides consistency to short term action while leaving room for interpretations as new opportunities arise. The organisational goals must be set outside the range of regular strategic planning exercise (Hamel & Prahalad, 1989). Innovation and the art of containing risks within manageable portions are essential for achieving the strategic intent (Hamel, 1999). Strategic intent is about driving innovation rather than focusing on increasing shareholder wealth. It is

about being more definite about the ends and flexible about the means. During Hamel's period, back in 1989, the relevance of digital technology to the organisation's strategic intent was minimally considered. ICT literature also contains very little information on technology's impact on strategic intent. Therefore, this construct was not very well thought through by executive management. The executives were more concerned about increasing shareholder value in their strategic planning exercise with little significance given to technology.

The contemporary economy is an intellectual knowledge-based economy that is supported by ICT, and information acts as the currency. The knowledge economy is a world in which people work with their brains rather than their hands (Ghosh & Ghosh, 2009). Technology creates competition, innovation, and new concepts. Investment is made in new concepts or the means to develop them rather than investing in new machines. In an information economy, rapid change is constant. Innovative ideas combined with technology empowers and enriches society. Hence in this digital age of information economy, the organisations must align ICT not only to corporate strategic planning exercise but also to strategic intent to pursue ambitious goals and be sustainable in the long term. Strategic intent enables an organisation to go above and beyond the reach, out to much greater heights than traditional strategic analysis like Strength Weakness Opportunity Risk (SWOT) analysis (Manikutty, 2010).

Mintzberg et al. (2003) specified that strategic intent aids in organisational learning. There is also a concept of emergent strategy in conventional strategy analysis. Mintzberg (1994a) had made a clear distinction between deliberate strategy and emergent strategy. Emergent strategies originate not in the mind of the strategist but the interaction of the organisation with its environment. He claimed that emergent strategies tend to exhibit a type of convergence in which ideas and actions from multiple sources integrate into a pattern. This is a form of organisational learning. In an information economy, the corporate strategies of an organisation will have to be emergent with an organisational learning focus. Strategic intent is separate from emergent strategy, and it encompasses the learning aspect of the organisation but with a longer-term focus.

Digital evolution is changing the business and process models rapidly. Brown (1997) stated that emerging technologies had created new business and process models, and innovation was linking emerging technologies with emerging models. Morgan and Page (2008) argue that, in a discontinuous and rapidly changing environment, strategy, operations, and ICT converge. Organisations will experience a syndrome of "active inertia," which can be characterized as an

organisation's inability to take the appropriate action in the face of shifting technological and economic conditions. Thorogood, Weiss, and Clark (2006) had explored ICT from different perspectives and how it integrates within the organisation. They stated that ICT integrates to varying levels within the organisation. The three profiles under which they integrate are technical profile, business enabler profile, and strategic profile. The technical profile calls for low levels of IT-business integration, whereas the business enabler profile deploys ICT in some business processes and begins engaging ICT with customers and suppliers. The strategic profile uses ICT to mobilize and extend the enterprise, which requires extensive ICT deployment, both internally and externally. This involves enterprise integration and undergoes digital transformation. The process of achieving enterprise integration includes all technological factors that enable cross-functional process integration. Digital transformation through enterprise integration is going to change organisational relationships forever. Enterprise integration and innovation by ICT will transform organisations throughout society (Dertouzos, 1991). Morgan and Page (2008) also state that ICT provides the means for digitally transforming the way business is conducted in many industries, but our understanding remains unclear how this form of change can be managed. Our knowledge of the digital transformation process in healthcare remains very limited to date.

The tools used for conventional strategic analysis like the SWOT are very narrowly focused. Only some tools force managers to consider digital transformation, radical innovations, and risks. For example, portfolio planning performed for strategic analysis portrays top management's investment options as an array of opportunities rather than an array of ICT technologies. Rapidly changing technology, deregulation, and globalization have undermined the value of traditional strategy analysis. Map-making skills are worth little in the epicentre of an earthquake. But an industry landscape in upheaval presents opportunities for ambitious organisations to digitally transform and redraw the map in their favour, so long as they can think outside traditional industry boundaries and conventional strategies. Therefore, the real challenge is in developing faith in the organisation's ability to deliver on tough goals, motivating staff to do so, and focusing attention long enough to internalize new digital capabilities. This digital change in healthcare is even more complicated due to difficulties in service delivery, a multitude of compliance requirements, and a wide range of clinical and non-clinical stakeholders. As previously discussed, during a digital disturbance, we can argue that it requires not only conventional strategic planning but also strategic intent to innovate, manage risks, and to achieve ambitious goals. This will be needed to handle the digital evolution

successfully. Only by awareness and in-depth understanding of this paradigm, senior managers in healthcare and other industries will be enabled to rise to the digital challenge and gain the courage they need to commit themselves to the long-term intent. This change in underlying assumptions is required to obtain much-needed efficiency and cost sustainability in healthcare. ICT should be a strategic resource for delivering the long-term goals and objectives of the organisation rather than being considered only as a technical resource.

2.1.5 *Technology use issues in healthcare*

The use of ICT systems in the healthcare environment has snowballed over recent years. The healthcare industry has slowly moved from paper-based systems to ICT applications for information processing and storage of data. Examples of the use of Healthcare ICT systems or Health Information Technologies (HIT) are electronic health records (EHR), computerized provider order entry (CPOE), picture archiving and communication systems (PACS), electronic prescriptions, access to medical databases on the internet, use of video conferencing for appointment and consultation with the doctors on the internet and for access to online patient information. There are different terms in use for HIT, the terms Healthcare ICT, Health Information Systems (HIS), and their variations are considered equivalent. Terms Electronic Health Record (EHR), Electronic Medical Record (EMR), Electronic Patient Record (EPR) and Personal Health Record (PHR) are also generally considered equivalent.

HIS systems are used for strategic information management consisting of patient information, medical images, and data from sensor-based healthcare applications. HIS is even used for healthcare planning and clinical research. HIS includes a user base such as healthcare professionals, patients, administrators, and other allied health professionals as the consumers of information. But due to various HIS systems, there is a need for integrated Healthcare ICT strategies, the requirement to explore innovative integrated system design models, to understand organisational change management and the need for appropriate training in Healthcare ICT (Haux, 2006). Australia has lagged other nations in harnessing the power of technology for healthcare. Srinivasan et al. (2018) recommend that Australia needs to be proactive in the use of digital assets and adopt a tech-savvy approach to tackle information management to harness massive amounts of unstructured data for improving health services outcomes to patients. Healthcare ICT can significantly improve the quality of care and management of health for the community.

Healthcare ICT has become the most promising and challenging field of research, with significant benefits to the community in general. Increased investments in ICT can be expected as progress in this field is directly correlated to the quality and efficiency of care (Haux, 2006). Governments are continually investing in Healthcare ICT. Lluch (2011) states that current HIS systems are inconsistent and inefficient, consisting of poorly coordinated processes. HIS systems have proven difficult to implement, despite their promise in reducing cost and improving quality of care. The systematic review reveals the implementation barriers are associated with organisational management and their interrelations (Lluch, 2011). Over a decade of effort shows some highly published HIS systems failures and costly delays (Kleinke, 2005). This has also been accompanied by an inability to achieve a widespread understanding of the benefits of HIS implementations and information exchange standards (para o Trabalho, 2010). Presently not all healthcare professionals and healthcare institutions are using HIS systems to its full extent. Various factors can be considered responsible for the slow uptake and failure of HIS. Lack of time linked to workflow factors have been identified by Granlien, Hertzum and Gudmundsen (2008). Rosen, Florin and Hutt (2007) identify trust as an essential factor, as they identify significant distrust in the data produced by HIS applications in their services and facilities. Choronaki, Andreassen and Bujnowska (2007) recognised that changes in HIS workflows constituted a heavier workload for healthcare professionals, resulting in slower adoption. After HIS applications were in use, clinicians also complained about the system being slow and taking a long time to enter data (Khoumbati et al., 2008; Rosen et al., 2007). Competence in using HIS systems and training has also been identified as barriers to adoption by various authors (Evans, 2008; Granlien et al., 2008; Meade, Buckley & Boland, 2009; Tan & Lewis, 2010).

Most of the time, software vendors are held responsible for the slow uptake and inability of the systems to be reliable and deliver benefits (Coiera, 1999). The top management layer is not attuned to ICT in healthcare organisations and has a very different way of thinking. They are strategic in business terms but not being strategic in technology terms. Healthcare professionals struggle to integrate HIS into their practice, and HIS systems continue to be underused (McMackin & Pittel, 2005). Very little is known about the organisational changes, costs, and time required for the successful implementation of HIS systems (Gagnon, 2009). HIS implementation failures should not be viewed as a problem in technology implementation but a holistic problem with organisational change (Wears, 2005). The executive management in healthcare sometimes do not take a holistic strategic approach to HIS implementations, and

this creates a significant challenge with technology adoption and use by healthcare professionals.

Various authors have tried to identify the different barriers to HIS implementation. Haluza and Jungwirth (2016) identify data security, lack of acceptance by doctors, and lack of technical perspectives as current barriers to HIS implementation. The technical aspects such as usability deficiency, lack of integration between different HIS systems, and system failures were rated as the highest barriers to HIS implementation, these reduced efficiencies of HIS systems and hampered physicians' work. Garmann-Johnsen (2015) argued that healthcare organisational structure and regulations regarding roles and responsibilities for healthcare plays a significant role in the choice of healthcare ICT strategies and approach towards HIS implementation. Garmann-Johnsen (2015) concluded that there were gaps in knowledge at the inter-organisation levels regarding HIS implementations and innovation strategies and required further research. He reasoned that there is a need to study how the strategic requirements poised at the national context translate to the regions. Kierkegaard (2015) discussed the importance of governance structures for Healthcare ICT. He specified that the HIS implementation efforts should move beyond the scope of having technology as the primary focus into a broader spectrum of governance structures and policies that can facilitate HIS implementations. Kierkegaard (2015) determined that there is a need to understand the dynamics of governance as the current HIS systems are often met with dissatisfaction by patients and healthcare professionals, as in the case of Denmark's eHealth implementation strategy which has had limited success. Pereira, da Silva, and Lapão (2014) discovered that socio-technical factors such as implementation strategies, participative design, autonomy, and usability issues that complicate the design and implementation of HIS systems were not often considered which led to significant system implementation failures. They also reason that ICT policy-making lacks evidence of innovation and cost reduction in healthcare, and more research is required in this area to provide evidence and their impact on HIS implementations. Steininger and Stiglbauer (2015) argued that the success of the HIS system was influenced by the acceptance level of the physicians and their intent to use the system. Social influence (Wells, 2009), experience in using HIS and privacy concerns were considered to have an impact on the perceived usefulness of the HIS systems. They (Steininger & Stiglbauer, 2015; Wells 2009) state that determining the factors relating to intent to use the HIS systems can allow policymakers to set target-oriented measures to increase acceptance.

Klöcker, Bernnat and Veit (2015) claim that HIS implementations such as nationwide eHealth systems get stalled long before they can deliver benefits because decisions get taken at the top layer or the macro layer while the actual benefits of HIS would surface at the individual or the microlayer, for example among healthcare professionals and patients. Not all stakeholder motivations and objectives are considered during nationwide HIS implementations. Klöcker et al. (2015) HIS strategy should not emanate through the intention of few individuals but a holistic process through ongoing consultation between different stakeholders. There should be engagement with various stakeholders at all levels of the organisation. Adoption and use of technology are transforming healthcare, but multiple authors have identified several issues with HIS implementations. Other researchers have recognized that there is a need for a comprehensive approach to solving the current problems with underused HIS systems and failed implementations (Coiera, 2006; Dobrev et al., 2008; Pare & Trudel, 2007) and further research was required in this area. There is also a need to consider organisation management models when studying the Healthcare ICT holistically (Harrop, 2002; Simon, Rundall & Shortell, 2007; Tufano, 2009; Walker & Carayon, 2009). Organisational structures, change management, and socio-political issues were identified as becoming dominant in healthcare ICT (Berg, Aarts & van der Lei, 2003; Kaplan & Shaw, 2004). Westbrook (2007) and Coiera (2009) also identified the need for developing socio-technical systems because the technology was significantly transforming healthcare. Lluch (2011) further argued that further research was required in understanding organisational change, end-users' use of ICT within health services, strategy, organisational structure, and work process issues involved, in realizing the benefits of HIS systems. Various authors also raise the need for a strategic fit of HIS with the organisational goals (Callen, Braithwaite & Westbrook 2008; Glasgow, 2007; Harrop, 2002; Shekelle, Morton & Keeler, 2006). Furthermore, strategic management of HIS is deemed as a necessary task (Winter, Ammenwerth & Bott, 2001). The aim of the Healthcare ICT strategy should be to support the patient management workflows through implementing suitable HIS applications and aligning with procedures for patient care, patient management, and administration. ICT strategy in healthcare should pursue the following goals to improve the quality of patient care and efficiency:

- Integrate care through a network of service providers
- Improve patient management through electronic patient record management and patient-centred documentation
- Integrate with knowledge and information for better decision support

- Enable standardization of medical process and information exchange standards.

Strategic management of HIS is becoming more than ever relevant. Proving timely successful HIS transformation is being viewed as a critical strategic instrument for providing the best possible results for Healthcare ICT. However, it is also not clear if successful implementation and use of technology in healthcare are dependent on the strategic intent of the organisation. Extant literature does not discuss on this topic. Therefore, there is a need for empirical research in Healthcare ICT to understand the adoption of technology and use with organisational strategic intent. This is required for the development of contemporary integrated next-generation ICT architectures, which will transform healthcare. New holistic architectures and management frameworks will be used to develop and manage next-generation integrated HIS systems which will be used for managing electronic patient records, providing online application access to a healthcare professional, and managing clinical workflows. Strategic management of HIS is also crucial for improving healthcare informatics in health services. Therefore, HIS adoption and use should align with the strategic plans and goals of the hospitals for the long term. Until such a time where the ICT adoption and use issues and strategic intent are not investigated holistically, HIS implementation issues will continue as is because they are being investigated in silos. It will also be unclear at this stage if the digital evolution of Healthcare ICT will be made possible without considering the strategic intent.

2.2 ICT adoption theories and strategic intent

2.2.1 Strategic intent

Goals state what is to be achieved and when. Although goals do not usually say how the results are to be achieved, they should be achievable (Quinn 1995; Lampel et al. 2013). Intent contains a conviction to achieve a certain state of affairs in the future (Bratman 1999). In the field of management, there exist several concepts, for example, vision, which is used by members to discuss such future-oriented behaviour (Mantere and Sillince 2007). The most striking difference between vision and strategic intent is the degree of collectivity, as many authors ascribe strategic intent as a phenomenon diffused at multiple organisational levels. In contrast, a vision is more clearly a top management leadership tool (Kotter 1995), often ascribed to a single visionary leader (Mintzberg and Waters 1985). Strategic intent should be understood as being immanent in an organisation not from being goal-oriented or from an overarching strategic plan perspective but internalised predispositions that orient staff in such a way that drives consistency in their coping actions and their engagement within and outside the

organisation (Chia & Holt, 2006). Strategic intent is different from goals in being super-ordinate to it (Hart 1992), long term or very long term (Burgelman and Grove 1996; Hamel and Prahalad 2005; Hart 1992), uncertain in its achievability (Burgelman and Grove 1996), linked to core competencies and of high significance (Hamel and Prahalad 1990). Strategic intent has long term focus on winning by improving competitive position relative to competitors (Kang and Liu, 2016). For this thesis, strategic intent is defined as the long-term ambition of the business, and it is the desired emergent characteristics of the business (Lejeune & Sack, 2008). It is the collective decisions interwoven into the fabric of the organisation for achieving long-term business outcomes.

2.2.2 *Technology organisation environment*

There have been several frameworks identified by various authors for technology adoption. The Technology-Organisation-Environment (TOE) framework (Tornatzky, Fleischer & Chakrabarti, 1990) is one of the widely used frameworks. The TOE framework identifies three essential elements that influence technological innovations. The technology context, is all the technologies, both internal and external, that are relevant to the organisation's technology use. Consequently, organisations must carefully consider these innovative technologies, for the type of organisation change they need to create and to adapt these technologies. Furthermore, the organisational context represents the organisational characteristics such as structures, internal communication, employees, and resources available. The organisational context influences technology use and adoption in different ways such as culture, cross-functional team communication, organisation structures, leadership, and strategy.

Furthermore, the environmental context refers to the industry context, the legislations, service providers, industry competition, and partners. The support infrastructure from an environmental context is also envisaged to impact innovation and technology use. The applicability of the TOE model is broad and can explain the various technological, industrial, and cultural contexts. Researchers have agreed that the TOE context influences technology use, but there are also a unique set of factors based on the industry context that influences the technology adaption, for example, industry competition, market intensity, and legislations. The TOE framework is highly adaptable, and it allows the freedom to vary the factors or the measures for the new research context that is going to be studied.

Furthermore, Diffusion of innovation theory (DOI) is also consistent with the TOE framework. The internal characteristics of the DOI theory (Rogers, 2010) are comparable with the

organisational context of the TOE framework, and the external characteristics of the DOI are comparable with the environmental context. The implicit technological characteristics in innovation in the DOI theory is comparable with the technological context (Zhu, Kraemer & Xu, 2006). Consequently, researchers explain that the DOI theory and the TOE framework are closely related. Some of the significant factors that have been identified in the existing empirical studies by Baker (2012) for the TOE framework are highlighted in Table 2-2.

Table 2-2 TOE framework factors

<i>Technology</i>	<i>Organisation</i>	<i>Environment</i>
Perceived barriers	Size	Role of IT
Compatibility	Strategic planning	Management risk position
Complexity	Infrastructure	Adaptable innovations
Perceived direct benefits	Top management support	Perceived industry pressure
Relative advantage	Championship	Perceived government pressure
Trialability	Perceived financial cost	Performance gap
Technology readiness	Perceived technical competence	Market uncertainty
Technology competence	Organisational readiness	Regulatory support
Technology integration	Financial commitment	

According to the DOI theory (Rogers, 2010), technology adoption can be categorized into the five categories of adopters such as Innovators, Early adopters, Early Majority, Late Majority, and Laggards. The factors that influence the adoption that has been identified by Rogers (2010) are observability, relative advantage, compatibility, trialability, and complexity. Culture and

psychological aspects of the organisation and the individuals, influence the early adoption process since the adoption decisions are subjective to the attitudes of the people in the organisation and are influenced by its cultural characteristics (Erumban & De Jong, 2006). DOI theory also provides a scaffold for planning health informatics related innovations in clinical informatics (Kaminski, 2011).

The TOE factors from Baker's (2012) study, as highlighted in Table 2-3 will initially be used for quantitative data collection. The TOE model will be further extended using the strategic intent context.

Table 2-3 TOE framework factors used

<i>Technology</i>	<i>Organisation</i>	<i>Environment</i>
Relative advantage	Strategic planning	Role of IT
Trialability	Top management support	Management risk position
Technology readiness	Perceived financial cost	Adaptable innovations
Technology competence-	Organisational readiness	
Technology integration	Financial commitment	

2.2.3 Technology acceptance model (TAM)

Davis introduced the TAM model over a quarter of a century ago (Davis, 1985). TAM helps in understanding the key predictors of human behaviour in acceptance or rejection of Technology (Marangunić & Granić, 2015). In the TAM, the two mediating variables, that is, perceived ease of use and perceived usefulness, are considered significant predictors in the potential system usage. There are a lot of cases of underuse, workarounds, resistance, and abandonment of technology by the clinicians in healthcare (Holden & Karsh, 2009; Koppel, Wetterneck, Telles & Karsh, 2008; Lapointe & Rivard, 2006). The studies in health IT are more about adoption, that is, if the clinicians and hospitals have purchased and installed the IT system, and less about how HIS is used by the clinicians (Holden & Karsh, 2010). Hu, Chau, Sheng and Tam (1999) state that TAM is a poor fit for physicians' acceptance of HIS, because of the professional difference between physicians and other workers who use IT. There is also a continued need to explore theoretically motivated variables and relationships that can be added to TAM. The generic variables, such as perceived ease of use and perceived usefulness, must also be contextualized to healthcare for actionable meanings. This will allow researchers to probe

various theoretically interesting clinicians' beliefs and develop a theory that is more robust and relevant to healthcare. Healthcare IT requires a comprehensive approach for understanding technology adoption issues and use in healthcare. The TAM model does not consider strategic variables such as strategic intent and strategic alignment that would impact technology adoption and use in healthcare. TAM is more about the use of HIS systems from an individual user's perspective. ICT adoption theories such as the TAM, DOI, and TOE discuss the adoption of technology use within the organisation. But the current acceptance and adoption theories do not link the technology adoption and use to the long-term strategic intent of the organisation.

2.2.4 *The gap in existing research*

Digital evolution is fundamentally changing the way we work, transforming our personal lives and the way we engage with each other. Information technology is blurring the lines between digital, physical, and biological spheres and is disrupting every industry in every country. This industrial revolution, which some refer to as a digital revolution, is characterized using information technologies. The information which is at the core of these technologies is becoming more critical than ever and is playing a strategic role in everything that we do from business transactions to healthcare, government activities and leisure pursuits (Webster, 2014). This digital revolution will be something that human society has not experienced before, and we are unsure of how this will unfold (Schwab, 2017). The healthcare industry is also inevitably impacted by this digital revolution. Patients and staff are becoming knowledgeable and familiar with emerging technologies and are demanding flexible, accessible, and interactive products and services. Technology is also changing the competitive game for all organisations regardless of the industry they operate in, so it has become paramount to explore potential technology use not only to optimize existing processes but to strategically use it in the delivery of more meaningful customer experience (Neuhofer, Buhalis & Ladkin, 2015). This will enhance competitiveness (Buhalis & Amaranggana, 2015). Hence there is a requirement for new best practices in technology adoption and its strategic use to be found, for management to take advantage of the digital revolution and create new innovative technology solutions that will enhance the quality and safety of patient care.

Presently strategic analysis does not consider digital transformation, innovation, and risks during the strategic planning exercise and is narrowly operationally focused (Kane, Palmer, Phillips, Kiron & Buckley, 2015). For example, portfolio planning performed for strategic analysis portrays top management's investment options in an array of opportunities rather than a variety of ICT technologies to transform the business through innovation digitally. Rapidly

changing technologies have undermined the value of traditional strategy analysis. But the industry in upheaval presents opportunities for ambitious organisations to digitally transform and redraw the map in their favour by building new sustainable business models, by reshaping customer value propositions and transforming operations (Berman, 2012). Developing the vision and faith in the organisation's ability to deliver on tough goals, motivating staff to do so at all levels of the organisation, and focusing the attention long enough to internalize new digital capabilities is the real challenge for organisations (Fitzgerald, Kruschwitz, Bonnet & Welch, 2014).

Organisational goals are also different from strategic intent. Strategic intent focus on the long term collective outcomes that the organisation is seeking to achieve. Long term transformation of the healthcare industry through technology can only be made possible by collective action at all levels of the organisation to achieve the desired intent. But a significant and problematic challenge is the disconnection in the understanding of strategic intent and its impact on digital services in an organisation, which is required for delivering efficient services to patients through technology use. Therefore, understanding the strategic intent paradigm becomes vital in digitally transforming the organisations in the long term.

Due to technology adoption and technology use factors, the environment in which the organisations operate has become dynamic. The dynamic nature of the situation will require continual assessment. The organisations should reposition themselves externally and rearrange internally to adapt to the dynamic environment continuously. They should be able to evolve from one perspective to another and be able to learn and adapt. Pollalis (2003) observed that if ICT was viewed as a strategic component, rather than a support component, then strategic alignment factors could produce a positive impact on the organisations. Strategic alignment contextual factors influence the business effect of technology (Kearns & Sabherwal, 2006). Hence the strategic alignment factors are also critical along with strategic intent because, with the lack of alignment, the value of technology investments cannot be realized (Henderson & Venkatraman, 1993).

As previously discussed, presently, there have been several issues with technology adoption and technology use in healthcare. Researchers argue that organisational problems have not received appropriate attention, and this can include issues that go beyond human-computer interfaces such as strategies for system introduction and behaviour of groups (Cresswell & Sheikh, 2013). According to Gagnon et al. (2012), there are three factors, that is, human,

technological, and organisational factors, which are impacting technology adoption, and these factors could be interrelated and may overlap. Consideration of the importance of technical, social, and organisational factors are essential in ensuring that the technology is not only useful but also supports the organisational functioning in which the clinicians and patients operate (Boonstra & Broekhuis, 2010; Greenhalg, Robert, Macfarlane, Bate & Kyriakidou, 2004). Achieving a certain degree of fit (alignment) between the three interrelated factors also becomes of prime importance (Yusof, Stergioulas & Zugic, 2007). The study conducted by Yusof (2015) on critical care information systems demonstrated that the problems in technology adoption were mainly due to technology mismatch with organisation structure, human clinical practices, and lack of stakeholder understanding. Yusof (2015) concluded that the human, technical, and organisational factors were intertwined and they must be fitted with each other to exploit the advantages.

There has not been an empirical study conducted to link the technology use and adoption issues with the organisational strategic intent and strategic alignment factors. To date, several frameworks have been developed to study the adoption of technology in the organisation, such as TOE framework, DOI, and TAM. These frameworks are flexible for any industry adoption. But, neither TOE framework, TAM model, nor the DOI theory completely addresses the strategic intent factors for technology adoption in healthcare and its impact on technology use. The strategic intent construct considers the strategic and human factors which are important for technology adoption and use. Amid the digital upheaval, it requires an understanding of the technology adoption issues from not only a technical, organisational, and environmental perspective but also the key understanding from strategic intent and strategic alignment perspectives. The knowledge of strategic intent and strategic alignment perspectives will allow an organisation to innovate, achieve ambitious goals, successfully engage key stakeholders, and accomplish a digital revolution in the long term. Transformation of healthcare through technology can be only made possible by collective intent and alignment at all levels of the organisation to drive successful outcomes. Pereira et al. (2014) in their study, discuss the importance of socio-technical factors in the implementation of digital change and argue that further research is required in this area. Digital change cannot be successfully implemented without strategically considering the socio-technical aspects. Technology disruption is a complex phenomenon. Sigala (2018) discusses the impact of technology to act as an agent and its potential to disrupt and transform industries. She states that further research from a multi-disciplinary perspective will be required to study this complex phenomenon.

Therefore, there is a need to explore technology adoption from different perspectives and to extend the TOE framework and to find its strategic use, using a multi-disciplinary approach in the era of digital disruption. Linking organisational strategic intent and strategic alignment to technology use and adoption factors, therefore, becomes vital in understanding the digital revolution from all perspectives. There has never been a time as crucial as now for the alignment of ICT use with the organisation's strategic intent, to achieve the long-term collective desired business outcomes. Therefore, there is a need to determine the other essential factors for subjective norms, and the barriers and facilitators to IT use in healthcare so that a robust model contextualized to the digital revolution is developed. This beckons for further research academically on this topic for better positioning of healthcare organisations in the times of rapid digital change. Until such time our knowledge will remain unclear on what is the impact of ICT use on healthcare organisation's strategic intent? Therefore, this study aims to identify if there is any significant association between technology use and the organisation's strategic intent. This study will also seek to identify the critical factors that impact technology use and strategic intent in a relational model. Since the integration of various technology and strategic intent factors are relatively new, convergent mixed method design (Creswell, Fetters & Curry, 2013) was chosen for this study.

2.3 Research questions

It is evident from the literature that ICT adoption use factors and strategic intent are not stand-alone issues in the digital age (Baker, 2012; Hamel & Prahalad, 1989; Holden & Karsh, 2009; Koppel et al., 2008; Lapointe & Rivard, 2006). Instead, they interact with each other at different levels, such as technology, organisation, and human factors level and requires further research. This issue has also been raised, and re-phrased as the need for strategic fit, or alignment, or the lack of holistic approaches when studying HIS. It needs to include the inclusion of management organisational models and knowledge from other disciplines. To date, there has been a consensus in most of the literature by various authors that there is a need for further research to understand barriers for HIS adoption better. How different factors and actors interact and are interrelated, as well as potential ways to overcome the barriers to achieve a desired long-term strategic outcome for the healthcare institutions. In this study, the strategic intent construct tries to explore the intent of the long-term business outcomes with internal fit and external context by digging deeper into various variables impacting ICT adoption and use.

In contrast to dynamic strategy for continuous change, the strategic intent construct does not explore the resource-based view nor focus on economic returns of resources as discussed by various authors in the study of dynamic strategies (Barney, 2001; Connor, 2002). This study does not focus on dynamic strategies for a rapidly changing environment. The conformist strategic thinking will have to change in the era of the digital revolution to a more strategic intent oriented approach. As previously discussed, various authors have argued that strategic intent is essential for an organisation's long-term survival and success in the information economy. With complex requirements for compliance, information exchange standards, complex ICT transformations, underused HIS systems, and ongoing failed ICT initiatives in healthcare, further research is required to understand and improve the current situation. There is a need to study ICT use alignment factors with the organisation's strategic intent from various perspectives. It is required to understand if there is an impact of ICT use on strategic intent. By understanding the above research situation, we will avoid financial losses for healthcare organisations from failed HIS implementations and underused HIS systems. This will also enable improvements in patient care outcomes and patient experience through the use of technology.

With active inertia experienced by healthcare organisations in the digital age, the proposed research project aims to explore the above-stated situation in greater detail and answer the questions if there is a disconnect between strategic intent and ICT use in healthcare? It also aims to understand what patterns are emerging from this digital evolution and what are the variables or dimensions impacting this transformational digital change. The study aims to analyze and generate appropriate methodological frameworks under which this digital transformation can be performed to achieve the desired strategic intent. The research questions for this project have been synthesized from various literature reviews by the different authors on strategic intent, and existing frameworks on ICT adoption and use. It is also based on my personal experience of the situation in a multi-national company, which went under administration in 2009 due to technical issues. With over 20 years of experience in the ICT industry and currently working with a Managed IT service provider for healthcare organisations such as Health Technology Solutions and WA Health, I have personally experienced this disconnect in strategic intent and ICT use.

Innovative, disruptive technologies have impacted and changed the underlying corporate strategies. The ability to achieve long-term strategic intent is dependent on an organisation's ability to utilize ICT as a strategic resource and undergo successful digital evolution. Most

organisations seem to overlook this point as they fail to thoroughly understand the technology use construct and how this connects with the organisation's long-term outcomes. This study will investigate the disconnect between ICT use and strategic intent in a healthcare organisation by analyzing the following questions:

- Is there a disconnection between organisational strategic intent and ICT use in healthcare?
- What factors are important for the alignment of ICT use with strategic intent?
- Can we create a framework to improve the alignment of technology with strategic intent?

The framework will be created from qualitative data through semi-structured interviews and quantitative survey data, based on the research design when the critical success factors have been synthesized. This framework will assist in the long-term organisational sustainability of healthcare.

2.3.1 *Research Aims and Objectives*

The following briefly states the aim, objectives, and goals of this research

2.3.1.1 *Aim—statements of intent*

The objective of this research project is to identify if there is a disconnection between organisational strategic intent and ICT use, such as, analyze ICT adoption and use issues from various perspectives concerning digital evolution, strategic outcomes and long-term objectives of the organisation, and report findings. The study also aims to identify the alignment factors for technology use with strategic intent. The research will aim to investigate secondary health service providers with enterprise sustainability as the research goal.

2.3.1.2 *Objectives*

The objective of the project will be to research two secondary public health service providers, one in a metropolitan area and another one in a regional area, and identify if there are any issues and gaps with technology use, organisational learning, innovation, culture, structure, engagement, enablement and strategic direction for achieving the organisation's strategic intent. Metropolitan hospital is a major public provider of tertiary health services, health professional education and research in Victoria, Australia. It operates across acute, sub-acute and mental health. The regional hospital is a major public hospital in Queensland, Australia. It offers a wide range of acute, speciality, mental health and allied health medical services to the regional areas. Two healthcare providers were chosen so that that data can be converged and

synthesised for generalisability. The mixed-method convergent approach is also used to create a statistical measurement model. The measurement model is used to develop a conceptual model for healthcare sustainability.

2.3.1.3 Goals—statements of outcome

The goal of the research is to document findings and create a conceptual framework for organisational sustainability with critical success factors and key focus areas identified for healthcare digital evolution. The goal is also to outline recommendations for better alignment of ICT use and strategic intent to the two public healthcare service providers based on the findings from the research data. The study will also identify areas for future research.

2.3.1.4 Benefits

The benefits of this research to healthcare organisations and the broader community of practice are:

- Findings from this research can be applied to corporate and business planning to achieve long-term strategic intent.
- ICT underpins healthcare service delivery. The reported findings will enable a better understanding of the digital healthcare revolution, which will be required for organisations in healthcare to transform themselves digitally and achieve long-term sustainability.
- The research output will be a conceptual framework around organisational sustainability with critical success factors and key focus areas identified for ICT use and strategic intent. This study could potentially deliver cost savings to the government in terms of duplicative healthcare technology spend, by reducing millions of dollars wasted in failed ICT initiatives and underused HIS systems.
- The project recommendations will drive organisational learning within the two public healthcare service provider organisations and help enhance ICT service delivery within the organisation.
- The research recommendations can also be applied to the broader healthcare and ICT community. Presently there is the duplication of efforts within different business units and money is spent on projects that are not required. This study will also lead to a better understanding of the complete picture between technology and clinical use, which could lead to cost optimizations and better return of investment on the government healthcare spend.

- The research findings will also help ICT practitioners understand healthcare service delivery issues.

This research is a convergent mixed method research-informed from the high-level TOE framework and strategic intent paradigm.

3 Methodology

3.1 *Introduction*

Quantitative and qualitative research are the two leading schools of thought underpinning research. Quantitative research can be associated with the collection of large-scale sets of data and the use of statistical, numerical, and computational techniques to analyze the data (Neuman 2014). Quantitative research is characterized by a focused research question and the development of hypotheses. Sampling techniques, sample size, and selection are essential considerations in the use of quantitative research methods. This is particularly the case when choosing the research design. In such circumstances, statistical analysis procedures are often used to determine reliability and validity.

Qualitative research is concerned with the collection and analysis of data in a non-numerical form, for example, the collection of people's perceptions about an event, and the subsequent analysis of this data to establish the range of perceptions (Denzin & Lincoln, 2011). When using qualitative research, the investigation tends to opt for exploring situations in detail and thus may concentrate on fewer instances. It might include the observation of a single situation over a period to analyze cause and effect in that circumstance (Berg, 1998). This would be done to show why certain events might occur. There is no single, general method of qualitative research. Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live. The research methods used in qualitative research are based on the view that knowledge has a social construct and that multiple realities can coexist (Krefting, 1991). As such, qualitative research methods tend to have a broad focus and are context-bound.

Examples of qualitative research methods include the use of:

- Phenomenology (Atwood & Stolorow, 2014)
- Action and interpretive research (Ormston, Spencer, Barnard & Snape, 2014)
- Archival research (Turiano, 2014)
- Case study research (Cronin, 2014)
- Ethnography (Pink et al., 2015)
- Grounded theory (Glaser & Strauss, 2002)
- Narrative and metaphor (Lewis, 2015)

These methods and others can be used to explore feelings, perceptions, attitudes, depth of knowledge, and thoughts from informants. Qualitative data sources can include the use of structured, semi and unstructured interviews, focus groups, documents and text, free text, photographs, videos, audiotapes or direct observation as data collection methods, organisation, and coding (Neuman 2014).

3.2 Types of methodology

The quantitative methodology has a post-positivist approach, whereas the qualitative methodology is inductive. In qualitative research, the data is used inductively to develop a theory (Neuman, 2014). People create and associate their subjective meanings as they interact with their environment. In the natural environment, qualitative research understands the meanings of events people assign to them. The inductive study of subjective and intersubjective meanings is defined as interpretivism (Orlikowski & Baroudi, 1991). Qualitative research is multimethod and involves a naturalistic and interpretive approach to the subject being studied (Denzin, 2008). There are different types of qualitative methodologies that can be used for qualitative research, which is mentioned in the following sections.

3.2.1 Action research

Action research is a form of qualitative research. The term action research (AR) appears to have been initiated by members of the London Tavistock Institute in the early 1950s as an "attempt to change industrial practice by combining research and theory" (Neuman & Hirschhorn, 1999, p.684). Kurt Lewin coined the term "action research" in 1944. These pioneers believed that research projects should not only increase knowledge, but it should also embrace improvement in human work situations. In conducting their research, initially termed socio-technical, they carefully monitored both efficient uses of technology and improvements in quality of life measures. AR represents the interface between action and research or practice and theory (Lewin, 1994). Cunningham (1993, p.67) describes AR as "a spectrum of activities that focus on research, planning, theorizing, learning, and development of a continuous process of research and learning in the researcher's long-term relationship with a problem". Carr and Kemmis (1986) describe a traditional view of AR, but they also emphasize the processes of "improvement" and "involvement" in AR.

The two essential aims of action research are to involve and to improve. Action research aims at improvement in three areas: firstly, the improvement of practice, secondly, the improvement of the understanding of the practice by its practitioners, and thirdly, the improvement of the

situation in which the practice takes place. An essential feature of AR is to focus on the generation of new knowledge by seeking solutions or improvements to "real-life" practical problem solutions (Elden & Chisholm, 1993).

3.2.2 *Phenomenology*

Phenomenology, in Husserl's (1970) conception, is primarily concerned with the systematic reflection on and study of the structures of consciousness and the phenomena that appear in acts of consciousness. Work in this methodology has also been done by Heidegger in 1927 (1988) and more recently by Moustakas (1994). In its most basic form, phenomenology attempts to create conditions for the objective study of topics usually regarded as subjective: consciousness and the content of conscious experiences such as judgments, perceptions, and emotions. Phenomenology does not attempt to study consciousness from the perspective of clinical psychology or neurology. Instead, it seeks through systematic reflection to determine the essential properties and structures of experience as shared by the research participants (Husserl, 1970). Phenomenology emphasizes the subjective lived experience of individuals (Lichtman, 2013). Some authors argue that it is a philosophy, which others speak about it as being a method or methodology. Lichtman (2011) states that a good phenomenology study moves beyond just a description of the experience, it strives to arrive at the essence of the experience. Phenomenology describes and tries to understand the lived experiences of individuals who have experienced a phenomenon. Moustakas (1994) states phenomenology allows for an in-depth inquiry of participants sharing a common experience. It will enable the researcher to examine the interrelated dimensions of human experience and address the universal research question. The basic essence of phenomenology is to reduce individual experiences with a phenomenon to a description of universal essence (van Manen 2016). The inquirer collects data from persons who have experienced the phenomenon and develops a composite description of the essence of the experience for all the individuals (Moustakas, 1994). The procedure illustrated by Moustakas (1994), consists of identifying a phenomenon to study, bracketing out one's own experience, and collecting data from several persons who have experienced the phenomenon. The researcher then analyzes the data by reducing the information to significant statements or quotes and combines the statements into themes. Following that, the researcher develops a textual description of their experiences (how they experienced it in terms of the conditions, situations, or context), and a combination of the textual and structural descriptions to convey the overall essence of the experience.

3.2.3 *Grounded Theory Method*

Grounded theory methodology was developed by Glaser and Strauss during the 1960s and has found application in areas such as education, social and health science, and information science research. Grounded theory is usually used in research studies that are concerned with developing context-based, process-oriented descriptions and explanations of phenomena, systems, and community settings (Charmaz, 2000). Grounded Theory Method (GTM) seeks to construct a theory about issues of importance in people's experiences (Strauss & Corbin, 1998). These issues of importance to participants emerge from the experiences they share about an area of interest they have in common with the researcher. GTM is a systematic methodology in the social sciences involving the discovery of theory through the analysis of data. It is mainly used in qualitative research but is also applicable to quantitative data. It is a qualitative research approach most closely associated with the quantitative approach (Litchman, 2011). GTM is a research method that operates almost in a reverse fashion from traditional social science research. Rather than beginning with a hypothesis, the first step is data collection, through a variety of methods. From the data collected, the key points are marked with a series of codes, which are extracted from the text. The codes are grouped into similar concepts to make them more workable. From these concepts, categories are formed, which are the basis for the creation of a theory, or a reverse-engineered hypothesis. This contradicts the traditional model of research, where the researcher chooses a theoretical framework, and only then applies this model to the phenomenon to be studied. The grounded theory does not test a hypothesis (Suddaby, 2006).

Furthermore, grounded theory is explicitly emergent, and this differentiates grounded theory from other research methods. It sets out to find what theory accounts for the research situation as it is. In this aspect, it is like action research, where the aim is to comprehend the research situation. As Glaser (1992, 2012a) states the goal, is to discover the theory contained in the data. This distinction between "emergence and forcing," as Glaser (1992, 2012a) frames it, is central to understanding the grounded theory methodology. Most of the researchers in many disciplines would have been exposed to hypothesis-testing research than to emergent research. The research processes most researchers have used, and the thesis structures they have internalized are those of hypothesis testing and not emergence.

Coming from a researcher's perspective, doing GTM is somewhat a matter of unlearning some of the concepts that have been acquired through literature. GTM should not be judged from a hypothesis testing perspective. If GTM is judged by the criteria that have been used for

hypothesis testing research, then it is likely to be misjudged. The place of literature in this method is different. GTM is responsive to the research situation in which the research is being performed. There is an ongoing search for evidence which disconfirms the emerging theory. The data drives the research output in a way such that the final shape of the theory is likely to provide a good fit for the research situation. Glaser (1995) suggests that the adequacy of the emerging theory should be judged on two criteria: it fits the research situation, and it works. It helps the people in the situation to manage the situation better by making sense of their experience.

3.2.4 *Grounded Theory Method-Lite*

Phenomenology emphasizes the meaning of an experience for several individuals. In contrast, grounded theory study intends to move beyond description and to generate or discover a theory, an abstract analytical schema of a process or action or interaction (Strauss & Corbin, 1998). The participants in this study will have experienced the research situation. Development of the theory might help explain the practice or provide a framework for further research. The key idea is that this theory-development does not come "off the shelf," but instead is generated or "grounded" in data from participants who have experienced the research situation (Strauss & Corbin, 1990, p. 24). Thus, grounded theory is a qualitative research design in which the inquirer generates a general explanation (a theory) of a situation or process, action, or interaction shaped by the views of many participants (Strauss & Corbin, 1998). Charmaz (2000) describes the grounded theory as the systematic inductive guidelines for collecting and analyzing data to build middle-range theoretical frameworks that explain the collected data. Throughout the research process, grounded theorists develop analytic interpretations of their data to focus on further data collection, which they use in turn to inform and refine their developing theoretical analysis."

The two popular approaches to the grounded theory are the systematic procedure of Strauss and Corbin (1990, 1998) and the constructive approach of Charmaz and Belgrave (2007). In the more systematic, analytic procedures of Strauss and Corbin (1998), the investigator seeks to systematically develop a theory that explains process, action, or interaction on a topic. Instead of embracing the study of a single process or core category as in Strauss and Corbin's (1998) approach, Charmaz (2006) advocates for a social constructivist perspective that includes emphasizing diverse local worlds, multiple realities, and the complexities of worlds, views, and actions. Charmaz places more emphasis on the views, values, beliefs, feelings, assumptions, and ideologies of individuals than on the methods of research (Creswell, 2007).

Charmaz's interpretive approach has many attractive elements such as being flexible in structure, whereas Strauss and Corbin's (1998) method is a systematic approach that is helpful in theory development that explains the process, action, or interaction on a topic. Creswell (2007) also states that Strauss and Corbin's approach is beneficial for individuals learning about applying grounded theory research to practice. The main procedures of a qualitative study based on grounded theory are presented in Straus (1987). These include:

- situation
- data collection
- coding /themes
- key categories
- saturation of the theory
- theory development.

There are debates on how to perform grounded theory procedures with different competing recommendations. The grounded theory aims to generate a plausible theory about a phenomenon that is grounded in the data (McLeod, 2001). GTM provides a systematic set of procedures to inductively derive a theory about a phenomenon (Strauss & Corbin, 1998). In contrast, grounded theory lite method has a clear distinction from the full grounded theory. GTM requires the implementation of complete grounded theory procedures such a theoretical sampling for producing theory grounded in the data. Full grounded theory is conceived to be achievable in large projects with ample resources (Braun & Clarke, 2006). Due to the constraint in time, resources, or other reasons, if full theoretical sampling could not be achieved to develop a thick, saturated substantive theory of the phenomenon then abbreviated GT or GT-lite is used (Willig, 2013).

Grounded theory lite involves using the techniques of grounded theory without going through the full GTM approach. The ground theory lite is like thematic analysis, and both involve coding and interpretation of data. This is a form of qualitative interpretative research (Denzin, 2008). The grounded theory lite approach consists in understanding the relationship between various categories (Pidgeon & Henwood, 1997). The thematic analysis seeks to understand the patterns in the qualitative data (Clarke, 2005). Grounded theory lite is also akin to thematic analysis as it does not subscribe to the full grounded theory procedures. In the thematic analysis and grounded theory lite, the researcher does not need to subscribe to full implicit commitments of a fully grounded theory methodology (Braun & Clarke, 2006). The grounded theory lite

utilizes some of the procedures outlined by the full grounded theory process and uses a qualitative, interpretivism approach.

The grounded theory-lite methodology involves using the techniques of grounded theory for the development of categories (and concepts), and an understanding of the relationship between the various categories (and concepts) (Pidgeon & Henwood, 1997). As previously stated, ground theory lite is like thematic analysis, both involving coding, and interpretation of data. For example, differences in terminologies, such as categories versus themes, can mask the underlying similarities. GTM- lite was more appropriate for the qualitative phase of this research rather than using the full GTM approach, as theoretical sampling was not performed due to resource constraints and the mixed-method paradigm.

So rather than just using thematic analysis for the qualitative phase, GTM-lite, with some of the rigour prescribed by GTM, was used to derive a conceptual framework inductively. GTM-lite with the phenomenological approach was more suitable for the qualitative phase of the research situation so that the researcher can uncover the emerging facts, that is if there is a real disconnect between ICT use and organisational strategic intent. The findings were then used to create a conceptual framework. The process of arriving at a conceptual framework is like an inductive process where individual concepts are combined to reveal the possible relationships and communicate the bigger map (Imenda, 2014). As indicated earlier, while the qualitative phase had some of the rigour of GTM, we classified the approach as GTM-lite due to the mixed-method paradigm.

3.2.5 *Mixed method research*

Mixed method research is a contemporary movement in research that has been called the third methodological movement (Denzin & Lincoln, 2011). The mixed-method offers a powerful tool to investigate complex processes (Creswell, 2009; Creswell et al., 2013). The use of a mixed-method has evolved after discussions around the perceived limitations of both qualitative and quantitative methods and paradigms in social and behavioural sciences. Mixed method research offers an alternative, based on pragmatism, which argues that the two methodical approaches are compatible and can be fruitfully used in conjunction with one another (Tashakkori & Teddlie, 1998).

Mixed method research is a type of research in which a researcher combines the elements of qualitative and quantitative research approaches, such as, use of qualitative viewpoints, quantitative data collection, analysis, and inference techniques, for the broad purposes of

breadth and depth of understanding and corroboration (Johnson, Onwuegbuzie & Turner, 2007). This is a form of methodological eclecticism; the combination of quantitative and qualitative methods is proposed on the grounds that this promises to cancel out the respective weaknesses of each method (Hammersley, 1996).

In health services, the researcher uses both quantitative and qualitative methodologies. Quantitative methodologies are used to address the questions about generalizability, the magnitude of effects and causality and qualitative methodologies are used to explore a phenomenon, develop a theory, or interpret the subjective meaning of events assigned by people. Mixed method research draws on the strengths of both quantitative and qualitative approaches and provides an innovative approach for addressing contemporary issues in healthcare (Creswell & Sheikh, 2013). Mixed method research can dramatically enhance the value of the research findings (Bryman, 2006; Creswell & Plano Clark, 2017). The advantages of multi-method integration are that quantitative data can be used to assess the validity of the qualitative findings and vice versa. The integration can be implemented at the study design level, methods, and interpretation, and reporting levels of the research process (Creswell & Plano Clark, 2017; O'Cathain, Murphy & Nicholl, 2010). At the study level, the integration can be exploratory sequential, explanatory sequential, and convergent. In a convergent design, the qualitative and quantitative data are collected and analyzed during a similar period (Fetters, Curry, & Creswell, 2013).

An interactive approach may be used where iterative data collection and analysis drives changes in the data collection procedures. Initial quantitative findings may influence the focus and type of data collected for the qualitative phase and vice versa. The convergent design can use multiple stages (Nastasi et al., 2007). In a multistage mixed methods framework, researchers use multiple stages of data collection that may include various combinations of exploratory sequential, explanatory sequential, and convergent approaches (Nastasi et al., 2007). In a study conducted by Crabtree, Miller, Tallia and Cohen (2005), they use quantitative and qualitative findings iteratively in multiple phases, such that data were interacting to inform the results. Krumholz, Curry and Bradley (2011) in their study used three phases: 1) descriptive quantitative analysis; 2) a qualitative phase to understand the process; and 3) primary data collection through surveys to test the hypothesis quantitatively (Bradley et al., 2012; Curry et al., 2011). In a common version, qualitative and quantitative data collection occurs in parallel, and analysis for integration begins after the completion of the data collection process. Frequently two forms of data are analyzed separately and then merged (Fetters et al.,

2013). Creswell and Plano Clark conceptualize integration to occur through linking the methods of data collection and analysis.

Linking occurs in several ways, such as connecting, building, merging, and embedding (Creswell, 2011). Integration through merging at the methods level occurs when the qualitative and quantitative data are brought together for analysis and comparison (Fetters et al., 2013). Bradley et al. (2012) analyzed the quantitative survey data and then merged the quantitative findings and qualitative analysis into a single paper. Saint Arnault and Fetters (2011) used a convergent design for conducting multiple surveys and ethnographic qualitative interviews to investigate different factors that impact help-seeking Japanese women. Castro, Kellison, Boyd and Kopak (2010) collected quantitative data with a series of scales and qualitative data using similar questions and then merged the resultant information after statistical analysis of numerical data, and qualitative analysis of the textual data was completed. Scammom et al. (2013) used a similar multistage, mixed-method study with merging, where they used multiple data sources of existing and newly collected quantitative and qualitative data. Meurer et al. (2012) collected the quantitative and qualitative data concurrently, and their approach to integration was also merging. In the mixed method design for qualitative analysis, they developed open-ended responses in the survey and interview questions for mini focus groups.

It was making this choice intentionally during the design, integration through merging naturally followed. Meurer et al. (2012) conducted a separate analysis of the quantitative and qualitative data in parallel. For quantitative analysis, they used descriptive statistics, mean scores, and standard deviations. For the qualitative phase, the investigators developed a coding scheme and conducted thematic searches using the pre-determined codes. The initial, higher-level coding scheme was developed based on the items arising from the survey and interview questions. However, as additional themes emerged from the qualitative data, codes to capture these were added. The methodological procedure facilitated thematic searches of the text that could be matched and merged with the scaled data. The data integration process used a narrative approach to describe the quantitative and qualitative data thematically. The narrative provided results from the scales to be weaved into the beliefs that were supported by the text. The potential question on the coherence of the quantitative and qualitative findings is referred to as the "fit."

The assessment of integration should lead to one of three possible outcomes: 1) confirmation, 2) expansion or 3) discordance (Fetters et al., 2013). Confirmation occurs when findings from

both qualitative and quantitative data confirm the results of the other. In the expansion, the findings from the two sources diverge and expand the insight of the situation being studied. Discordance occurs when the quantitative and qualitative findings are inconsistent. Mixed method research methodology which integrates both the qualitative and quantitative analysis through convergence at the design level and merging at the methods level will be used for this study. Regarding the fit, the integration of the qualitative and quantitative data should result in the expansion of the understanding (Meurer et al., 2012). The design of this research will use a multi-stage approach.

4 Research Design

Paradigm is a way of looking at the world which is composed of philosophical assumptions that guide thinking and action (Mertens, 2010). There are two main competing research paradigms in the social sciences: “the positivist mainly quantitative paradigm, and the constructivist, primarily qualitative, paradigm”(Neuman, 2014, p.84). Epistemology is concerned with how valid knowledge is obtained (Blaikie, 2007). In other words, epistemology refers to the underlying theory of knowledge generation held by a researcher (Zuber, 2000). A researcher's epistemology is embedded in the theoretical perspective taken by the researcher and, therefore, within the methodology chosen when designing a research project. An alternative paradigm, which is based on a pragmatist epistemology, is commonly understood as the standpoint of researchers using a mixed-method research design (Johnson et al., 2007).

As a researcher coming from a pragmatic perspective, I hold that knowledge (truth) is relative and can also have an objective and subjective reality. The objective and subjective reality are intertwined (Gallimore, Goldenberg & Weisner, 1993). All individuals can have their unique interpretation of reality when there is no singular construction of reality. I construct a personal view of reality through reflection on my experience, acknowledging multiple realities that exist in experiences of people, data collected from various sources, and practical information. The purpose of this research is to identify how technology use impacts the strategic intent by understanding the technical and social process of the digital revolution phenomenon and to improve the situation. From this perspective, learners (researchers) continually interact with their environment and compare new information with their existing knowledge base, for example, experience and data, adjusting where necessary. Thus, knowledge is situational to experience, subjective meaning of experience, and embedded in the objective data. Both qualitative and quantitative methods are compatible with the pragmatic paradigm (Mertens, 2010). In epistemological terms, pragmatists are free to study differences through the variety of quantitative and qualitative methods and utilize the results in ways that can bring about a positive consequence to the value system (Tashakkori & Teddlie, 1998).

Research methods for this project consisted of a multi-stage mixed method convergent approach that draws on both quantitative and qualitative data to find out the underlying theory for conceptual framework generation. The pragmatist researcher carefully thinks about the perspectives provided by qualitative and quantitative research, and then he or she constructs a combined or mixed approach to address the research questions (Johnson, 2008; Johnson &

Gray, 2010) which was specifically focused on listening to multiple paradigms and interdisciplinary perspectives. Therefore, as a researcher, I have used the mixed method design approach from a pragmatic perspective. I have kept the time orientation of the quantitative and qualitative data collection to be concurrent so that each of the quantitative and qualitative data collection and analysis can be conducted in parallel. The research design approach used for this study is outlined in Figure 4-1.

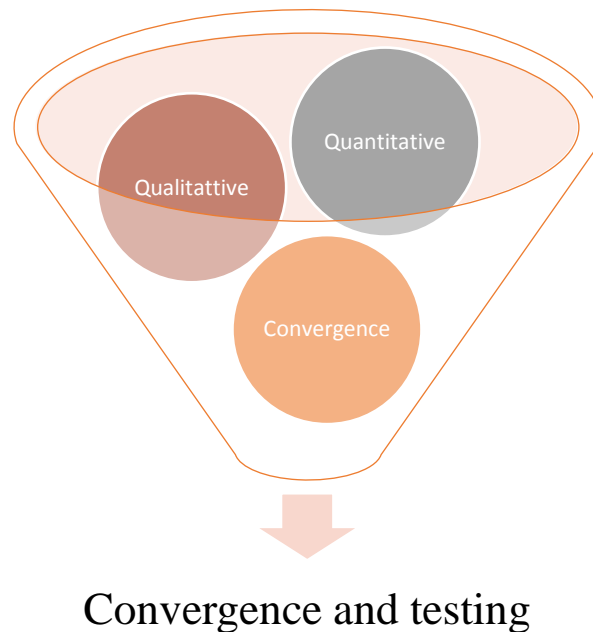


Figure 4-1 Mixed method design

The paradigm emphasis refers to whether the qualitative and quantitative parts of the study have approximately equal importance. The paradigm emphasis can be of equal status or dominant status (Morgan, 1998). In this study, qualitative and quantitative paradigms are given equal emphasis because the objective of the research is to create a conceptual model by converging both paradigms. Quantitative and qualitative data were used to explore the constructs for theory generation and for creating a conceptual model. The conceptual model was tested statistically to confirm the converged findings and validate the theoretical causal relationships. To answer the question as to how will mixing of approaches helps the researcher answer the research question, I refer to the framework recommended by Greene, Caracelli, and Graham (1989). They recommend a triangulation purpose to seek convergence, corroboration, correspondence of results from different methods. Triangulation is the term given when the researcher seeks convergence and corroboration of results from different methods studying the same phenomenon. When the researcher is finding the pieces of evidence to lead to the same

inferences and expansion of understanding, convergence can substantially increase the credibility or trustworthiness of a research finding (Johnson & Christensen, 2012).

4.1 Mixed method design

This research project was aimed to answer the question: Is there a disconnect between ICT use and strategic intent in healthcare? The study sought to document and analyze the process of technology adoption and use and its impact on the strategic intent of the regional hospital and the metropolitan hospital. The project, therefore, sought to understand the lived experiences of staff and senior management and look for themes of human experience around technology use and strategic intent, to develop the core categories and to test the assumptions with quantitative statistical analysis objectively. The underlying framework for the research design was emergent. Pragmatic approach fitted with the proposed research question and research objectives in which the lived experiences of healthcare staff was converged with quantitative data from statistical analysis to investigate the research situation and generate a conceptual framework objectively.

The study, therefore, was located within the mixed-method research paradigm. The GTM-lite approach was used to identify codes, categories, and concepts (Riethmeister, Brouwer, van der Klink & Bültmann, 2015) for the qualitative data. Descriptive and inferential statistical analysis was used for quantitative data analysis. Maxcy (2003) states that

In social-behavioural research, methodologists have begun to move toward a pragmatic criterion for method acceptability. It is reasoned that the best method or mix of methods is the one that produces the most "effectiveness." The suggestion calls for "mixed methods" research strategies that combine quantitative and qualitative approaches in a regulated fashion. Effectiveness (rather than the correspondence of findings to some "true" condition in the real world) functions to justify the method or methods mix employed. Maxcy (2003, p. 81)

The research design of this project was therefore based on a multi-stage mixed-method design, composing of qualitative phase, quantitative phase, convergence, and statistical testing of the conceptual framework. The stages are depicted below:

- Stage1: Qualitative and Quantitative phase
- Stage 2: Convergence of quantitative and qualitative data
- Stage 3: Statistical analysis and conceptual framework generation.

The survey and interview questions were based on the TOE and strategic intent context. The qualitative phase commenced with the thematic analysis of the open-ended questions in the survey. Semi-structure interviews were also performed with clinical, non-clinical staff and executive management. The thematic analysis was performed using the GTM-lite methodology. Qualitative methodology such as GTM- lite with a phenomenological approach was suitable for the qualitative analysis phase of the research project to inductively derive a theory. Therefore GTM- lite with a phenomenological approach was chosen as the qualitative research methodology for this study. GTM-lite was found to be consistent and suitable with the study objectives. GTM-lite follows valid scientific procedures for data collection and coding, however, in GTM-lite the data analysis such as coding, categorizing, and memoing will be from a single dataset (Willig, 2013). Any limitations of GTM-lite was overcome by adopting mixed-method methodology into the research design. Various methods, such as surveys and semi-structured interviews, were used for collecting quantitative and qualitative data.

The qualitative data at the regional hospital and the metropolitan hospital were collected through semi-structured interviews and open-ended survey questions. The subjective experiences of participants were collected via open-ended survey questions and semi-structured interviews. Morgan (1997) mentions the use of qualitative approaches in social science research as a self-contained method, used as a supplementary source of data, or used in multi-method studies. While many techniques are available to capture data, this study employed semi-structured interviews and open-ended survey techniques to understand various issues influencing ICT use and strategic intent. This approach allowed this study to elicit open-ended responses to interview and survey questions and to obtain categories that were not constrained by a pre-determined identification of hypotheses of constructs found in traditional surveys and to determine the significance of such pre-determined categories (Newman, 2003). Semi-structured interviews in the qualitative phase were used to further explore the themes identified from the open-ended survey questions in greater detail. There was also an absence of comprehensive empirical study to relate ICT use and strategic intent. Therefore, this study used both the open-ended survey and semi-structured interviews to collect the qualitative data.

The data were analyzed to identify emergent themes and categories. Concepts and theories emerged as the research situation was uncovered and investigated. Furthermore, the theory was developed, which explained the phenomenon (Maxwell, 1992). Theoretical efficacy was required from the data. Theoretical validity refers to the degree to which a theoretical explanation developed from the research study fits the data and is therefore credible and defensible. Theoretical efficacy was established from the qualitative data when the saturation of the constructs was reached from the data analysis.

In the quantitative data collection phase, an online survey was distributed to clinical staff, non-clinical staff, and management at the regional hospital and the metropolitan hospital. The quantitative survey questions were used to understand the various factors influencing ICT use and its impact on organisation strategic intent. The online survey incorporated both open and closed-ended questions for simultaneous data collection and analysis of both quantitative and qualitative data. In the quantitative analysis, the constructs from the survey questions were analyzed using descriptive statistics from the participant responses. It was anticipated that there were other variables or constructs that could impact ICT use and strategic intent, which might not be captured in the initial online survey. These possible variables were tested in the semi-structured interviews. The convergent design of qualitative and quantitative data also enabled this study to look for new themes and categories that arose. Finally, the categories and concepts that emerged from the convergence of quantitative information and qualitative information were tested for statistical significance using the Structural Equation Model (SEM). The nature of the study was exploratory; therefore, the research was designed to capture the cross-sectional snapshot of ICT use and strategic intent in healthcare. The conceptual model emerged from convergence, rather than pre-determined theory.

4.1.1 *Qualitative analysis*

Qualitative analysis will be performed using GTM-lite methodology (Braun & Clarke, 2006) by applying some of the rigour of GTM. If a full grounded theory analysis is not conducted, it is classified as grounded theory lite (Mc Sharry, Bishop, Moss-Morris & Kendrick, 2013). The qualitative phase will start with the thematic analysis of the open-ended survey questions. Semi-structured interviews will be conducted with at least 20 participants from each site with 40 interviews in total from both locations. The interviews will be conducted in 2 phases. In the first phase, clinical and non-clinical staff from both sites, that is, metropolitan hospital and the regional hospital will be interviewed. Following the analysis of the data from this phase, I will be talking to executive management. This study has not used the GTM approach due to a lack

of clarity on the integration of full GTM with the mixed-method approach. Guetterman et al. (2017, p.11) state that in mixed-method GT

"While there are many methodological procedures that are characteristic of grounded theory studies (theoretical sampling, theoretical saturation, constant comparative and iterative coding and analysis phases, memoing, and theory development), there are no definitive requirements for research methods to "qualify" as grounded theory."

In their study, they found that the authors were liberal with the use of GT terminology and provided scant descriptions of mixing GT with a mixed method. The lack of procedural details in published studies provides limited guidance on best practices for using full GT within a mixed method framework. Guetterman et al. (2017) find little consistency in how full GT, which is consistent with broad applications and exemplifies with the history of GT, is designed, integrated, and implemented with mixed-method research. This study will, therefore, classify the qualitative approach used as GTM-lite, which is like inductive thematic analysis, and GTM procedures will be used for data analysis and conceptual framework generation. Qualitative analysis using the GTM-lite methodology for this research project will follow some of the methodical and systematic GTM procedures. GTM-lite procedures for this research are summarized in Figure 4-2 below:

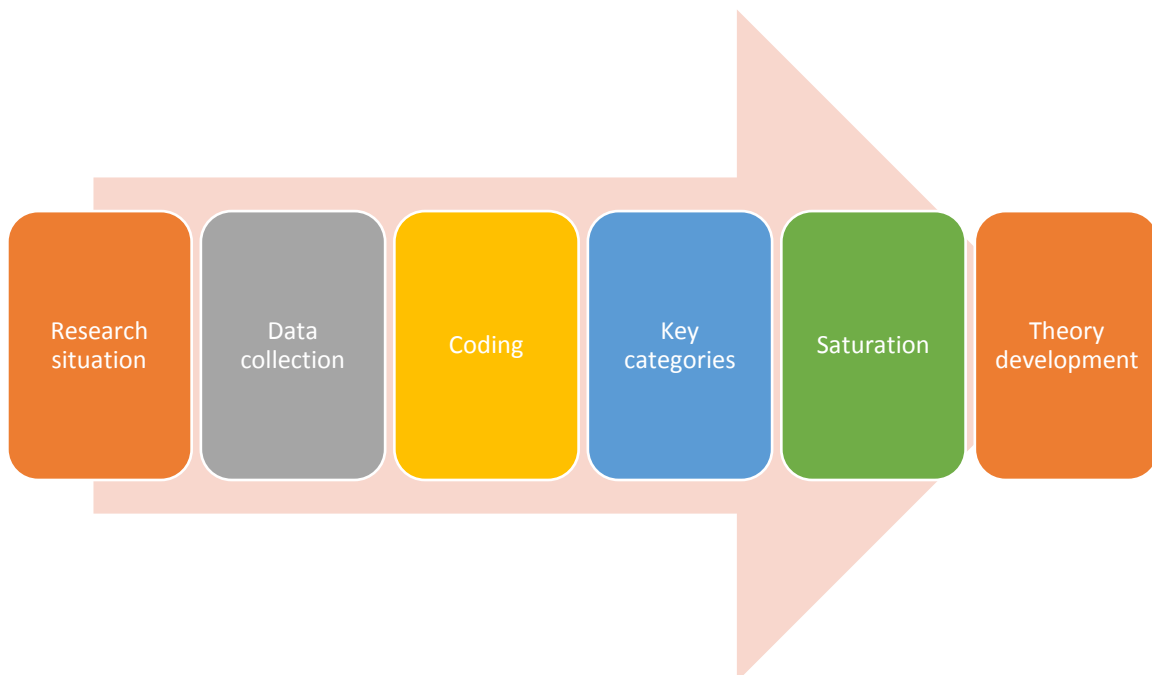


Figure 4-2 GTM-lite procedure

GTM-lite will work through several overlapping phases. Data collection, note-taking, and coding will co-occur from the beginning. Sorting will occur when all categories are saturated. The theory is emergent -- discovered in the data, Glaser (1992) says the methods can be emergent too. The GTM-lite for this research project can be further broken down into the following key activities:

- Research situation
- Data collection
- Coding
- Identifying key categories/themes
- Saturation of the theory
- Literature review (theoretical vs. emergent)
- Theory development.

4.1.1.1 Research situation

GMT begins with an approach that involves the generation of theory based on the data. Data go to concepts, and concepts get transcended to a core variable, which is the main underlying pattern (Glaser, 2010). The research project aims to study and verify if there is a disconnect between ICT use and organisational strategic intent in an information economy and induct the theory from the data. The research situation is the concept chosen for further analysis. Within that situation, the task of a researcher is to understand what is happening there and how the participants manage their roles. This will be mostly done through open-ended survey questions with the participants, observation, conversation, and semi-structured interviews with the staff. After each session of data collection, the researcher notes down the key issues: this is labelled as "note-taking." Constant comparison is the heart of the methodology. At first, the researcher compares the interview (or other data) to every other interview (or other data). Theory emerges quickly when it has begun to appear, and then the researcher compares data to theory. The researcher collects data to saturate the categories (or find information that continues to add to them until no more can be found). A category represents a unit of information composed of events, happenings, and instances (Strauss & Corbin, 1990). The researcher's task is to identify categories (equivalent to themes or variables) and their properties (in effect their sub-categories). During the coding process, certain theoretical propositions will occur to the researcher. These may be about links between categories, or about a core category: a category which appears central to the study. As the categories and properties emerge, they and their relationships to the core category provide the theory.

If the core category and its linked categories saturate, then it is no longer required to add them or their properties. The process of taking information from data and comparing it to emerging categories is called a constant comparative method of data analysis (Creswell, 2007). When the categories of information become saturated, and theory is elaborated in all its complexity, then it is time to move to code. The researcher begins with open coding, coding the data for its significant categories of information. From this coding axial coding emerges in which the researcher identifies one open coding category to focus on (called the core phenomenon), and then goes back to the data and creates categories around this core phenomenon. Strauss and Corbin (1990, 1998) prescribe the type of categories around this core phenomenon. This consists of causal conditions (what factors caused the core phenomenon), strategies (actions are taken in response to the core phenomenon), contextual and intervening conditions (broad and specific situational factors that influence the strategy), and consequences (outcomes from using the strategy). These categories relate to and surround the core phenomenon in a visual model called the axial coding paradigm (Creswell, 2007). The final step then is selective coding in which the researcher takes the model and develops propositions (or hypotheses) that interrelate the categories in the model or assembles a story that describes the interrelationship of categories in the model. This theory, developed by the researcher, is articulated towards the end of a study and can assume several forms, such as narrative statement (Strauss & Corbin 1990, 1998), a visual picture (Morrow & Smith, 1995), or a series of hypotheses or propositions (Creswell & Brown, 1992). The result of this process of data collection and analysis is a conceptual framework, a substantive-level theory, written by the researcher close to the specific problem, phenomenon, or population of people. The conceptual framework emerges with the help of the process of memoing, a process in which the researcher writes down ideas about the evolving theory throughout the process of open, axial, and selective coding. The researcher groups his memos, like with like, and sequences them in whatever order will make the concept and the theory most explicit. The literature is accessed as it becomes relevant; it is not given special treatment. Glaser (1992, 2002) makes the point that most research, including qualitative research, is hypothesis-testing. The order of sorted memos provides the researcher with the skeleton, and many of the words, to begin writing the thesis. The substantive-level theory and the conceptual framework may be tested later for its empirical verification with quantitative data to determine if it can be generalized to a sample and population (Creswell, 2007). Alternatively, the study can end at this point with the generation of the conceptual framework and the theory as the goal of research.

4.1.1.2 Data collection

The methods for data collection will consist of open-ended survey questions, semi-structured interviews, and observation. There will be a lot learned from observations alone, some of which are evident within minutes of entering the situation of the organisation being researched. Interviews will frequently be the primary source of the information which will be used to develop the theory. Glaser (1992) recommends any data collection methods can be used. Focus groups are common in other qualitative research and are suited to grounded theory. So is an informal conversation, group feedback analysis, or any other individual or group activity which yields data. Semi-structured interviewing will be a primary method for data collection. Seidman (1998) states interviewing is a process that provides access to the context of people's behaviour. Thereby it provides a way for researchers to understand the meaning of that behaviour. A fundamental assumption in in-depth interviewing research is that the meaning people make of their experience affects the way they carry out that experience (Brinkmann & Kvale, 2005). Interviewing allows the researcher to put behaviour in context and provides access to understanding people's actions (Seidman, 1998). Kvale (1996, 2006) states that there is no standard procedure for interview research. Interview research if well carried out, can become an art (Kvale, 1996, 2006). As stated by Kvale, there is no standard procedure for the semi-structured interviews, and it will depend on the research situation and the capability of the researcher to carry out the procedure. Semi-structured interviews will be conducted with participating organisation's staff and senior management, and an analysis of organisational documents will also be done to establish an organisational context. As categories emerge, the researcher targets certain groups or subgroups for data collection, first to test and refine the emerging categories, and then to elaborate and saturate them (Schreiber & Stern, 2001).

GTM exponents have also proposed "that a well-rounded and balanced explanation of the phenomenon can only be produced through sufficient variation in the sample population" (Morse, 2001, p.11). At the commencement of the investigation, final sample size and the parameters of the sample selection cannot be known. The sampling outcomes will be developed as required throughout the research in ensuring saturation of emergent categories. Statistical sampling, while not needed for theory identification, maybe later called upon if the researcher wishes to define the "magnitude of extracted relationships within particular participant groupings" (Glaser & Strauss, 2017, p.161). The current study wants to research the disconnect between ICT use and strategic intent in an information economy. For this research project and to ensure enough clarity for initial ethical clearance requirements, a purposeful initial sample

has been identified. This identification of a sample participant population to commence the research also is necessary, given the researcher's intent to compare experiences and perceptions across health services. In the subsequent investigation, the useful data collection tool will be targeted interviewing. It is also recognized that a trade-off of breadth against the depth of knowledge may be required to ensure that data credibility and data comparison is achievable. Units of analysis are not predetermined and are not known until the data is in hand. The units of theoretical analysis may not be the individual participants themselves but maybe incidents, stories, examples and so forth (Schreiber & Stern, 2001).

4.1.1.3 Data collection methods

Initially, in the first phase of the research, data will be collected through open-ended survey questions. For the subsequent phases, semi-structured interviews will be conducted within three categorical levels, that is, clinical staff, non-clinical, and executive management. Semi-structured interviews will be done with at least 20 participants from each site. The total number of participants, participating in the semi-structured interviews from both sites will be 40. There are several debates on the right sample size for qualitative analysis. Theoretical saturation should be considered when limiting the sample size (Mason, 2010). Saturation is defined as a point at which the data collection process is no longer useful and does not offer any new information. The conceptual categories in the qualitative analysis will not spark any new additional theoretical insights with new data nor reveal new properties of the core categories (Charmaz, 2006). The recommendation is that 25–30 participants are the minimum sample size required to reach saturation and redundancy in GTM studies that use in-depth interviews (Dworkin, 2012). A sample size of 25-30 allows for a thorough examination of characteristics of the research question, maximizes the possibility that enough data has been collected to clarify relationships between conceptual categories and maximizes the chances that negative hypothetical cases have been explored (Charmaz, 2006; Morse, 1995, 2001).

The goal of the researcher is to understand the shared basic social problem from the participant's perspective (Schreiber & Stern, 2001). The semi-structured interview “attempts to understand the complex behaviour of members of society without imposing any a priori categorization that may limit the field of inquiry” (Fontana & Frey, 2000, p.645). The primary data collection process will be undertaken for garnering the participants' perspective, and subsequent coding will be conducted, from staff in the participating health sector organisation. The second set of semi-structured interviews will serve to provide contextual information and will be with the senior executive management staff of each organisation. In a subsequent stage

of the data collection process, additional semi-structured interviews may be conducted with senior management and clinical and non-clinical staff with further, more focused interviews. Throughout the study, research of archival organisational data will be undertaken to gather supporting documentation to provide organisational context for the research. Documentary materials may assist in developing an understanding of the field of study, and in all areas of the research as a form of secondary data, providing both background context and assistance with theory generation (Glaser & Strauss, 2017). GTM endorses the use of non-technical publications such as reports and internal documents as a potential source of data. Strauss and Corbin (1998, p.52) indicate that from the nontechnical literature, “much can be learned about an organisation, its structure, and how it functions.”

4.1.1.4 Data collection tools

The interview is a common technique used for data collection in qualitative research. The first phase of the data collection will be done using an online survey. The participants will be asked to respond to the open-ended question, will be analyzed and coded using NVivo 12 application. In the subsequent phase, the data will be collected using semi-structured interviews with a subset of staff members who are located at different hospital sites. An initial template for a semi-structured interview is provided in Appendix F. The content included within this template displays the general categories and themes that will be discussed with the interviewees. Actual interview questioning will be determined as each interview progresses and will be based on information offered by participants and emerging themes gathered by the researcher. Semi-structured interviews with the senior management of the participating organisations will be conducted to determine their strategic management philosophies and their understanding of the nature of the digital revolution within their respective organisations. Initial senior management interview designs are also provided in Appendix F. Similarly, the interview structure offered is a guideline and will evolve during the interview process. Initial staff surveys are also provided in Appendix G. Data collection for phase 1 will proceed as shown in Table 4-1

Table 4-1 Data collection

<i>DATA COLLECTION METHOD</i>	<i>SITE</i>	<i>SAMPLE SIZE</i>
ONLINE STAFF SURVEY	All staff – at both sites	300
SEMI-STRUCTURED INTERVIEWS	Staff (Clinical and non - clinical) - at both sites	30
SEMI-STRUCTURED INTERVIEWS	Senior Managers at both sites	10

According to the Australian Research Council (2018), sample informant interviews are conducted with people whose experience or expertise is taken as representative of a broader group. Interviews will be audio recorded with the permission of the interviewee and transcribed. The results of the analysis of the semi-structured interviews will be built upon further in the subsequent phase. These subsequent semi-structured interviews will continue to build a contextual image of the organisation's strategic intent and ICT use. As participant data is analyzed and descriptive categories identified, the researcher may require further interviews with members from the initial sample group. In applying GTM, practitioners undergo category refinement and theoretical development. The researcher may return to the research field "to collect specific conceptual data gaps" (Charmaz, 2000, p.28). It is considered this is dependent on the findings of the proposed research. In this research, the phased approach to the data collection process utilizing a combination of semi-structured interviews, a collection of supportive organisational documentation and open-ended survey techniques will be used.

4.1.1.5 Coding

Glaser (1992, 1998) recommends against recording or taking notes during an interview or other data collection session. However, for thesis purposes and to avoid vulnerability, keyword notes will be made during the meetings only to convert them into themes later. A tape recording of the session will also be done and transcribed to check the notes against the tape recording. This method will suit the research situation well. This will also assist in coding, which is the next step in the process and will make the subsequent activities of GTM-lite easier.

After note-taking, the next step of the process is coding. This is the process of analyzing the data from the interview through constant comparison. It is about taking a sentence and examining it to understand the situation and drivers behind the situation. The drivers will help identify a code by comparing data set to data set and later comparing data set to theory. As any theoretical ideas emerge during coding, it will be noted down immediately. Software tool NVivo will be used for coding due to ease in sorting at the later stages.

4.1.1.6 Identifying key categories

The category is a theme or variable which makes sense of what the informant has said. It is interpreted in the light of the situation being studied, and other interviews, and the emerging theory. After a time one category (occasionally more) will be found to emerge with a high frequency of mention and to be connected to many of the other categories which are emerging. This shall be the core category. It may be hazardous to choose a core category too early in the data collection. However, when one category is mentioned with high frequency and is well connected to other categories, it is safe to adopt it as the core category. Glaser (1992, 1998) recommends focusing on one core category at a time. If more than one core category emerges, it can be coded again for the second time later if required. After a core category has been identified, coding is ceased against any sentences which do not relate to it. It is found in most instances that coding becomes more efficient as the study progresses. Coding is done for the core category, other connected categories, and properties of both. Any identified connection between categories is recorded in memos. This is continuously done by adding a sample as necessary until saturation is reached. Saturation is a point of diminishing returns for a category in collecting and interpreting data. Eventually, all interviews and data collected add to no value to what is already known about that category, its properties, and its relationship to the core category. When this point is reached, coding will be ceased for the category. Axial coding will be developed around the core category.

4.1.1.7 Sampling

The research situation defines the initial sample. The sample will be diverse since there are many people associated with the situation. The diversity of the sample will be broad enough to capture all aspects related to the research situation. As categories emerge from data, then the sample will be added in such a way so that it further increases the diversity in useful ways. The purpose of the sample will be to strengthen the emerging theory by defining the properties of the categories and how those mediate the relationship of the category to category. Glaser and Strauss (2017) refer to this as theoretical sampling. The sample is emergent, as is the theory

and the method generally. For this study, clinical and non-clinical staff will be interviewed in the first phase. In the second phase, executive management who are experts in their field will be interviewed to get a 360-degree view of the research situation as part of a theoretical sampling exercise.

4.1.1.8 Memoing

Theoretical memoing will be conducted as part of documenting ideas and concepts. Memos are the theorizing write-up of ideas about substantive codes and their theoretically coded relationships as they emerge during data collection, analyzing data, coding, drawing conclusion and reporting. Theoretical memoing is "the core stage of grounded theory methodology" (Glaser, 1998, p.158). Memoing is also vital in the early phase of a GT study, such as open coding. The researcher is then conceptualizing incidents, and memoing helps this process. Theoretical memos can be anything written or drawn in the constant comparison that makes up a GT. Memos are essential tools to both refine and keep track of ideas that develop when comparing incidents to incidents and then categories to categories in the evolving theory. In memos, the researcher develops ideas about naming concepts and relating them to each other. In memos, the researcher tries the relationships between concepts in two-by-two tables, in diagrams or figures or whatever makes the ideas flow and generates comparative power. Without memoing, the theory is superficial, and the concepts created are not very original. Memoing works as an accumulation of written thoughts into a bank of ideas about concepts and how they relate to each other. This bank contains rich parts of what will later be the written theory. Memoing is total creative freedom without rules of writing, grammar, or style (Glaser, 1998). The writing will be an instrument for the outflow of ideas, and nothing else. When the researcher writes memos, the views become more realistic, being converted from thoughts in his mind to words, and thus ideas communicable to the audience. In GT, the preconscious processing that occurs when coding and comparing is recognized. The researcher is encouraged to register ideas about the ongoing study that eventually pop up in everyday situations, and awareness of the serendipity of the method is also necessary to achieve good results. For the research project, memoing will continue in parallel with data collection, note-taking, and coding. NVivo tool will be used for coding, writing, and storing memos. In effect, a memo is a note to the researcher about some hypotheses he has about a category or property, and particularly about relationships between categories. Glaser (1998) makes the point that memoing is given high priority. As an idea occurs to the researcher, the pause is required in what is being done and a memo written down. Software tools will be used for memoing and

note-taking to leverage technology. In a time when the core category and the categories related to it would have saturated, the researcher would have accumulated many memos. Between them, they will capture the different aspects of the theory, which has emerged from data. In short, in using GTM, the researcher assumes that the theory is concealed in the data to be discovered. Coding makes visible some of its components. Memoing adds the relationships which link the categories to each other. The next step is to structure the report to communicate the theory to the readers. Sorting assists with this purpose.

4.1.1.9 *Sorting of memos*

The next step of the process is to sort the memo, which is the key to formulating the theory for presentation to others in thesis format. Sorting enables putting back the fractured data together. During sorting, lots of new ideas emerge which in turn are recorded in new memos giving the memo-on memo phenomenon. Sorting memos generates a theory that explains the main action in the studied area. Sorting of theoretical memos are important because theories written from unsorted memos may be rich in ideas, but the connection between the concepts can be weak. Software tools for qualitative analysis can again help in note-taking and easier sorting. NVivo 12 will be used for sorting memos. Memo sorting can be done by grouping based on similar categories or the properties that they address. Groups can be then arranged to reflect on their relationship. The theoretical memo, sorting their two-dimensional layout and relationship, will capture the structure of the final thesis. The sequence of the categories will allow for the fabric to be described, and this provides a basis for writing up a thesis.

4.1.1.10 *Literature review*

The vital point to be made about the literature is that as the nature of study for this research project is emergent. The literature chosen at the beginning may turn out to be irrelevant, and its implications can be at both for the place of reading during the research process and during the drafting of the thesis. The literature is treated at the same status as the data. The literature readings will be emergent for this research. Glaser (2010) states that researchers only through discovery can find out what is going on about a research situation, and it cannot be deduced from reformulated ideas evidentiary in preconceived research and pre-study literature reviews.

Moreover, the transformation of ICT has happened at a rapid pace in the last decade, with little research done in this field. Some literature reviews will be done around ICT adoption theories and strategic intent to formulate the initial constructs for the online survey for descriptive statistical analysis. But, because of the exploratory and emergent nature of the study, further literature will be accessed to create the conceptual model as the high-level theory emerges. The

conceptual model based on the emergent theory will be tested for statistical significance so that the findings can be generalized to a population using a structural model. During the qualitative analysis of the research, new categories will emerge from the semi-structured interview data. The literature will be accessed as the new categories emerge. If no significant evidence is found to support the findings in the structural model, then the results will be reported as is, highlighting the discrepancies in the findings, calling for further research.

In an emergent study, data collection can begin with a research situation, and the literature can be then accessed as it becomes relevant. Glaser (1998) recommends making prior background reading which provides the models to help make sense of the data and reading widely while avoiding most literature closely related to the topic being researched since it may otherwise constrain the coding and memoing process. This approach may leave the researcher vulnerable to criticism from readers and examiners. The defence will take special pains to be responsive to data and to seek disconfirming evidence assiduously and to defend by careful argument the researcher's decision to do so. The literature will be accessed as the theory emerges, and it becomes more relevant to the situation. It is expected that the study will be located within the appropriate fields of literature, in this instance being strategic intent and its impact on information technology adoption and use in healthcare. Broader samples will also be reached in effect by refining the findings in the light of the literature in slightly different but related fields. Progress accessing and reading of relevant literature will also be a part of the data collection process. Constant comparison is a core process here. The researcher aims to compare literature to the emerging theory in the same way as to compare data with emerging theory. The same procedure can be followed as of data collection processes, such as reading the relevant and related literature overlapping with note-taking, coding, and memoing.

The critical issue to be noted here is if there is an apparent disagreement between the researcher's emerging theory and the literature, it is not assumed that the emerging theory must be wrong (Glaser, 1992). Since the researcher is concerned with its fit to the data and its ability to make sense of experience, he then seeks to extend the theory so that it makes sense of both the data from the study and the data from the literature. The issue of treating disagreement appropriately can be substituted by the data, rigorous data collection procedures, note-taking, coding, memoing, and sorting correctly with rigour and accuracy. GTM, according to Glaser (1992), gives the researcher the freedom to generate new concepts explaining human behaviour. This freedom is optimal when the researcher refrains from doing a rigorous pre-research literature review and talking about the research before it is written up. These rules

make GTM different from most other methods using qualitative data. Studying the literature of the area under study gives preconceptions about what to find, and the researcher gets desensitized by borrowed concepts. To avoid being biased by borrowed concepts, most of the literature will be accessed in the data collection and the sorting stage, being treated as more data to code and compared with what has already been coded and generated.

4.1.1.11 Grounded theory and Action research

There are obvious parallels between GTM and Action Research (AR) methodology. AR represents the interface between action and research or practice and theory. Cunningham (1993, p.67) describes AR as “a spectrum of activities that focus on research, planning, theorizing, learning, and development ... a continuous process of research and learning in the researcher’s long-term relationship with a problem”. AR involves components of fact-finding or diagnosing, planning action and evaluation or reflection that leads to re-planning and further action in a cyclical nature. Outcomes are considered, and the conclusions are determined at the reflective stage and are based on the context of the whole process to that point of time.

As with GTM, the explanations emerge gradually from the data as the study proceeds. An online survey will consist of an open-ended question. All semi-structured interviews begin with open questions, and in the later interviews, there will be more probe questions. And more of those probes are specific. The theory emerges from the data, from the informants. In the early stages, it consists primarily of themes. These become more elaborated as the study develops. This can be depicted diagrammatically (Dick, 2005), as shown in Figure 4-3.

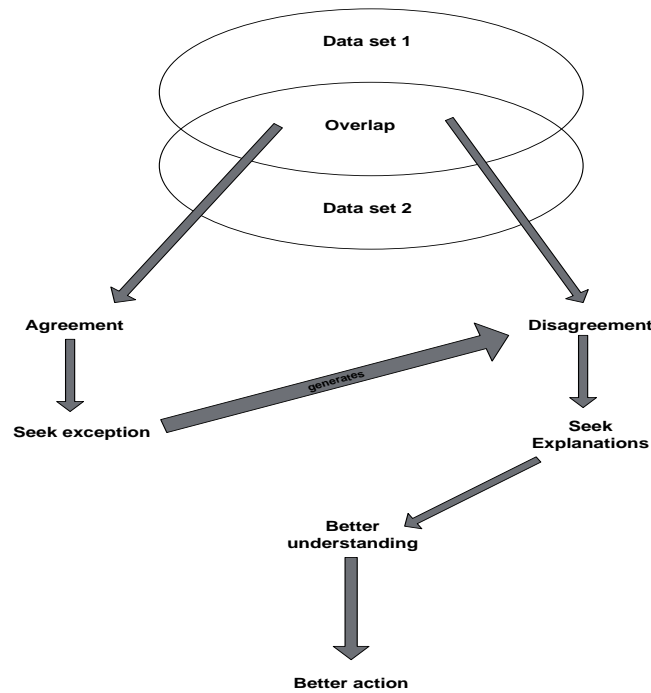


Figure 4-3 Inductive analysis Source: Dick, 2005

While the use of AR as a form of inquiry is undisputed (Torbert, 2004), its epistemological basis has been questioned based on the different meanings that have been attributed to it over time (Lau, 1997). The specific contextualization, the lack of comparative evaluation, and the perceived lack of impartiality of the observer/researcher and inability to correctly attribute all changes are the key issues.

The GTM-lite procedure consists of systematic inductive guidelines for collecting and analyzing data to build middle-range conceptual frameworks that explain the collated data. GTM-lite inquiry spans different territories of experience at the personal level within the chosen healthcare organisation for fact findings. This method also promotes timeliness-learning with a moment to moment, intentional awareness as the data is being probed, and as the theory emerges. GTM-lite helps in understanding the current gaps in the research situation and recommending remedial actions required to address the gap, as it is uncovered to build the conceptual framework. Hence GTM-lite is chosen over action research for qualitative analysis.

4.1.2 *Quantitative analysis*

4.1.2.1 *Survey design*

The online survey will be used for quantitative data collection. In order to obtain an in-depth understanding of the issues, a web-based electronic survey will be used as the proposed methodology for collecting data from a probability of simple random sample (Argyrous, 2011;

Swift & Piff, 2010) of a large sample. An online survey will be conducted at the metropolitan hospital and the regional hospital, with clinical and non-clinical staff to understand their views on the organisation's strategic intent and technology use. The survey link will be sent to approximately 3000 staff at both sites. The survey will be designed to understand if there is any dependence of the TOE adoption factors with the organisational strategic intent. The survey has a total of 60 questions and will take approximately 20 minutes to complete. The primary constructs that will be used in the online survey will be Culture, Enablement, Engagement, Strategic Direction, Governance, Investment, Organisational Learning, Digital transformation, ICT Operations, Leveraging ICT, and Information Management.

The constructs will be operationalized based on the TOE framework and strategic intent context. The TOE factors from Baker's study will be used and then extended to include the strategic intent context. The TOE factors that are used for the operationalisation of the survey constructs are listed in Table 4-2 and Table 4-3.

Table 4-2 TOE factors operationalised

<i>Technology</i>	<i>Organisation</i>	<i>Environment</i>
Relative advantage	Strategic planning	Role of IT
Trialability	Top management support	Management risk position
Technology readiness	Perceived financial cost	Adaptable innovations
Technology competence-	Organisational readiness	
Technology integration	Financial commitment	

Table 4-3 Operationalised constructs from TOE

<i>Operationalised constructs</i>	<i>TOE factors</i>
Leveraging emerging technologies	Relative advantage, Technology readiness
ICT Operations	Technology competence
Information Management	Technology integration
Strategic direction	Strategic planning
Enablement	Top management support
Organisation learning	Organisational readiness
Investment	Perceived financial cost, Financial commitment
Governance	Management risk position
Digital transformation	Role of IT, Adaptable innovations, Trialability

The key constructs will be further operationalized based on published literature, practical experience, careful observation, and reviews with industry experts. The operationalized constructs are listed as below:

4.1.2.1.1 Technology context:

- Leveraging emerging technology is defined as the use of new and innovative technologies (West & Bogers, 2014).
- ICT operations are defined as the everyday operational use of ICT applications and services, such as systems development, implementation, and operations (Elliot, 2007).
- Information management is defined as information standards, information interoperability, and information errors (Franklin, Halevy & Maier, 2005).

4.1.2.1.2 Organisational context:

- Strategic direction is defined as the setting of the organisation's strategic direction by senior leadership, and its understanding by staff to their job role and everyday activities (Lumpkin & Dess, 1996; Proctor, 1997).
- Enablement is defined as having the required resources and technology needed to deliver the goals of the organisation. This is defined as the ability of the engaged employees to make a maximum contribution (Royal & Agnew, 2012).

- Organisational learning is defined as the use of knowledge management systems, lessons learned and training to improve service delivery continuously. It is the process of creating and applying knowledge for organisations to learn (Albelda Perez, Correa Ruiz & Carrasco Fenech, 2007; Leistikow, Mulder, Vesseur & Robben, 2017).
- Investment is defined as investment expenditure beyond that which is required to maintain assets in place and to finance expected new investments in positive NPV projects such as new technologies to deliver the right strategic outcomes (Richardson, 2006).

4.1.2.1.3 Environment context:

- Governance is defined as the implementation of suitable organisational structures, policies, and procedures for service delivery and risk management so that the organisation sustains its strategic objectives (De Haes & Van Grembergen, 2004).
- Digital transformation is defined as the successful implementation of changes and transformation, which are built on the foundations of technology (Nwankpa & Roumani, 2016).

4.1.2.1.4 Strategic intent context:

- Engagement is defined as the individual's involvement, satisfaction, and enthusiasm to work. This involves communications from management, understanding the employee needs, stakeholder engagement, and employee's connectedness to the success of the strategic objectives (Abraham, 2012; Bakker & Demerouti, 2008).
- Culture is defined as the values and beliefs shared by the personnel in the organisation. It is the assumptions, behaviour, and norms to support change, collaborate, and to adapt to new technologies and innovation (Martins & Terblanche, 2003).

The survey enables the collection of views and perspectives expressed by staff regarding the above constructs. This process allows the research to have an appropriate “prism” that achieves the following objectives:

- Enables simple statistics to be completed around the assessments;
- Allows the researcher to go beyond their understanding and knowledge by using the quantitative analysis tool;

- Also, the quantitative part enriches the discussions and enables the researcher to go beyond the structure of the initial part of the semi-structured interview;
- Enables an examination beyond the researcher's own biases and allows the collection of key themes, ideas, or comments from the participants in the semi-structured interviews; and
- It enables the researcher to test the conceptual model based on the themes derived from the qualitative phase.

Mark and Gamble (2009) propose a strategy called principled discovery. The principled discovery involves two primary stages: In the first stage, the researcher carries out exploratory analysis by looking for interaction effects using one after another variable on which the participants have been measured. A wide variety of statistical techniques can be used for exploratory analysis. In the second stage, the researcher would seek one or another form of quasi-independent confirmation of a discovery. In many instances, this will involve tests that can be carried out within the same data set. Mark and Gamble (2009) explain that this two-step process protects against any data confessing falsely because of the effect observed in stage 1 is purely due to chance then there is no expectation that it will occur again in stage 2.

In the first stage, simple descriptive statistics such as mean and median values from the participants for the survey responses will be analyzed. The participant responses will be grouped as Agree, Disagree, and neutral responses under each of the 11 constructs. Causal modelling will be used to test the conceptual model in the later stages of the analysis, that is, after convergence from qualitative data using the mix method design. The survey responses will be collected using 5-point Likert reflective scales. The data collected for the discrete variables will limit participants in the survey to a nominal 5-point Likert scale. The five-point nominal Likert scale that will be used to collect responses as per Table 4-2.

Table 4-4 Participant response scales

<i>Scale</i>	<i>Field</i>
1	Strongly Disagree
2	Disagree
3	Neither Disagree nor Agree
4	Agree
5	Strongly Agree

Demographic information such as role will also be collected from the staff to form the nominal data for the research. A visual diagramming model Smart PLS software application's graphical interface will be used to draw the conceptual diagram depicting the measurement model. PLS-SEM structural equation modelling technique will be used for diagramming causal relationships. The features that make PLS-SEM the preferred software are its bootstrapping capabilities of the formative constructs. PLS-SEM automatically calculates bootstrap confidence intervals and bias-corrected intervals for parametric or non-parametric estimation. Furthermore, because the research uses formative constructs, Smart PLS software will be used to test the measurement model.

4.1.2.2 Survey distribution and prize draw

An online survey will be distributed to all health service staff via intranet publishing and email distribution through the staff email distribution list. In order to reimburse survey participants for their time, one iPad mini will be offered as a prize draw at each site. All survey participants will be eligible to go to a prize draw to win one iPad mini. An online survey will be closed towards the end of the data collection phase of the project based on the research project plan. After the survey is closed, under the supervision of the principal supervisor, the research team will use a random number generator to generate a random number, which will be used to pick the winner of the iPad mini from the list of survey participants. A cash alternative will not be substituted for the prize. The following online random number generator will be used for the prize draw.

- <https://www.random.org/integers/>

4.1.2.3 Survey Questions

The survey questions were constructed to collect simple statistics for the key variables. The same data will also be used to construct the structural conceptual model for statistical significance testing. There will also be one open-ended question in the survey which will be used for collecting the qualitative data and for starting the qualitative analysis simultaneously with the quantitative analysis. After the survey is closed, participant responses will be analyzed using descriptive statistics. Some of the questions will be reverse coded for descriptive statistics. The questions that will be used in the online survey for the essential 11 constructs and the questions which will be reversely coded are shown in Table 4-5:

Table 4-5 Online survey questions

	<i>Enablement</i>
ENA01	ICT use in my job allows me to be as productive as I can be.
ENA02	I am aware of Hospital Management's commitment to innovation in ICT.
ENA03	Hospital Management will provide the right advancements in technology as technological changes happen.
ENA04	Hospital Management is continuously implementing new innovative ICT technologies to improve the quality of patient care.
ENA05	We have resources that are needed to deliver business goals.
ENA06	ICT use is required to deliver high-quality services to patients.
	<i>Culture</i>
CUL01	Staff feel that they can easily learn new technologies.
CUL02	Staff is always ready to adapt to new ICT tools and applications.
CUL03	Staff always supports new ICT projects.
CUL04	Hospital management provides a work climate that promotes collaboration.
CUL05	Staff is using collaborative ICT technologies that enable them to improve the quality of patient care.

	Engagement
ENG01	Hospital Management is customer-focused (i.e., it seeks to understand and meet its patients' needs and requirements).
ENG02	The staff understands what is required of them during technology transformation projects.
ENG03	Hospital's ICT department understands the patient's needs and requirements.
ENG04	My direct manager communicates how new ICT technologies can improve healthcare by reducing the cost of patient care.
	Leverage ICT
LVG01	Staff leverage new ICT technologies such as social media (e.g. Facebook, Yammer, Twitter, etc.) to collaborate.
LVG02	I would like to see big data technologies and analytics implemented to improve the quality of patient care by the ICT department. (Reversed coded)
LVG03	Hospital Management promotes ICT use to reduce patient wait time.
LVG04	Hospital Management promotes ICT use to reduce the cost of patient care.
	Strategic direction
SDD01	I have a good understanding of the strategy and goals of my organisation.
SDD02	I have a good understanding of the strategy and goals of DHS (Department of Human Services Department) and eHealth implementation goals.
SDD03	Strategy and goals in my organisation are the right ones at this time.
SDD04	I have a good understanding of the ICT strategy and goals.
SDD05	Hospital's ICT strategy and goals are the right ones at this time.
SDD06	DHS's strategy and eHealth implementation goals are the right ones at this time.
SDD07	I understand the relationship between my job and the strategy and goals of my organisation.

SDD08	I understand the relationship between my job and the ICT strategy and the goals of my organisation.
SDD09	I understand the relationship between my job and eHealth implementation goals.
SDD10	I understand the expected business outcomes of the organisation's business strategy.
Digital Transformation	
TTT01	New ICT transformation projects will improve business outcomes.
TTT02	Hospital Management is currently implementing technology transformation projects to improve business outcomes.
TTT03	Hospital Management seeks to deliver high-quality services via ICT transformation projects.
TTT04	ICT Transformation projects are delivered successfully by the ICT department.
ICT Operations	
OPS01	The ICT department supplies the required level of support to assist me in performing my everyday job activities.
OPS02	ICT procedures and IT systems are well-organized for service delivery.
OPS03	I would like to see improvements to the Hospital's existing ICT practices (Reverse coded).
OPS04	The ICT department is well structured for service delivery.
OPS05	ICT systems and applications to the hospital's business process.
OPS06	I always get the required level of operational support from the ICT department.
Governance	
GOV01	I always get Hospital management support to implement ICT changes correctly.
GOV02	Hospital Management is well organized for good service delivery.
GOV03	Hospital Management is well organized for risk management.

	Organisational learning
OGL01	Hospital currently uses previous lessons to enhance ICT use.
OGL02	ICT technologies can improve operational efficiencies by implementing knowledge management applications.
OGL03	Hospital Management is currently implementing technologies to improve knowledge management.
OGL04	There are good opportunities for learning new ICT technologies in my department.
OGL05	In the last 12 months, I have received the appropriate amount of technical training for my position.
OGL06	I am happy with the level of training provided to me with new ICT technologies during technology transformation projects.
	Information management
INM01	Important patient care information is often lost (Reverse coded).
INM02	Problems often occur in the exchange of information across hospital units (Reverse coded).
INM03	I trust the information and data that I receive from existing IT systems and applications.
INM04	The hospital IT department protects patient information during data exchange between different hospitals.
INM05	Patient history can be accessed from other hospitals.
INM06	eHealth implementation will improve information exchange standards for healthcare service providers.
INM07	We are aware of the information standards that currently exist for data exchange.
INM08	The quality of information management can be improved (Reverse coded).
	Investment

INV01	There is sufficient investment in ICT projects from Hospital Management.
INV02	Investments made by the Hospital Management are in the right areas.
INV03	Investments in ICT by Hospital management are strategic in intent.
INV04	ICT Investments will deliver the right outcome for the hospital.
	Open-Ended
Open-Ended	Do you have any additional comments or feedback?

4.2 Convergence

The quantitative strand and the qualitative strand will be converged through integration using a narrative approach to generate a conceptual model. Triangulation involves the use of multiple methods and multiple data sources to support the strength of interpretations and conclusions of the research (Mertens, 2010). Guba and Lincoln (1989) note that triangulation should not be used to gloss over legitimate differences in interpretations of data as this would be an inaccurate interpretation of the meaning of triangulation. Richardson and St Pierre (2005) suggest that a better metaphor for this concept will be crystallization. The crystal metaphor suggests multi-faced sources of data that are brought to the interpretation of the findings. Jang, McDougall, Pollon, Herbert and Russell, (2008) used traditional quantitative statistical analysis techniques to perform a factor analysis on the quantitative survey data. They also engaged in qualitative analysis strategies for developing the codes process. Firstly, they compared the factors that were identified by factor analysis and compared the associated concepts with the themes from the qualitative data. Secondly, they merged the themes from the two types of data and used the new set of themes as an organizing framework to categorize the items from the survey according to which theme they represented. Thirdly, they conducted a quantitative analysis of the survey items to see how participants responded in this thematic context. Finally, they were able to provide specific recommendations to improve the research situation. In this research situation, data from the descriptive statistical analysis of the online survey will be integrated with the categories from the GTM-lite qualitative analysis and the key categories, and then the theory will be conceptualized in a conceptual model for statistical testing and conceptual framework generation. The conceptual framework generated from the convergence will be used in making recommendations to improve the researched situation.

4.2.1 *Structural model and significance testing*

This study will also test the conceptual measurement model derived from quantitative and qualitative analysis using structural equation modelling. Online survey data will be used for the structural model. By analyzing the responses of the respondents, the study will examine the overall model fit and the criteria for construct validity and reliability. The p-value associated with the result from the sample will be considered significant using a type error rate of 0.05.

In explanatory research, researchers are interested in testing theories that explain how and why a phenomenon operates as it does (Pedhazur, 1997). The researcher's goal is to understand the phenomenon being studied. The form of explanatory research, which is increasing in popularity, is called causal modelling (Maruyama, 1998; Schumacker & Lomax, 2004). Causal modelling is a procedure in which the researcher empirically tests the model to determine how well the model fits the data. The researcher develops or constructs the causal model based on research findings and theoretical considerations (Johnson & Christensen, 2012). The causal model depicts the interrelationships between several variables and is used to explain how some theoretical process operates. Some of the procedures or techniques for casual models are path model, structural model, and theoretical model. Structural Equation Modeling (SEM) is chosen as the quantitative technique to test the conceptual model, which involves multiple regression analyses of factors of many relationships estimated simultaneously (Hair, Black, Babin, Anderson & Tatham, 2006; Tabachnick & Fidell, 2007). Regression coefficients or path coefficients provide quantitative information about the direct effects based on the data collected in a research study. If the coefficient is positive, then the relationship between the two variables is positive, and if the coefficient is negative, then the relationship is negative. SEM provides a means of incorporating multi-scales that may be necessary for the analysis to account for measurement error associated with each of the scales (Hair et al., 2006). To connect the structural equation model to the data collected and deduce inferences that can be generalized using quantitative methods, the survey questionnaire will be designed using a 5-point Likert scale and for random sample selection. Measures will be reflective; namely, the direction of causality will be from the latent construct to the measured items for the first-order constructs. The second-order constructs will be derived from the first-order constructs. For reflective measures, if there is a change in any construct's measured indicator variable, then it is expected that a change will occur in the other (Argyrous, 2011, Hair et al., 2006; Hair, Hult, Ringle & Sarstedt, 2013; Tabachnick & Fidell, 2007). All the measured indicator variables will be consigned to only one construct each and will be endogenous.

Several features of Partial Least Square- Structural Equation Modelling (PLS-SEM) have led to its increasing use in management, strategy, and marketing research (Drengner, Gaus & Jahn, 2008; Gruber, Heinemann, Brettel & Hungeling, 2010; Hennig-Thurau, Henning, Sattler, Eggers & Houston, 2007; Robins, Tallman & Fladmoe-Lindquist, 2002; Sattler, Volckner, Riediger & Ringle, 2010). In general, PLS-SEM is a so-called soft-modelling approach (Wold 1980, 1985) and is less suited to testing well-established complex theories due to a lack of a global optimization criterion to assess overall model fit (Hair, Ringle & Sarstedt, 2011). PLS-SEM is, however, advantageous compared to covariance-based structural equation modelling when analyzing predictive research models that are in the early stages of theory development (Fornell & Bookstein, 1982). The latter exemplifies the research described in this study. PLS-SEM can deal with both reflective and formative measurements. It is vital to determine the appropriate mode (Bollen & Lennox, 1991; Coltman, Devinney, Midgley & Venaik, 2008), as this decision guides the selection of proper data-analysis methods and the relevant criteria for reliability and validity assessment (Diamantopoulos & Winklhofer, 2001). This study will use both reflective and formative measurements. The decision regarding the mode of measurement for the newly created second-order formative constructs will be based on the supporting results of confirmatory tetrad analysis in PLS-SEM (CTA-PLS). SmartPLS 3.0 software will be used to analyze the data models generated in PLS-SEM.

4.2.1.1 Independent variables

A latent variable design for the measurement of independent variables that represent a bundle of activities that together form an influence (Landau & Bock, 2013) will be used for independent variables. Measures will be developed from the survey questionnaire to measure the reflective independent latent constructs. All the constructs will be represented as a bundle of activities, and this study will choose reflective operationalization for the first order independent variables.

4.2.1.2 Dependent variable

ICT use and strategic intent are the abstract dependent variables that have been used and quoted widely in various research literature reviews. The formative construct specifications will be used for the dependent variable's ICT use and strategic intent. Formative performance measure was opted because it has been previously used in empirical research. This is rather new to strategic management research, but reasonable for this study's analysis as it allows the deduction of specific recommendations regarding items of a construct to create value (Podsakoff, Shen & Podsakoff, 2006).

4.2.1.3 *Construct validity*

Construct validity refers to the extent to which a higher-order construct is represented by the study. Construct validity is addressed by the operationalism of the constructs. Operationalism means that the constructs are represented by a specific set of steps or operations. Construct validity- convergent validity- begin by examining the factor loadings. Loading estimates that are significant provide a useful start in assessing the convergent validity of the measurement model. All loadings are required to be significant and convergent validity of at least 0.5 or better 0.7. Path estimate-emphasis on the loadings of each indicator on a construct will be checked to modify the measurement model.

4.2.1.4 *Convergent validity*

To assess the validity and reliability of the reflective measures used in this study, exploratory factor analysis will be tested, which confirms the unidimensionality of the constructs (Steenkamp & Van Trijp, 1991). To assess convergent validity, Cronbach's alpha, Average Variance Extracted (AVE), factor loadings, and composite reliability will be measured. For all constructs, Cronbach's alpha and the factor loadings should show values above the required thresholds of 0.7 and 0.5 for exploratory research, respectively (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). The composite reliability should be above the required threshold of 0.7. For all constructs, the AVE should be above the threshold of 0.5 (Hair et al., 2011).

4.2.1.5 *Discriminant validity*

To test whether constructs are sufficiently different from each other, discriminant validity will be inspected using the Fornell and Larcker (1981) criterion, which calls for a construct's AVE to be larger than the square of its largest correlation with any construct. All constructs used in this study should fulfil this requirement. Taken together, these results should lead to enough confidence that the reflective measurement model fits the data well. Discriminant validity will also be assessed by testing unidimensionality based on the cross-loadings of indicators (Bagozzi & Phillips 1991; Chin 1998; Hair et al., 2013; Henseler, Ringle & Sarstedt, 2015). All constructs should show enough levels of discriminant validity. Heterotrait-Monotrait Ratio (HTMT) will also be used to test the discriminant validity of the constructs. All constructs should be below 0.7 HTMT measurement value to satisfy the HTMT discriminant validity condition.

4.2.1.6 *Test of direct effects*

The sign and magnitude of path coefficients and their t-values will be assessed, which will be obtained from applying nonparametric bootstrapping and calculating effect sizes and total

effects (Chin, 1998; Zucker, 1987). Path coefficients should show the expected signs for the beta value of above 0.1 and should be significant at a level of $p < 0.05$ or and $t > 1.96$.

4.2.1.7 *Assessment of Structural model*

To assess the quality of the structural model, predictive validity will be evaluated using the Stone- Geisser-Criterion (Q²), derived through the blindfolding procedure with an omission distance of 7 (Geisser, 1975; Stone, 1974; Tenenhaus, Vinzi, Chatelin & Lauro, 2005; Wold, 1985) and VIF at the structural level (Getotz, Liehr-Gobbers & Krafft, 2010). The coefficient of determination (R²) (Chin, 1998) will be measured. Values for Q² should be above the critical threshold of zero and VIF below the value of 5. Acceptable R²-values depends on the research context (Hair et al., 2011). According to Cohen (1992), values between 0.12 and 0.25 indicate a moderate effect size. Moderate values of R² are acceptable for this research since the measurement model is exploratory.

4.2.1.8 *Assessment of formative constructs*

The second-order constructs will be conceptualized through the hierarchical component model. The hierarchical model will be formed through repeated use of the manifest variables (such as, indicators) of the underlying first-order reflective constructs (Tenenhaus et al., 2005; Wold, 1985). For second-order constructs, we will use a composite model second-order index, which is reflective-formative (Becker, Klein & Wetzels 2012) (Type II: reflective-formative type). The decision regarding the mode of measurement for formative indicators will be based on the supporting results of Confirmatory Tetrad Analysis in PLS-SEM. CTA-PLS provides insights as to if the reflective indicator specification or formative indicator specification is more appropriate for the construct. As suggested by Gudergan, Ringle, Wende and Will (2008), the formed construct will be computed for all vanishing tetrads for the measurement model of each latent variable. The model implied vanishing tetrads would be identified, which is followed by eliminating redundant model-implied vanishing tetrads based on the examination of the statistical significance test for each vanishing tetrad. The results will be evaluated for all model-implied non-redundant vanishing tetrads. For all model implied non-redundant vanishing tetrads, the p-value of some of the tetrads should be below 0.05 were which will support the formative measurement of the model specification. All formative indicators should also exceed loadings of 0.1, which suggests the importance of all indicators in the formative construct.

Due to the different measurement logic, the established criteria for assessing reflective constructs cannot be applied for formative measurement models (Diamantopoulos & Siguaw, 2006). Various quality criteria will be required to determine the measurement properties of the

formative second-order index, as aspects such as internal consistency and convergent validity do not apply to formative constructs (Bollen & Lennox, 1991). Thus, tests for multicollinearity (Diamantopoulos & Winklhofer, 2001) using the variance-inflation factors (VIF) will be used. According to the recommendation of Hair, Sarstedt, Ringle and Mena (2012) and Henseler et al. (2015) to evaluate the measurement models for the second-order formative constructs, tests will be performed for multicollinearity based on variance inflation factors, which should show that these are below the very conservative threshold of 5 (Diamantopoulos & Winklhofer, 2001; Grewal, Cote & Baumgartner, 2004). Also, the weights of all measurement items should be significant (Cenfetelli & Bassellier, 2009).

4.2.1.9 Sample size estimate

The minimum sample size will be calculated using the G Power calculator. The total number of predictors is 11, alpha of 0.05, and the required power used here is 0.95. Thus, the minimum sample size needed to achieve the power of 0.95 is 91 based on the calculator output (see Figures 4-4 and 4-5). The effect size is taken at a moderate value of 0.2 (Hair et al., 2013).

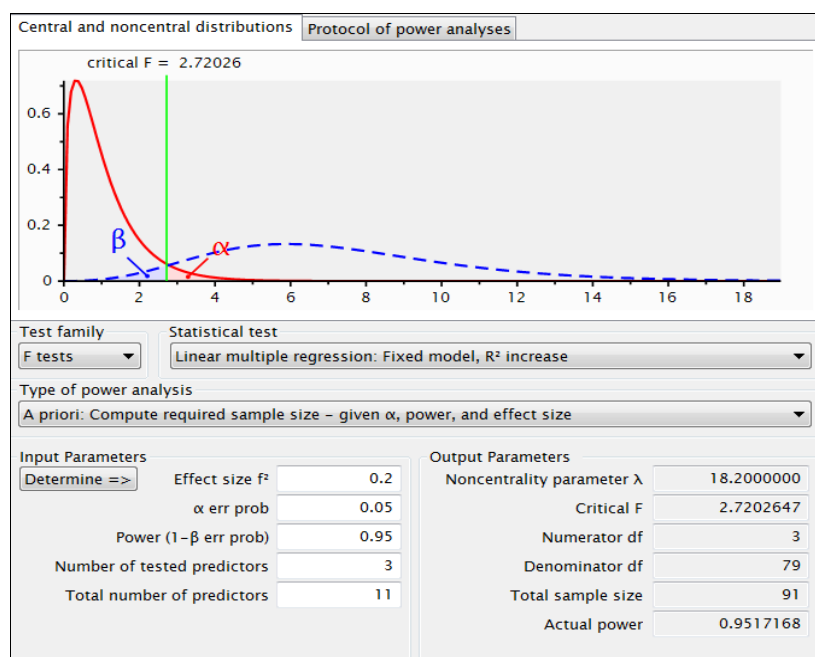


Figure 4-4 Sample size calculator

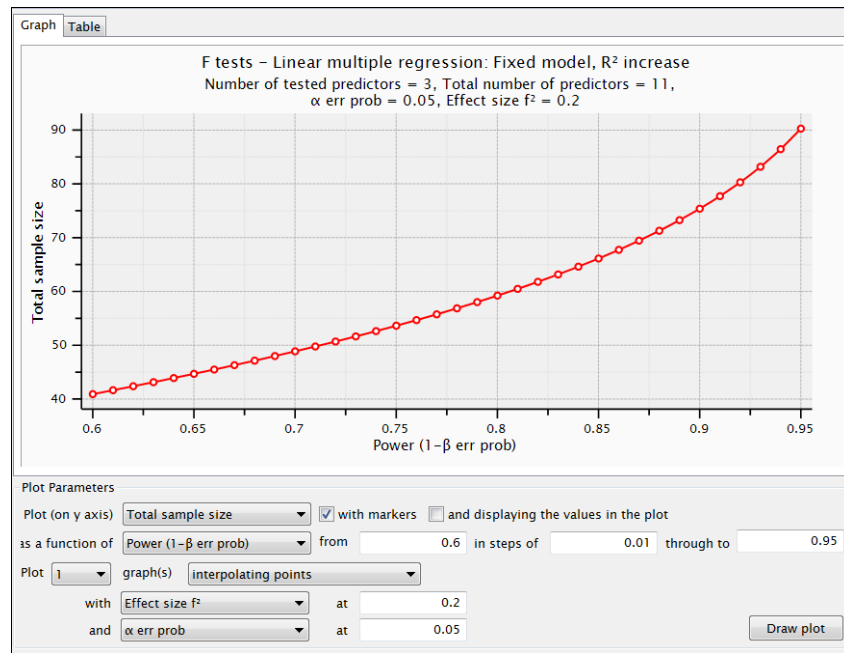


Figure 4-5 Power estimate

The estimated minimum sample size for this research will be 100 at each site for the Online survey. The minimum total number of total participants from both sites will be 200.

4.3 The validity of mixed-method research methodology

Onwuegbuzie and Johnson (2006) discussed nine types of validity to mixed research, which will be used to test the validity of the design:

- Inside-outside validity: refers to the extent which the researcher accurately understands, uses, and presents the participant's subjective view, also referred to as the emic view and the researcher's objective view seen as the etic view.
- Paradigmatic validity: refers to the extent to which the researcher reflects on, understands, and documents his or her integrated mixed research philosophical and methodical paradigm, including his or her epistemological, ontological, axiological, methodological, and rhetorical beliefs about mixed research. To obtain paradigmatic validity, the researcher's paradigm must make sense (Johnson & Christensen, 2012). The pragmatic approach is used to derive the paradigmatic validity of this research.
- Commensurability mixing validity: refers to the extent to which meta-inferences made in a mixed research study reflect the mixed world view. The integrative world view forms both qualitative and quantitative lens views; it is used to understand and explain the phenomenon being studied.

- Weakness minimization validity: refers to the extent to which weakness from one research approach is compensated for by the strengths of the other approach. Weakness in the qualitative approach will be minimized by the strengths in the quantitative approach and vice versa.
- Sequential validity: refers to the extent to which one has minimized a potential problem that might occur when the quantitative and qualitative components of a research study are conducted in phases. The idea is to try to understand if the results would have been different if the phases had been conducted in a separate order. The data analysis for this study will be concurrently, thus minimizing any validity issues due to sequencing.
- Conversion validity: refers to the extent to which a mixed-methods researcher makes a high-quality data transformation (of quantity or quality) and an appropriate interpretation and meta inferences based on the transformed data. The extent to which the data transformations will be done in this research study will be minimal because the finding from the quantitative analysis will be merged with the data from the qualitative analysis.
- Sample integration validity: refers to the extent to which the relationship between the quantitative and qualitative samplings designs yields quality meta-inferences. The researcher should be careful about how he combines the qualitative and quantitative samples to apply generalizations. The samples for quantitative and qualitative for this study will be independent of each other.
- Political validity: refers to the extent to which a mixed-methods researcher appropriately addresses the interests, values, and standpoints of multiple stakeholders. The way to reach this kind of legitimation is to understand fully the politics and interests and viewpoints involved with the research topic and to respect and represent these viewpoints. The subjective validity will be tested objectively using structural modelling and significance testing.
- The last type of validity is multiple validities: this refers to the extent to which the mixed methods researcher successfully addresses and resolves all relevant validity types, including the quantitative and qualitative validity types. The validity of quantitative and qualitative analysis is addressed independently of each other while addressing the method convergence validity in the mixed-method design.

4.4 Conceptual framework development

After following qualitative analysis using GTM-lite, that is, coding, categorizing, and memoing, the sorting theory will emerge that will be documented using narrative and captured in a conceptual model. Glaser (2009) states,

“one widespread problem in GTM is that researchers have trouble in maintaining the conceptual level that they have worked so hard to generate. The dictum is to write conceptually, by making theoretical statements about the relationship between concepts, rather than writing descriptive statements about people “ Glaser (2009, p.7).

Thus, the researcher must write in such a way as to make explicit the dimensions, properties or other theoretical codes of his theory and the theoretical integration of these codes. Glaser (2012) states that readiness for emergent theory should begin with conceptual completeness about a core category. He also explains how a core category resolves the primary concern and most often does not take more than 4 to 6 sub-concepts. Extensive further conceptualization can easily bypass the readiness moment produced by the method. The first draft will be prepared by typing up the theoretical memos in a sequence and then integrating them into a coherent argument using a narrative. The different categories will be correlated to each other and their core variables. At this stage, the new theory should be almost close to complete. The theoretical density can be then closed with the concept being mixed with the description in words, tables, and figures to optimize readability. The relevant literature will also be interlaced to put the theory as an extension of the context.

The conceptual framework will be developed from the core categories identified by following the GTM-lite inquiry procedures and statistical significance testing. The GTM-lite inquiry output will be merged with the survey data and tested using a structural equation model. The tested structural model will form the foundation of the conceptual framework. Statistical tests will be performed to test the inter-relations and causal relationships between the core categories of the conceptual measurement model. Test results from the statistical testing will be documented and woven into the newly developed conceptual framework. Critical success factors and key focus areas for the key concepts will be identified in the conceptual framework. The conceptual framework aims improvement in 3 areas: firstly the improvement of ICT practice in ICT by identifying ICT use and adoption gaps and aligning it to organisational

strategic intent. Secondly, it will provide greater clarity in understanding of the ICT practice from a healthcare perspective by information technology practitioners, and thirdly it will help improve the ICT adoption and use situation in the organisation being researched.

4.5 Ethics

With over 20 years of experience in ICT and working with large enterprises, as a practitioner, I have conducted one on one interviews and facilitated workshops with focus groups for conducting business analysis activities. From professional experience, the GTM-lite method of inductive inquiry is more suited to the research situation, to my professional experience and my role as a researcher in the organisation chosen for this research project. An aspect of knowledge utilization could also be explained by me being the researcher acting also as a change agent.

The research was conducted and approved under the governance framework of the Human Research Ethics Committee (HREC) at Central Queensland University. The research project was approved per the National Health and Medical Research Council; ethical clearances were also sought from each participating site, that is, the regional hospital and the metropolitan hospital. Under the CQU guidelines, the research was deemed low risk, but the critical element was to ensure that the participants felt free to answer the questions openly and to ensure that their responses and the organisation that they worked were not identified. The de-identification of data was a critical element in the context of the participants for this study. A letter of introduction and participant consent and information form was made available to the participants, which explained the research and assured the participants that their involvement was purely voluntary. The introduction form contained the contact details of the researcher, HREC, and the research supervisors if the participants were to have any concerns over the process or in ensuring their anonymity. Data entry after receipt of the response from the online survey was conducted using Excel and using SmartPLS software. All the data were de-identified for analysis purposes. All interview data were de-identified and analyzed using NVivo software. Original survey responses are securely stored in the CQUniversity Cloudstor location and in the shared drive of the CQUniversity research data management plan. Research Data management plan repository is the University's research data management repository and complies with the guidelines for data storage requirements required for ethical approval.

5 Qualitative analysis

5.1 Introduction

Open-ended survey question and semi-structured interviews were conducted with clinical staff, non-clinical staff and executive management at the metropolitan hospital and the regional hospital. N=109 responses were received for the open-ended survey questions at both the metropolitan hospital and the regional hospital. Semi-structured interviews were also conducted with staff from the metropolitan hospital and the regional hospital. The semi-structured interview questions were based on probe questions from open-ended survey response and high-level themes identified from the survey responses. The semi-structured interview questions are provided in Appendix F. The staff demographics included executive management, clinical and administration staff. Sixteen clinical staff, 13 administration staff, and 14 executive management staff from both sites participated in the interviews, as shown in Table 5-1 and Table 5-2. Email invites were sent to all staff, including executive management for interview participation. Participation in the semi-structured interview was voluntary.

Table 5-1 Metropolitan hospital participants

<i>Metropolitan hospital</i>	<i>Number</i>	<i>Age range</i>
Administration	6	20-60
Clinical	7	20-60
Executive Management	8	40-60

Table 5-2 Regional hospital participants

<i>Regional hospital</i>	<i>Number</i>	<i>Age range</i>
Administration	7	20-60
Clinical	9	20-60
Executive Management	6	40-60

The objective of the interview was to understand the key issues around technology use and strategic intent so that they can be grouped into core categories in the qualitative data analysis. The GT-lite methodology was used for the qualitative analysis. Interviews were conducted in multiple phases. The first round of interviews was held with clinical and non-clinical staff, and the data were analyzed using open coding in NVivo 12 application. The next series of interviews was conducted with executive management with some of the follow-up questions arising from the first phase of the interviews with clinical and non-clinical staff. The data were analyzed from the 43 interview data sets and the open-ended responses so that saturation could be achieved for the vital core categories and subcategories. The digital audio recording of the

semi-structured interviews was transcribed verbatim. Data analysis consisted of reading the transcripts and looking for important general themes using open coding and then looking for emerging themes through the transcript and developing coding categories and applying them to the transcripts. The data analysis process also involved revisiting and reviewing the data to check if any section had been omitted concerning the research question. Inter-relatedness of the themes was examined and coded using the axial coding method (Corbin & Strauss, 2008). Axial coding involved a continuous comparison of data segments across groups and searching for similar ideas or themes, until smaller categories were achieved, exploring the causal relationship between the categories. Consistent with the constant comparative analysis suggested by Strauss and Corbin (1998) a number of follow-up questions were asked to the executive management group, based on the responses and themes derived from the first round of data analysis with clinical and non-clinical staff. When the categories and subcategories were saturated, that is, the new data were not yielding any further information, the relationship between the core categories and their causal relationships were identified and hypothesized. The selection of core categories and their relation to other categories, which was derived from data analysis are illustrated in a coherent narrative through the use of selective coding. Some of the participants' own words are preserved in the report to illustrate the categories and the proposed phenomenon. Some of the participant quotes and detailed descriptions are also provided to exemplify themes. In order to ensure participants' anonymity, any identifying information was omitted. The themes and categories were derived from open coding and memoing. Memoing was used to write down ideas of the evolving theory through the process of open, axial and selective coding. The memos and participants' quotes are grouped in the order, which makes theory and the concept most explicit. Similar ideas and themes were grouped until saturation was achieved. Three core categories, i.e. strategic intent, strategic alignment and technology use, and twenty subcategories, were identified from the qualitative data analysis.

5.2 Discussion

5.2.1 Strategic intent

Strategic intent was identified as one of the core categories, with the following sub-categories:

- Culture
- Ecosystem
- Information continuum

- Leadership
- Strategic direction
- Enablement
- Engagement

All the above subcategories formed the core category of strategic intent. Strategic intent was a dominant theme that was supported by sub-themes such as Culture, Ecosystem, Information continuum, Leadership, Strategic direction, Enablement, and Engagement. Barriers and facilitators for each of the sub-themes were identified. Internal challenges and facilitators enabled us to understand the central construct, which is strategic intent in greater detail. Participants expressed some of their challenges under each of the subcategories which were required to be addressed by the hospital management to achieve the organisational strategic intent. The references from clinical, administration and executive management, for the regional and metropolitan hospital, is shown in Table 5-3 below:

Table 5-3 Strategic intent construct coding

<i>Regional hospital</i>	<i>Strategic intent</i>	<i>Culture</i>	<i>Ecosystem</i>	<i>Enablement</i>	<i>Engagement</i>	<i>Information continuum</i>	<i>Leadership</i>	<i>Strategic direction</i>
Administration	322	65	0	70	57	9	23	123
Clinical staff	252	42	0	46	57	16	24	85
Executive Management	108	16	23	32	15	26	12	32
<i>Metropolitan hospital</i>	<i>Strategic Intent</i>	<i>Culture</i>	<i>Ecosystem</i>	<i>Enablement</i>	<i>Engagement</i>	<i>Information continuum</i>	<i>Leadership</i>	<i>Strategic direction</i>
Administration	193	51	0	44	45	8	9	60
Clinical staff	166	25	0	26	64	29	3	61
Executive Management	179	26	17	32	25	19	28	79

5.2.1.1 Culture

Organisation culture was one of the critical constructs that were identified from the data, which was impacting the organisational strategic intent. This subcategory had 138 references from the regional hospital and 109 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme.

Table 5-4 Culture construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Culture	138	Culture	109	247

5.2.1.1.1 Internal challenges for culture

Participants highlighted the following internal challenges concerning culture:

- The culture is risk-averse. Clinically based culture is based on compliance and risk aversion.
- People operate in political cycles. We don't have a culture of innovation and strategic risk-taking.
- Clinicians are interested in anything that improves patient care and satisfaction. Clinicians are not well leapt into the IT stuff. People spend a 15-minute writing email, rather than having a 2 min conversation over the phone.
- Health services are set up to be competitors rather than collaborators. There is sometimes a reluctance to partner and share information.
- People need to think beyond their immediate remit. People in healthcare are very insular. People are more pigeonholed into their silos. People don't work very well with other people. Some departments soak up change more quickly than others. IT staff have forgotten that they are here to help clinicians. Frustrations lead to a feeling of dismay and disconnection. The culture is toxic. Some areas work well with others, and others don't.
- Health is also an emotional exercise, and it also about understanding people's emotional needs. Management needs to do a much harder job of involving the patients in the journey.
- There is a generational issue with the use of technology. Technology is reducing face-to-face accessibility.
- When people can't get things done, and they need to escalate, then they feel disempowered.
- Society uses health as a basic need and necessity.
- Everyone is under pressure, looking after their little area, and protecting their regions. I don't think there is a lot of impetus to change the system until someone gets sued. You don't have time to go upstream, as you are busy pulling out people at the other end. It is about getting to the root cause of the problem.
- I think it is about changing the mindsets of people who have been here for several years. The whole mentality of we have always done like that is difficult to change.
- Physically the hospital does not make it easier to collaborate with other people. We don't meet regularly, and the direction is not very clear. Don't know if healthcare needs

more collaboration, but more transparency. Collaboration is not a base competency in health. Nursing work with nursing, medical work with medical.

- The respect that they give to our IT people is appalling. People don't look favourably on IT now.
- Medicine itself is a powerful culture. When IT communicates is different from the way doctors communicate. IT people are not good at dealing with cultural problems and politics. There is a disconnect in the culture of ICT.
- There is a lack of appreciation for work done in the regional area.
- You are not bringing talent from outside and encouraging institutionalization.
- The management issue is inter-generational. The generation of baby boomers has been deficient in technology. Cultural change will happen over time.

5.2.1.1.2 Facilitators for culture

Some of the key findings identified by the participants, which are facilitators for cultural change in the healthcare sector are:

- Focusing on innovation. Innovation is driven through collaboration, and it is a key enabler.
- There is a positive culture to leverage in healthcare.
- Patients feel disempowered when they come to the hospital. Patients come in and put their trust in the doctors. Patients need to feel empowered. Technology needs to be used to empower patients.
- People need to understand the value of cultural diversity.
- The culture needs to be about helping clinicians see what matters to them and how it is going to help them in minimizing risk, delivering better patient care outcomes and research outcomes. Clinicians will have to buy into the technical stuff, and IT should support the clinicians in seeing the value in technology.
- Culture needs to change to challenge the status quo and wanting change.
- Culture needs to promote collaboration and transparency. There must be more collaboration in the technology space. More the partnership, more people feel comfortable working with others. Collaboration between teams will reduce waste. Staff needs to be encouraged to use collaborative tools.
- People are happy to support change that improves patient care. Technology change should demonstrate how it can improve clinical outcomes.
- The culture of continuous improvement needs to be institutionalized.

- The culture needs to promote flexible working conditions and mobility of clinicians.
- The culture needs to reduce power distance and promote more collaboration at the ground level.
- Culture needs to promote core values such as care, respect, and integrity.
- Culture needs to support strategic risk-taking.

5.2.1.2 *Ecosystem*

The ecosystem was one of the critical constructs that were identified from the data, which was impacting the organisational strategic intent. This subcategory had 32 references from the regional hospital and 17 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Participants highlighted that building an ecosystem between other healthcare providers, suppliers, and partners was required to deliver the strategic intent. The strategic intent could not be accomplished without building appropriate ecosystems.

Table 5-5 Ecosystem construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Ecosystem	32	Ecosystem	17	49

5.2.1.2.1 Internal challenges for ecosystem

Participants highlighted the following internal challenges concerning building ecosystems:

- The organisational view is a very siloed, insular view. We should be strategic in how we build relationships with partners. Digital is much more than electronic health records. We don't maximize our economies of scale.
- The Department of health does not take a very global view. There needs to be a strategic vision from the department of health if we are going to have connected systems. Health service cannot deliver strategic intent alone, key partnerships are required with other districts and multiple partners.
- Everyone is doing their own thing with variable success. Different health services are at varying levels of digital maturity. Organisational systems need to collaborate with electronic systems. Entities need to work within the ecosystem.
- It is very much dependent on your appetite to partner, rather than a framework. Untapping on how to allow people to build partnerships, connections, and collaborate is an issue. Policies and procedures and governance are essential while building ecosystems. The process is currently disjointed to build ecosystems, and even internal business units now do not work well with each other.

- Patients are moving from one state to another, and information should follow the patient.
- Future information will have to be designed to map the patient's journey within the ecosystem to provide the right information at the right time. For information to follow the patient, we will have to force integration. Government, non -government, GPs, community care, pharmacists, other hospitals all form part of the patient ecosystem.
- Data interoperability between different sites is a challenge. Data sharing and confidentiality is an issue in the sharing of information with private providers and partners. We need to be comfortable with the data that we are sharing with our partners. There is a reluctance to partner and share information because health service is set up to be competitors than collaborators.
- The resource is scarce, and we need to be strategic about what we need to invest. To build new capabilities, there should be enough throughput population mass. The geographical reach to have the information available is a challenge. The infrastructure required to build ecosystems is significant.

5.2.1.2.2 Facilitators for ecosystem

Some of the key findings identified by the participants, which will facilitate ecosystem development in the healthcare sector are:

- Critical partnership and collaboration with other health services across the district and multiple partners will be required to deliver the organisation's strategic intent. There will be advantages in having a partnership with another Hospital and Health Services (HHS) since patient information can be shared. Instead of building their capabilities, the inhouse partnership allows for utilizing expertise from other Health service and private practices. There could be synergies in solutions by engaging with the state-wide and eHealth teams.
- Health services need to be aligned with their key partner organisations. They should leverage partnership opportunities with other health services, research institutes, and universities rather than relying too much on the health department. Example: the metropolitan hospital has partnered with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to work on innovation projects. There is also the potential to lift and spread the technology across the sector.
- Collaboration at the National level will be required to build a trusted site, which patients can refer.

- The patient should be made as to the focal point, and information should be available at the point of care. The patient should be made the data custodian for the information that they carry. The patient should be put at least some of their information into the information ecosystem.
- All stakeholders will have to be brought together to build ecosystems. Partnerships are required, and ecosystems will have to be created for data interoperability. Data flow must follow the patients. Partnerships should be more than HHS like GPs should be able to book a specialist appointment for the patients. It will be good for a digital record to include information such as diagnostic tests and medications, with access to pharmacy records.
- Partnership with organisations, community partnerships, and research organisations will be beneficial to health services since lots of opportunities come with the partnership model.
- Partnership with other organisations should be made as one of the strategic priorities. There should be account managers appointed to manage partner relationships. Nothing should be seen in isolation. Learning from other health services should be the way of the future.

5.2.1.3 *Information continuum*

The information continuum is the flow of information within the ecosystem. Information continuum was one of the basic core categories that were identified from the data, which was impacting the organisation's strategic intent. This subcategory had 56 references from the regional hospital and 56 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Participants highlighted that the smooth and continuous flow of data with the ecosystem was required to achieve the organisational strategic intent. Without the constant flow of information, the ecosystems built around the patients will be ineffective.

Table 5-6 Information continuum construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Information continuum	56	Information continuum	56	112

5.2.1.3.1 Internal challenges for information continuum

Participants highlighted the following internal challenges concerning the information continuum:

- Health services have a lot of information. Information is not in a user-friendly format. It is challenging to navigate and to access information. It comes down to the individual's capability of knowing how to navigate and access data and what to do with it. There are no live dashboards that provide a range of information against the measures.
- There is a lost opportunity to share information between different health services and the state. Without the ability to partner, without information flow, the health services we will be siloed. Example: The hospital in the region does not know what treatment has been provided by other health services.
- Health services need to make sure data is much more accessible across organisations and within their organisation. They need to be a better mechanism for coordinating and communicating data. If a patient has attended cancer care at Northern, there is no way of knowing that information unless the patient tells, so it is unsafe. Currently, if the patient's pathway or history needs to be accessed, then the notes will have to be faxed from other providers, and the information does not always reach timely. Information is not always readily available in real-time. The information does not always flow back, i.e., there are no reverse updates between systems. Updating one system does not necessarily update the other system.
- There is a lack of understanding of information flow between different providers and services in the ecosystem. Data captured in acute settings are not used or useful to community health.
- There is a lack of information on from where the different sources of funding are coming.
- There is a national scheme around having a unique identifier, but it is very limited in what information gets put in there, and it is not mandated. The whole of HHS does not have a single health record. Patients do not have a single identifier, so there is no one place to get all clinical information. My health record is good but does not have everything in it that a clinical record would have. The viewer is good but again does not carry all the information like the ECG, Anaesthetic record, Emergency department notes. Systems do not currently capture all patient history such as mental health and patients cannot be relied upon to remember all their history, so the gap in information generates patient risks
- A high-level vision needs to be understood upfront on how health services are going to force the integration of information. Device integration, system integration, billing now

is separate. Data does not flow with the patients between different facilities. There is an artificial or manual handover of patient records.

- It is essential to understand where the health services would like to be in 5 to 10 years because the decisions that they make now will be tough and costly to unwind. There is no systematic on-going information continuum for any patient, and this is going to be fundamental for healthcare.
- Health service is sluggish in their privacy and data protection requirements. They have over-regulated data control in the health space and have made it hard on themselves on any formal information continuum. There are no existing national policies for supporting the flow of information between different states and healthcare providers.
- There is no one trusted site for patients to look up information.
- Security and confidentiality issues are a challenge in data flow between partners and private providers. Security and confidentiality issues are barriers now for patient holding the information and transferring it to the care providers.

5.2.1.3.2 Facilitators for information continuum

Some of the key findings identified by the participants, which will facilitate information continuum development in the healthcare sector are:

- Information is critical now for healthcare and has become an integral part of how they manage the business. The information has become a significant strategic lever. Information flow and information sharing between different entities will be required within the ecosystem to achieve the collective strategic intent.
- Live dashboard monitoring for patient flow will improve patient management and management of healthcare demand. Before and after information flows should be mapped, so that it can provide the right information to the right person at the right time. Patient information should be available to clinicians no matter where they are. The live monitoring dashboard can help in identifying how many people are waiting in the queue and redirect patients to other hospitals in the HHS.
- National policies will be required for the seamless flow of patient information. A national-level framework for data sharing will be necessary.
- A lot more thought should go into planning for information flow. The system should accommodate both productive and non-productive variables.

- Health services should give greater control of an individual's data to patients so that the information could move with the patient. Patients should be empowered to self-manage information as much as possible.
- The patient-centred information portal is necessary. There are a lot of great things that could be done in the patient portal space. The patient could be made the holder of the information. Now health services are relying on the system to transfer the information and to have that available. The patient should be made knowledgeable about managing their information and the disease process. The patient should take ownership of the information. Clinical information flow improves patient safety. Patient portal information could be integrated with the information to the national health database.
- A single digital record for a patient is required. The digital record could include information like diagnostic tests and medication. Movement of information needs to be facilitated across acute, sub-acute, and primary care. Data flow needs to be interoperable. The information flow principles should be based on patient focus. Hospitals should be more engaged with primary care providers.
- Health services should feel comfortable sharing data with partners. The cost of healthcare could be reduced in the aged population if proper information flow and patient information is shared and is available to other health service partner organisations. Patient travelling with his health information reduces duplication in diagnostic tests.
- Monitoring patient history information could help develop improved healthcare measures.
- There should be a trusted site for patients to look up information. The trusted site should be at the national level so that the patient can look up reliable information related to their care, rather than Google the information.
- Patient journey should be seamless, and information should be available at the point of care in the ecosystem. Delivery of care should be seamless. Patient information should flow seamlessly between GP's, primary care providers, and to the community care because if there is a requirement such as chronic illness, there will be several services interacting.
- Mapping the data flow within the ecosystem and allowing for the information to flow through seamlessly will improve the quality and safety of patient care and help achieve the strategic intent.

5.2.1.4 Leadership

Leadership was identified as a crucial category for delivering organisational strategic intent. Transformational leadership has a significant impact on technology adoption (Spencer, Buhalis & Moital, 2012). This subcategory had 67 references from the regional hospital and 40 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Participants highlighted that authentic and robust leadership was required for delivering long-term strategic goals, and the leadership had to be stable.

Table 5-7 Leadership construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Leadership	67	Leadership	40	107

5.2.1.4.1 Internal challenges for leadership

Participants highlighted the following challenges that they were facing concerning leadership:

- The cyclical nature of the key stakeholders is a problem in healthcare. It is the power and control of these key stakeholders to provide funding that varies because of the cyclical nature.
- The government changes priorities regularly, and it is a bit of a whim of the government in terms of funding.
- Leadership is about taking strategic risks for better outcomes. There is no strategic risk-taking from the leadership group currently.
- Leadership should have a solid understanding of the business outcomes to the technical requirements. We need to have capable experts in ICT within the organisation. Leadership should be able to put the technology lens and help drive business decisions.
- We need to build leaders who can help drive transformation and change. The leadership is entirely reactive. We haven't got strong leadership, because we haven't made that capability. Health does not invest in leadership very well. We don't have strong leadership to go to.
- We need to be clear about what we are going to do and not be side-tracked by the next new thing that comes along. Leadership is critical to help to make decisions and providing priority focus areas. Leadership is crucial for investing in priority decisions.
- Leadership in IT is about governance, who owns them, runs them, and who is responsible for them. Leadership in the IT space is lacking and needs to be built.

- It would be good if the department of health and human services led to the process. The requirements cannot be established to be one organisation alone, and it needs higher governance and support. No one has taken a national role to sort this out.
- Leadership starts at the top. Leaders should back people if somebody needs to have a go at something new.
- Leaders will have to make visionary decisions. Leadership should be made as a priority in governance to make bold visionary decisions.
- Leadership needs to be collaborative and respectful in terms of diversity
- There is a lack of leadership at the executive level and the technology level. Not all leaders understand the benefits and pitfalls associated with technology. If you have an uneducated group in control of the business, then you will not necessarily have the required technology focus.
- This visibility, in terms of what is going on to senior management? is very fluid now. Leadership is critical to the organisation's overall success. Leadership is essential in deciding the pathway that we need to take.
- Leaders in IT should uptake to improve the quality of care. We need leadership from external, who have come with expertise from private enterprise.

5.2.1.4.2 Facilitators for leadership

Some of the key findings identified by the participants, which will facilitate leadership development in the healthcare sector are:

- Building leadership capability is the key to digital change and for achieving the organisational strategic intent. Leadership capability should be built-in technology. Technology leadership and business leadership are interlinked. Executives will have to be capable individuals who understand technology importance. Investment needs to be made in developing leaders.
- Collaboration, strategic risk-taking, and people management are essential for leadership. Leadership style must be more collaborative rather than directive. Leaders should own the problem, and they need to acquire and support funding and should influence both internal and external stakeholders. Leaders must build relationships with both internal and external stakeholders.
- Leadership should be stable because constantly changing vision will detract the organisation from achieving its intent.

- Business transformation is a cultural journey. Change management and cultural change management requires leadership. People's transformation journey will lead by the leaders. Business transformation is about articulating people's strategy. People's strategy is about understanding, what are the skills, capabilities, and behaviour that are required in the people that we need to invest in now, to take us into the future.
- Right people must be provided with the right environment to provide informed commentary. Leadership is about creating the right environment.
- Leadership should come with clarity in decision and sponsorship. There should be joint executive ownership, and they should be able to sing the song and walk the walk for the next many years it takes to deliver the strategic intent. Leadership is being bold and sticking to the technology and the strategic business plan. Leadership is about talking the talk and walking the walk.
- Leadership starts at the top and works its way downwards. The only way change is going to occur from top-down. You are only as strong as your leadership group.
- Leadership needs to come from both the state and federal level to support the ecosystem.
- A leader needs to develop and maintain strategic intent. Leadership is required from the IT strategy perspective.
- A leader should be ethical in conduct should be trusted by their followers. Leadership should maintain transparency in their information, must be accountable for their actions.
- Leaders should not undermine their staff, and they must engage staff, listen to their requirements. They should have a consultative approach and be more approachable to staff.

5.2.1.5 Strategic direction

The strategic direction was one of the crucial categories that were identified from the data, which was impacting the organisational strategic intent. This subcategory had 270 references from the regional hospital and 226 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Participants highlighted that having a clear organisational direction with strategic priorities identified was important for delivering the strategic intent. The strategic intent could not be accomplished without having a clear plan and by not recognizing the strategic priorities. Strategic capabilities will have to be built to achieve strategic priorities.

Table 5-8 Strategic direction construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Strategic direction	270	Strategic direction	226	496

5.2.1.5.1 Internal challenges for the strategic direction

Participants highlighted the following internal challenges concerning strategic direction:

- The direction from the government is lacking, and the department historically has been reluctant to provide any guidance. We don't think the department has a great strategy. There is no national role in sorting out strategic issues. We need to look at what is required by the legislation, rather than fix all the errors. Information in Victoria needs to talk to information in Queensland. The government doesn't have a clear strategy of where they are trying to get to either and are leaving up to the health services to map the strategy. It seems to me, and there is a disconnect between the department.
- The Department of health does not take a global view in developing a clinically sustainable model and spreading it across other services. It would be easier if the department of health sponsored or led the process. I think we should be doing a lot more as a Nation and government to breakdown these barriers. There needs to be a strategic vision from the department, but not how you enact it to the nth degree.
- There is a total disconnect between the department's direction and the funding that goes behind it. There is a lack of strategy and planning from the Health services corporate office. IT strategy from the health service needs to connect to the corporate office in Brisbane. There is a lack of strategy and later stage planning from the corporate office. The current plans are disjointed.
- The national standard is required. The standard is currently very disjointed.
- There is no strategy, and it is just incremental updates. They are looking for the cheapest way to deliver healthcare. Managers are not on the floor and involved in patient care. There is a reliance on the vendor to make changes, and we are wedded to the vendors. IT is a rapidly changing world, and we must keep pace with the change. Currently there is no impetus to change the system, until the system breaks.
- There has been no ICT strategy. IT doesn't have a great vision or a strategy because the team has not evolved with the context of the organisation. We think IT has been neglected organisationally for a long time. The biggest challenge for us is to be focused on IT. The IT objective must relate to better patient care or outcomes, and then people will embrace it. We need to be bold with IT and stick to the plan. People end up passing

the IT system because they don't get what they want from IT. Technology is a dynamic field, and the capability of the product changes over time. There has been a lot of short-termism in the expectations of the benefits of IT. Influencing the people who give us resources and making them aware is the vital need for IT. I think there has been a lot of missed opportunities in looking strategically at, what is the next piece of the pie, around what we need to complete to have an end to end system. We don't know how all the products hang together.

- We need to build a strategic plan for the strategic intent. We need to develop a strategic plan for ICT. We don't have a common understanding of what our current state is. We haven't had a great vision, so it is hard to design a capability structure around something that you do not know. We need to build an operational plan. We need to be clear about what the enablers are. We need to understand workforce capabilities and facilitators. We need apparent capacity and accountability within the ICT team. We need to have a team of capable experts to support ICT within the organisation.
- We have addressed the local isolated need vs. the more significant organisational priorities.
- Money should be well spent, where it affects the level of care. There is a disconnect between what is intended and what is delivered. We need to involve the patients more.
- It is a long game, and we can't start the process and change the tact in 12 months, because of an emergency priority. What annoys people is when we regularly change focus or priority. There hasn't been a direct link to strategic objectives.
- There hasn't been clarity on what the strategy should be and how we should consider a solution towards that.
- There hasn't been a long-term people strategy, which is linked to strategic objectives of Health services, so it hasn't helped give clarity or focus, direction, and investment in terms of IT investments or solutions.
- There is a lack of clarity around the strategic areas of need and the strategic priority. There is a lack of an organisational-wide view of a lot of these challenges. We have a strategic plan but don't know what arrangements have been put in place beneath that to enable that. There hasn't been clarity around what do we need to do to enable the strategy and how do we go about doing that.

- They haven't figured out what the future dream state looks like and how might we work towards it. We need to understand what the strategic priorities look like and what does it mean in terms of our people.
- At the top level, we need to be clear about what our priorities are. We need to be saying no to certain things. There has been a shortage of people leading. We are thinking about advancing healthcare, and then we need to be having common goals.
- The biggest problem the hospital has is, there isn't an IT strategy, and there are a lot of issues that need to be addressed first before we implement anything new. The executive should make IT strategy a key priority and address them. For example, if HIS had 30 modules, we should have weighed the pros on cons and which modules to start first, and what the issues in not having some of the modules. We have made it harder for the people to do their jobs, because of the way we have implemented things. We do not have a good strategy for managing system changes. The IT plan is not transparent and not visible, so it is not clear what the priorities are for IT in the next 12 months. There is a lack of capability around understanding how the business and technology goals link. We need a plan to work out what the gaps are and take a much more strategic approach to it.
- There is a different breadth of people that work at health services, some might need the flashy stuff, while some might need just the basics to work correctly. Without a clear roadmap, we start to bring in systems and patch things and fill gaps.
- ICT is a vital part of the healthcare infrastructure. The necessary IT systems are not there, so it makes the stuff around clinical information, a pipe dream. We must put the house in order before we start looking at innovation. We need a long-term plan, and we need to stick to it. We are not going to be side-tracked by this new thing that comes along. The planning is not very clear, and we have half rolled out Tap on and tap off project.
- We are not sure if there are products available to deliver all the things that we are talking about.
- We did not articulate where we were trying to go. We have not painted the vision, the map, and the pathway. We have not fully understood the resources required.
- In health, once we have invested millions, we do not have the strategy of continuing to improve.
- As an organisation, we have not called it out, that this is important for us.

- A lot of our funding goes into covering the basics, for example, replacing beds and clinical equipment. So, it leaves little to invest strategically unless you have a longer-term view.
- Our strategy is often derailed by the political environment that we work. Strategic intent can fail because it wasn't the flavour of the month with the government. We often get the money that we don't need or don't align with our strategy, and we struggle in the areas of technology, innovation, and data. When the government changed, there were a lot of redundancies, and some of the IT projects were seized.
- We have a broad geographical spread, but the population is not so vast, so planning for new technology could be a challenge.
- There is still a bit of work to be done on how the vision plays at the shop floor, concepts around paperless, and making sure that we are productive. Understanding where we want to be in the next 5 to 10 years is essential because the decision made is hard to unwind.
- There is a lack of capability in the organisation around the strategic direction. There is a lack of strategic planning or strategic direction. There is not wholistic view on the appropriate technology, platforms, and systems. We have not seen it done well in the health sector. There needs to be greater understanding around the business direction and how technology is going to support that.
- A good strategy is the one that is built from the ground up. Strategic direction and business engagement of IT need to rework.
- The current strategy is not providing what we need. There are good at promoting strategy, but what happens at the ground level is a different story.
- We don't have a strategic roadmap, we have had a list of projects, they are two different things.
- A strategy must be a living and breathing document which we are continually monitoring and adjusting.
- I am not sure if there is an official strategy as such for IT. IT strategy for one IT services across the GPs, community clinic, and maternity clinic must come from higher up. People die across the transition of care, and we, as a nation, have accepted the risk. The discussions of having one systemic ensued 20 years ago. We don't believe the state has any health strategy to solve the problem.

- We have a more significant issue, the individual health services, GPs, and the royal colleges can't solve the problem. It should be the responsibility of the department to provide a uniform and unified IT health system to the health services.
- There is no IT plan for developing a cohesive framework to support clinicians and patients. Focus on IT tends to be accounting.
- There is a piecemeal approach, with no integration. Looking in isolation does not translate well, and there is a need for sustainability in health service and core direction.
- Sometimes having one system does not provide flexibility. We don't plan for version upgrades and technology upgrades. Systems are implemented with a lack of strategy and based on how they get their funding. Systems are continually patched and maintained, and more money is spent on patching.
- Organisation goals change with the changing executives. Health services are not keeping up with the pace of change. Our vision keeps changing on who our CEO is.
- There is no sustainability, and we are bad at sustainability. Because we don't plan, we don't make it sustainable. We need some core direction and sustainability within healthcare.
- A patient-centric strategy is required. There are gaps in strategy in connecting with patients. The community needs to have confidence in the technology. Our destination 2030 is caring closer to home.
- Queensland Health is a large organisation. Queensland health is significant, and changes are challenging to implement.
- Only big political media things get addressed. Smaller services get ignored in the hospital.
- Not sure what they are looking at providing us with what we need. There is disjoint planning between community health and acute health services. They don't use the right people for planning. We have no real direction. They don't understand public health requirements.
- Some changes we are implementing are for over ten years. The strategic plans are not linked to operational plans.
- The organisation has a powerful clinical focus. Strategic planning should be an iterative consultative process. Continued short sight is an issue in Health services. We probably need a 20-year plan.

- We have not canvassed health system technology needs at the national level. Every health service is doing their own thing at different rates and is at varying levels of maturity. We don't know what we don't know. We need somebody who is going to co-ordinate and bring it all together.
- If someone comes up with something free of charge, we will say OK we will have it. We accept the systems that are not functional, even if it is 20% better than what we have got. We are pouring more and more money to patch the old systems which are not functional, to keep it running.
- Technology is brought in, in bits and pieces. Technology is changing quickly, and we need to keep up with the pace.
- There is a duplication of services and funding to provide similar services in Health services.
- We don't have much information filtered through with ref to IT strategy. I am sure there is something out there, that is better than our current patient management system.
- We have no real direction as to what is happening
- We don't think they use the right people in the planning stage. Staff feedback and input have not listened. A community-based setting like drug and alcohol is sitting under sub-acute services. Public health is an essential area in healthcare, and it affects many people.

5.2.1.5.2 Facilitators for strategic direction

Some of the key findings identified by the participants, which will facilitate strategic direction development in the healthcare sector are:

- Long term planning and clarity in direction will be required to deliver the strategic intent. Strategic priorities should be identified and linked to the strategic plan and strategic intent. The operational plans must be built to support strategic priorities. The operational plans will have to be designed with a clear understanding of the workforce capabilities and supporting enablers, which are required to deliver the strategic intent.
- The organisation should be proposing and projecting the technology systems that are going to see in 10 to 15 years. The strategic intent and strategic plans will have to be defined for at least ten years.
- Strategic planning should focus on healthcare sustainability strategies like prevention and cost sustainability.

- There should be a national approach to healthcare strategic planning. The current problem is more significant than individual services. Individual, organisational strategies should link up to national strategy. Consumers or patients should have an input into the strategy, as to what kind of systems and patient experience, they would prefer.
- Strategic intent should be supported nationally, by the board, individual health services, and the community. Cohesive strategic planning is required between the hospitals and the state governments. The strategy needs to be driven by the state for all services within healthcare and by the federal nationally.
- Local solutions have been implemented to solve local problems. Taking part in the system in isolation does not translate very well into a new system. The IT strategic plan should take a holistic approach to the problem.
- IT should plan to continuous software upgrades and continuous technology refresh as part of the IT strategy. There is a need to ensure that the systems are fit for purpose and are supported. IT systems should enable the integration of stand-alone systems. IT strategy should support the clinician's mobility.
- Healthcare services should understand that IT is an essential part of a healthcare organisation. Long term IT strategy solution planning should be done in consultation with the clinicians.
- The vision and strategic direction of the organisation should not change with leadership. Long term strategic goals and objectives must be defined. Change must be implemented top-down with stable executive leadership.
- Multiple systems are used for the same purpose. IT strategy should identify the duplicate solutions and duplicate processes so that it can bring efficiency to the clinicians' workflows.
- The universal patient number should be the first thing to go. Duplicate systems must be eliminated, for example, implement an electronic medical record with direct entry into the hospital's primary patient management system. Having a universal patient number will minimize the need for duplicate entries into duplicate systems.
- Healthcare is set and forget mentality with technology. They need to forge the technology path forward and build capability in what is possible around digital solutions.

- Innovation should be made as a strategic priority and how healthcare services can partner with other organisations to drive the business further.

5.2.1.6 Enablement

Enablement was one of the key categories that were identified from the data, which was impacting the organisational strategic intent. This subcategory had 184 references from the regional hospital and 111 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Participants highlighted having the staff enabled to deliver the strategic priorities in terms of resources, time, and skills were essential to delivering the organisational strategic intent.

Table 5-9 Enablement construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Enablement	184	Enablement	111	295

5.2.1.6.1 Internal challenges for enablement

Participants highlighted the following internal challenges concerning enablement:

- We don't think there is a long-term people strategy linked to strategic objectives. Healthcare has talented individuals in pockets. It is challenging in some roles to get people out of those roles.
- We have clinical product advisors who provide advice on IT equipment, but we don't seem to have that level of skill in IT.
- Staff across Heath service have different levels of maturity with ICT skills.
- Expectations are unrealistic with budgets and resources.
- We are not going to pull the stuff with existing infrastructure. Infrastructure and Wi-Fi issues lead to some of the work is not completed on time. We don't have the IT infrastructure for the GPs to be able to read our notes. Most of the people at the lower pay rate don't have access to computers.
- There is no money, and we are hamstrung for resources. IT is not resourced well enough to do the job that they need to do. We need to understand where we are trying to get to so that we can request for the resources that we need. Resourcing has been an afterthought. Most of the projects are under-resourced. We don't have the resources, and we keep repeating the same mistakes.
- There needs to be more staff in ICT who are allocated to technical services. The hospital fails to deliver because of insufficient resourcing. Financial constraints appear to

hamper the provisioning of the best available ICT service. We don't have the best support structure to support applications when the person goes on leave, and everything comes to a standstill.

- ICT systems have been added to people's roles as an impost. Management hasn't resourced the clinicians with the time, to be able to go and customize the systems to their requirements. People either don't have the skills or are time-poor.
- People in IT don't understand the medical context and don't design the system to meet that context.
- Whenever clinicians need IT help, it takes a long time to deliver. Clinicians are stuck with time-consuming systems.
- Management doesn't think they appreciate the time it takes for nurses to fill the questionnaire on the computer before undertaking surgery. We need additional resources to fill out the forms on HIS. Clinical systems currently are another impost on a clinician who is trying to look after the patient. Clinical staff must do a lot of data entry work into the systems. Clinicians are extremely time pressured in the clinical environment.
- Up to date, technology is required to retain clinicians.
- We have few talented people who are time-poor, ETF allocation for reporting is minimal to the size of the organisation. Demands that are placed on the IT staff are completely arduous.
- Clinicians don't have the time to attend meetings or make some of the changes that they need to do to the IT systems. The clinical staff doesn't have the time to participate in training. A lot of senior teams miss training due to time constraints. Risk assessments are not done correctly due to time constraints. Sometimes the resources can be stretched.
- When the strategy gets to the ground level, things don't work as planned, or there are not enough people or enough funding. In the past 4-5 years, nothing is getting done.
- The amount of information that needs to be put in the strategic plan is vast and needs guidance. Information from various data sources needs to be fed into the strategic plan. It is a very manual exercise, and we must get someone from the directorate to pull all the data. We spend a good amount of time trawling through the data, to get the right lens on the information. We have several competing players drawing on a few resources.

- We can't get the information that we need from the system, nor we are being enabled to change them. With a lack of skills, the staff have no confidence in using technology.
- People feel disempowered if they need to escalate to get things done from other departments.
- We have got capability barriers around writing business cases. The organisation, over the past five years, have not had the right capability. Health needs to have the right folks with the correct technological understanding. Our IT staff do not understand the patient workflow and the different medical craft groups and how they operate as a business. We don't have the right capability to implement the process.
- We need to be building leadership capability. There is no investment in leadership in the IT space.
- We don't think we are using the right people on projects to do the work. Sometimes nurses are asked to deliver or implement IT projects. They should use proper project managers instead of nurses. We have people with meagre qualifications in the admin areas.
- There is a lack of external funding to build new capabilities, and some of the capabilities must be built from within.
- The skill level in IT needs to be improved. Clinicians are under the pump, work pressure is high, and the skill levels in the application support team need to be improved. People don't have the knowledge that they should have. There is a lot of forgotten education like ward clerks.
- There is an insufficient workforce to customize the systems for different departments. There is a workforce limit to produce more sophisticated systems. FTE resourcing to respond to IT query is minimal at the ground level, hence the ability to respond to requirements is also minimal.
- To squeeze meetings for a clinician during a typical week is difficult. The meetings need to be scheduled. Specialists are very busy people.
- Each department has a different funding model and works in silos. Healthcare services are under-resourced from a technical perspective because the focus is on the medical side.
- The staff have limitations with what they can purchase due to budget restrictions.
- There are no data-savvy people in the health space, and the staff is data naive and in its infancy with clinical informatics.

- There is a lot of wait time on the service desk to get the required IT support. Service desk staff are under-resourced and under-skilled. The enterprise solutions are supported centrally, anything outside of that comes to the local IT staff, and local IT staff is under-resourced. It takes a long time to enable staff.
- The geographic spread and servicing regional areas are a challenge.
- It is challenging to attract the right IT talent. The government cannot attract and retain the right talent.
- Lack of management skills is a challenge in health service. Pay is a challenge in healthcare, and hence, we don't get the sharpest tool in the toolbox to come and work for the organisation. Low pay is unable to attract the right skill sets into the organisation.
- What we don't know is what we don't know, so that limits the ability to respond. There is a lack of knowledge of how the IT systems integrate and work together. Sometimes people don't have enough knowledge in IT to make the right decisions.
- Finding clinical expertise time is a challenge. Clinicians are always time-poor, so it is difficult for them to pull time from their daily clinical workload.
- Sometimes people are backfilled without the required skills. With short term contracts, people don't get the depth of knowledge. Work allocation is not done correctly, and work gets added on to standard days' work. Some of the positions are part-time due to lack of funding. The job descriptions do not document a systematic way of acquiring new skills and knowledge. External skills are not being utilized to help the organisation. Redundancies and staff turnover have caused a loss of knowledge and critical skills.
- Not being able to dislocate staff to other areas from the region is also an issue, because the management does not want to disrupt the staff. Staff turnover is causing frustrations. Staff retention and employing staff permanently is an issue. Sometimes there is a rush to fill vacant positions, and they may not bring in candidates with the right fit.
- There is a lack of project management type skills in health service. Sometimes resources with the right skills are not found to do the job. It takes a very long time to fill empty positions. Getting people with multiple skills or the required experience can be difficult.
- Executives do not well support IT, specialists. A lot of the skills in IT are self-taught.
- Clinical people have done an add on for their admin side of things. The clinical staff are not very good in management skills. Clinical capable staff lack technology and management skills.

- Innovation with existing resources is a challenge in health service.
- Some of the IT systems are not reducing the clinicians' time by not auto-populating the alert data. Sometimes clinicians waste time doubling up on documentation. More technologies will result in more staff to manage the systems. IT applications have become an added burden to clinical tasks.
- There is a lack of understanding regarding the tools, equipment, and applications required by staff. There is a lack of knowledge of the data requirements needed for state-level reporting and internal reporting. Staff are having issues with getting tools and equipment approved because senior management doesn't read the provided documentation, and they don't have a proper understanding of the requirements.
- There is no professional development offered to admin staff.

5.2.1.6.2 Facilitators for enablement

Some of the key findings identified by the participants, which will facilitate enablement in the healthcare sector are:

- Having the right skills and time was identified as a critical enablement challenge in healthcare. Health services need to develop teams with the right skills, experience, and knowledge.
- Reskilling is vital to healthcare staff. It is essential for people in IT to be involved in re-educating themselves. It is not about training, but it is also about supporting and coaching. Health services will have to develop some skills and bring in some new skills into the organisation.
- Skills in ICT is required to transform healthcare digitally. Banks have capable individuals and executives who understand technology importance, but technology skills are lacking in the healthcare space and should be developed.
- Staff should be enabled with time, resources, and tools that they need to do their job. A lack of resources has the potential to derail the strategy. Quality of hire and getting the right people with the skills will be vital in delivering the organisation's strategic intent.
- There is the institutionalization of resources. Diversity in people strategy is required so that there is the right mix of internal and external skills. Tapping people on the shoulder does not allow an organisation to acquire diversity. Bringing in external skills will help with digital transformation. Trying to slow down staff turnover is important at the same time, there is a need to bring in fresh blood.

- It is good for IT staff to be competent in social skills. ICT departments should be able to connect with organisational skills at large. ICT needs strong advocates in healthcare. ICT needs to be able to write up a business case on how to communicate in helping patients and clinicians in improving their clinical outcomes.
- Clinicians should be freed up from admin work such as data entry. It is better to preload the forms with some of the necessary information prefilled to reduce clinician's time spent on data entry or use scribes to minimize the data entry workload.
- Clinicians hang up on the service desk after waiting for a long time to get the necessary IT support. Clinicians should be better supported from a technology perspective.
- IT is an enabler to provide better healthcare service to patients. IT acts as an enabler to retain clinicians. IT systems should enable clinicians to deliver better clinical outcomes for patients by addressing some of the usability barriers and clinical outcome requirements.
- Knowledge of technology or advice from experts is required during system procurement. Skills should be developed around technology procurement in healthcare.
- If a clinician's time is required, then they need to be paid for the time and backfilled. Clinician's time should be valued and respected. Bit of prevention time can lead to better clinical outcomes. If clinicians' time is freed up, then they can work with IT to improve the systems. Sharing knowledge and not just providing treatment will be a change in underlying assumptions for clinical staff.
- The job roles need to be aligned with the strategy. Employee profiles should be reviewed and realigned with the changing digital capability.
- Resources with data analysis and management skills are required in healthcare. ICT skills should be a requirement to be in the position descriptions for clinical staff. Excellent management skills will have to be developed for clinical staff.
- Improving the knowledge base and upskilling of the resources is required. Bringing in people from different departments to backfill a temporary role can help with cross-skilling and cross-training. Training and cross-skilling is an excellent way to provide staff with opportunities for growth.
- Acquiring new skills will allow the employee to value add, without value add, employees cannot stay employed. Skills capability will have to be built to align with the strategy. Contractors can be brought in to fix temporary technical issues.

- Support from line management improves enablement. Line management should support staff enablement.
- Professional development helps with staff retention. Professional development of staff, both clinical and non-clinical, will be required.
- The organisational goals should not change with leadership. Sustainability of the same goals during leadership change and providing incoming leaders with training to drive the necessary mindset and strategic intent forward will be needed to keep focused on the long-term goals.

5.2.1.7 Engagement

Engagement was one of the key categories that were identified from the data, which was impacting the organisational strategic intent. This subcategory had 149 references from the regional hospital and 143 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Participants highlighted that engaging with stakeholders, understanding stakeholder requirements, and communicating the strategic direction was essential for achieving the organisational strategic intent.

Table 5-10 Engagement construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Engagement	149	Engagement	143	292

5.2.1.7.1 Internal challenges for engagement

Participants highlighted the following internal challenges concerning engagement:

- The government changes priorities quite quickly, and that has the potential to negate engagement.
- There will be logistic challenges in engaging staff.
- Clinical staff look after their patients and do not give any feedback on IT systems. There is no organisation-wide approach for engaging staff feedback. Feedback is only captured during project implementation. Engagement is something that needs to be continuously looked at. We need to empower people to speak up around what the issues are.
- Things shouldn't be asked from end-users when the project is underway, most of it should be understood upfront. People become angry when their ability to care for the patients is undermined, and it hampers their daily working environment.

- We haven't allowed staff to evolve and grow, allowing them to be involved, and to be part of the decision making. Stakeholders are consulted narrowly and administratively. The actual users, the senior doctors, were not included in the decision-making process of the product and how it was set up. There was no early engagement, and the project suffered severely.
- IT has just been a desktop function, and there has been a wrong form of engagement from IT to the business. It takes excellent relationship building skills and consulting skills to understand what is essential to the clinicians, something that they need help in.
- IT did not take actual user requirements and what clinical workflows did they need to solve into consideration during system implementation.
- We need to have leaders who can engage staff at the ground level. We don't communicate effectively with the people at the ground level. Assumptions were made by the individual, which were incorrect on how the theatre room functioned. The requirement was not understood. The requirement was incorrectly delivered. The end to end view of how the clinicians needed the system to operate was not laid out. The project team did not understand the whole journey and the end-to-end functioning of all the system interfaces.
- We need to talk to the people about the potential and the future and get them excited about the strategy. The organisation needs to work much harder in involving the staff in the journey. Executives need to communicate the strategy better. Currently, it is not being communicated to us on how senior management is going to achieve the goals.
- Cultural engagement requires leadership. The staff does not trust senior management. The staff were told how it had to be, rather than providing some flexibility. Sometimes the information passed down is not transparent.
- There is a lack of IT engagement. We don't know what projects they are doing. IT does not take stakeholder input. Communication from the IT department is poor.
- Stakeholders don't try the product and provide feedback before project implementation.
- Engagement depends on the manager. In some areas, it is challenging to access supervisors.
- Important stakeholders are overlooked. They only look at the clinical side and not consider the administrative team during decision making. They are not effectively using stakeholder management.

- We need to be gathering the right information. They are getting the wrong bit of information from the people who don't understand the application. They should be getting end-user feedback when they are developing. There are specific requirements that we need, and we are being delivered a vanilla product.
- Senior management doesn't communicate well, their ongoing plans for the area. Senior management doesn't engage well with their staff. Staff meetings are quite uninformative at times. Communication is sometimes not timely and informative.
- Management is not on the floor and involved with the patient. We could do with better communication. There can be better communication between business units. We don't know if the vision has been adequately communicated to clinical staff.
- Engagement in terms of investment in outcomes and improvement is variable.
- We need to think about how we can involve the patients more in using ICT. It is difficult to track patient discussions in the notes. Important patient conversations cannot be tracked. The contact details are not recorded correctly in the system. Patients don't fit the nice little boxes you are supposed to tick.
- We are struggling to make the required legislative changes with IT.
- We don't think they understand the pressure of a clinician, and they believe clinicians are a bit pedantic. Clinicians don't know who they are going to see and what is going to happen. They don't understand the challenges of recording the information when the patient presents in an emergency. Patients are sometimes in a room where there is no privacy.
- We weren't consulted during the purchase of the HIS product. The amount of feedback that we get as clinicians is minimal. There is very little communication between the head of the unit and management. We need the system simplified for our department. Everyone works in silos, and messages aren't communicated as well as they can be. That limits communication, and people are very busy.
- Clinicians may not have time to focus on everything else, except for things that will provide the best for the bang.
- Sometimes there is information overload. We don't need to know the stuff which we don't need to know.
- Everyone works in silos. There is no proper communication between the teams. HHS and other health services do not work well together, and they work in competition.

- The way IT communicates with each other is different from how doctors communicate with each other and how nurses communicate with each other. IT people should learn to communicate with people at a high level as it is essential. We need IT to understand the objectives and make better decisions.
- Engagement from senior management with staff decreases, as the pay rate decreases. Most of the people on lower pay rates don't have access to the computer. People on the lower pay rate see that effort to engage by senior management are cynical or token. There are gaps in timely communication from senior management. There is a miscommunication with staff at the ground level.
- We don't have an engaged social media.
- Clinicians haven't had much interest in the IT space.
- There was an expectation that the system will deliver certain things. There is a lack of understanding between what they think the vendor is selling and what the organisation is buying.
- Sometimes hospital executives were not involved in the decision making of the clinical systems and were asked to sign off on the system as an owner. Not all key stakeholders are engaged and included in the decision-making process for the clinical systems.
- We are not listening to the clinician and their requirements. The systems are just given to the clinicians to use. Clinicians do not have a choice in the use of digital systems. There is no feedback taken from the clinicians when the systems are implemented. The systems that were promised were never delivered in full, and some of the modules were missing in the implementation.
- There is a lack of senior management engagement because they change very often. Communication from senior management is sometimes inadequate. A lot of things are heard second hand and through corridor conversations. Senior management sometimes does not read the information that has been sent to them.
- There is a lack of communication between Health services in HHS. Some people have no understanding of what specific areas do in health service.
- Sometimes there are too many meetings, and people have no idea as to what is going on in these meetings since everyone talks about their silos. Sometimes there is no sustained message, the information may be available today, but if a new staff member comes tomorrow, he will not be able to get it.

- A lot of background information is missing as to why the systems are being implemented. There is no consultation with the clinicians when the systems are removed. There is no communication or engagement after the project has been implemented. People are unaware of changes that have happened to the systems in other departments. People are sometimes unsure of what is available to them.
- Staff working in shifts in different locations do not receive adequate information.

5.2.1.7.2 Facilitators for engagement

Some of the key findings identified by the participants, which will facilitate engagement in the healthcare sector are:

- The clinical staff are interested in anything the genuinely seeks to improve patient care. The clinical staff are naturally curious and naturally interested in discovery. Clinicians are more engaged when they were involved in the decision-making process. Clinicians should be included in the decision-making process related to technology.
- If the staff doesn't meet regularly, then the direction gets blurred. Staff should be continually engaged in providing input to the strategic priorities and feedback related to technology issues. There are a lot of competing meetings, timetabled meetings with management for clinicians to discuss strategic objectives will be okay.
- End-user input was not taken into consideration with the existing system builds. The systems are getting better as they get more clinical input. The earlier systems that were built had no clinical input. The technologists built the system on the brief that they were given. End-user input should be taken into considerations while developing and trialling new systems.
- The clinical systems should be assisting in improving clinical outcomes and not just weighted activity units. The IT systems should be able to get the clinicians excited and should not be an impost to their existing roles.
- More engagement and communication with the staff groups at the ground level is required from senior management. Senior management should share the strategic goals of the organisation, share with staff on how they are going to achieve those goals, and get staff excited about the journey. Involving staff will improve employee engagement.
- Staff consultation is required at all levels. Stakeholders should be engaged, and technology requirements should be captured from clinicians.

- Expectations should not be set very high with the vendors, because they will not have answers to all the problems. Key SME's should be involved in the procurement of IT systems so that the end-user requirements are adequately considered. It may be a bit unfair to expect from the company that the system will deliver everything.
- Clinician buy-in is required for delivering the strategic intent.
- Influencing the government is not communicating, but a challenging thing. Senior management in IT should be able to influence the key stakeholders in the government. Influencing the people who give resources and making them aware is the vital need for IT. Health services need to engage and influence the people who hold the purse strings.
- Engagement needs to be done with mutual respect taking time into consideration. The right representatives should be chosen to represent end-user requirements.
- Technology should enable the staff to do their job efficiently. Collaboration between business unit managers can improve the quality of clinical information and staff engagement.
- Vital communications should be communicated to staff using the right communication techniques and should be as transparent as possible. Transparency of information improves engagement.
- People still like to connect with someone face to face. Social media and technology collaboration tools should be used to communicate between departments where feasible. Building networks improve staff engagement.
- Having the required skills will improve staff engagement. Staff should be trained in the requisite technology skills.
- Clinicians know what they want, and the system implementers will have to work with the clinicians. It is required to understand the impact of system implementation on different business units. Internal feedback will be required during product development and system implementation.
- People engage well when they feel connected. Keeping the strategic focus is important during staff engagement.
- Senior management should effectively engage with staff at all levels. Staff needs to be respected and consulted at all levels. The consultative process makes strategy implementation easier.

- Co-creation helps with staff engagement. Staff should be involved in building the digital strategy. An organisation needs to live and breathe the co-creation philosophy. The organisation needs to include staff in the design of the design thinking concept.
- Management needs to hear the staff's perspective and take their feedback. How it impacts them is a caveat, where they need to include the user's perspective. With clinical equipment, there is evaluation, input, and then a final decision, but it does not appear to be the same with technology.
- If staff feel that they have a voice, then they will help direct some of the focus areas. Health service needs to bring cohorts of clinical staff collectively into a conversation at an organisational level.
- Health service needs to understand what they need collectively, vs. individually vs. departmentally.
- Communication should not be overdone. Meetings are held regularly in the clinical area. Regular meetings between clinicians and IT will be helpful.
- Staff needs to see things happen differently. Senior management should influence earlier and ensure the staff gets involved sooner than later.
- Customization of HIS will help the clinicians and will be able to improve clinician's engagement with technology.
- Management needs to give staff the resources that they need to do their job, and staff need to see some runs on the board. Management needs to make the strategic direction clear to staff.
- Collaboration and communication go hand in hand. Collaboration and communication at all levels of the organisation will improve staff engagement.
- Engagement is an ongoing cyclical process. A continuous approach to engagement should be followed.

5.2.2 *Technology use*

Technology use was identified as one of the core categories. Technology use and ICT use terminology is used interchangeably in this thesis. It was highlighted from the participant interviews that ICT plays a vital part in the delivery of healthcare services. Technology use was a dominant theme that was supported by sub-themes such as system design, ICT operations, information management, leveraging emerging technologies, agility, and platforms. Delivering the strategic intent of the organisation was dependent upon how the

technology was implemented and used by the clinical and non-clinical staff in the organisation. The following sub-categories were identified for the core category of technology use:

- System Design
- Platforms
- Leveraging ICT
- ICT Operations
- Information Management
- Agility

All the above subcategories formed the “Technology use” core category. Participants expressed some of the challenges under each of the subcategories which were required to be addressed for improving the technology use. The references from clinical, administration and executive management, from the regional and metropolitan hospital, is shown in Table 5-11 below:

Table 5-11 Technology use construct coding

<i>Regional hospital</i>	<i>ICT Use</i>	<i>Agility</i>	<i>ICT Operations</i>	<i>Information Management</i>	<i>Leveraging ICT</i>	<i>Platform</i>	<i>System Design</i>
Administration	271	0	81	53	70	0	83
Clinical staff	275	0	75	75	70	0	77
Executive Management	109	7	32	33	37	8	28
<i>Metropolitan hospital</i>	<i>ICT Use</i>	<i>Agility</i>	<i>ICT Operations</i>	<i>Information Management</i>	<i>Leveraging ICT</i>	<i>Platforms</i>	<i>System Design</i>
Administration	155	0	76	18	33	0	45
Clinical staff	278	0	94	67	46	0	121
Executive Management	116	0	40	29	29	10	39

5.2.2.1 System design

The system design was one of the critical categories that was identified from the data, which was impacting the technology use. This subcategory had 222 references from the regional hospital and 257 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Systems integration and systems usability were identified as critical issues related to system design.

Table 5-12 System design construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
System Design	222	System Design	257	479

5.2.2.1.1 Internal challenges for system design

Participants highlighted the following internal challenges concerning system design:

- We have an unsophisticated immature IT architecture.
- The department has a broader remit and is likely to choose an application that has a more extensive reach, rather than an area, and those systems might not be a perfect fit.
- There is a web of different systems and different processes. We start to do X and then do Y and then the next bit, the result is we end up with duplicate systems.
- There are parts of the system that we have not purchased, so we can't introduce the timetable that will help us with the scheduling.
- The systems are being particularly non-user friendly. The information is available in a non-user-friendly format, and it is difficult to navigate. Clinicians can't get the information that they want quickly. People site examples of tens of clicks to get to a single piece of information.
- We need to make sure that the interface for capturing clinical notes is not long and frustrating and move away from scanned medical records at some stage.
- There have been more issues with integration and some issues with usability. The main frustration is with the integration of the systems. We don't understand the complete functionality of what we have got because there are so many systems.
- The patient look up things on google, and some of it is correct, and some of it is not, and there is no trusted information site.
- There is an expectation from patients that we are providing more patient-centred information. We are still discussing what information should a patient have access to and how should they access their records, access myHealth record, and the patient portal.
- The capabilities of technology sometimes dictated the model of care. The model of care changes and the needs change, and the structure in HIS was rigid. It was sort of the tail wagging the dog. The adaptability of the systems to the dynamic environment as models of care change is important. The technology could not be easily changed to suit a more contemporary model.
- If the technology doesn't meet the needs of the clinicians, they will go around it. WhatsApp is a good example that is serving the need.
- Healthcare record is potentially complicated because we are bringing so many things together, we are trying to hang a lot of things to a single point, so the layering is going

to be complex out of necessity. There is an opportunity to streamline the initial user interface and bring essential factors to the front as soon as a user logs in and tailor that for separate units. The interface may be slightly different in neurosurgery or psychiatry and be able to customize that to some extent.

- HIS has come a long way, and it as a company is responding to our needs, but it is a bit clunky at times. HIS becomes quite complicated as you drill down to the individual patient level. If you sit down with the clinical informatics team, the initial interface can be quite streamlined. You wonder as you step down the layers like allied health information, weather that can be streamlined or not. We have a fragmented approach to scanned medical records, with HIS based products and PACS in Radiology.
- No product is going to be perfect to meet the needs of everyone.
- There is a lot of fragmented systems for clinicians to access notes and write notes. People still must document it and write it, and then it gets scanned into SMR.
- We don't have a sophisticated way of collecting data at the enterprise level. So, whenever we need to extract data for some planning, we need to contact a different range of people.
- We have quality and safety information that sits in one system, and we have clinical information that sits in another system, and HR and workforce information in another system. All the individual systems are fit for purpose for their individual needs, but they don't hang together from an information perspective. The finance system does not talk to rostering or HR systems. There are 3 or 4 systems for managing our workforce. So, people only get part of the data, or they get the wrong data.
- We have not kept up with the speed of what the consumer or the society wants. If patients are not empowered or not knowledgeable to pull out information, then it is problematic.
- At another hospital currently, they have no records to look up if the patient has been on a chemotherapy trial. We can't see GP's notes, and they can't see ours, we fax them or email them. GP's and hospitals have their software and are a bit reluctant to change. The pathology service can't see our record, and we can't see theirs. Patients are at risk when there is a delay in information from the hospitals to the GPs. Patients die across the transition of care, and we have as a nation accepted the risk.
- The organisation needs to be careful about using the hybrid model, i.e., some of the paper and some on different systems. If a patient cancels the appointment in the hybrid

model, then the whole process falls apart. There are risks to patients in using the hybrid model of patient care.

- Patient x-rays are only available in the system for three months, and if the appointment is rescheduled, then the X-ray disappears, and it undermines the care of the patient.
- We jump into a solution, rather than addressing the problems that we are trying to solve. We do not consider staff input or feedback in the solution design. We do not listen to staff requirements.
- The challenge is to transfer that is very abstract to very basic for people, so that they can picture what is coming.
- The patient-controlled record currently has a poor uptake, and it is relatively useless to the healthcare professionals. Patient managing their record is different to them entering their clinical information.
- Every service has slightly different needs. Each area has designed systems that fit their needs best. Pharmacy and Radiology have entirely different needs. The individual systems were explicitly built at that time. If we must build the system that is going to cater to everyone's needs, then it is never going to happen. We have adapted our practice to HIS as opposed to other systems that were built around clinician's needs. HIS is unwieldy. They are trying to fit US-centric clinical informatics into the Australian context.
- Expired medications in the system mask current drugs. The same information must be entered again and again while reordering blood tests. HIS was never fit for purpose. It cannot manage multiple episodes of care within a single admission.
- Bedside ICT interface in ICU continues to stymie workflow
- Old patient notes are entirely inaccessible, and it takes 15 mins to reconfigure screens. It takes a long time to log on, and if someone else pulls the card, then you have no access to the computer.
- The system should not interrupt clinicians at the point of providing care. Many people do not fill mandatory things in the new system. I am unable to locate the patient's emergency contact person. Important patient alerts are buried within HIS and not visible.
- IT does not seem to take stakeholder input. The user interface is very clunky and time-consuming.

- Some of the charts without a paper copy is often forgotten. New systems introduced are harder for staff to grasp. There appears to be constant change, and too much time spent looking at systems. Medical history is fragmented. There is only one screen when the clinician needs multiple sources of information.
- The systems are complex and do not easily allow for the change of medications at the bedside. Due to the emphasis on maintaining data input, patient care has become a secondary objective. The nurse looking after the patient is far more critical than scanning computer file.
- We don't have a good catalogue of documented ratified solutions, from which you could pick from. Every time you seem to be reinventing the wheel and starting from scratch.
- The biomedical equipment such as the ECG, heart rate monitor, blood pressure is all stand-alone and require data to be manually entered and transcribed.
- The solution does not work the way the salesman says it will.
- It is easy to articulate the benefits of one big goliath system, then trying to interface with multiple different vendors.
- There is a fine line between innovation and longevity, security and interoperability of systems, and integration with broader health services.
- There are 100 local IT systems, and 60 Enterprise solutions, the ownership of the solution is a problem.
- Patients have several identifiers across HHS, with the move to electronic health records, the patient should have a single id. There is no single identifier, so there is no one place where you can get all your clinical information to inform decisions.
- There are duplicate processes and consistent data integrity issues. In a day, patients with complications can have their data put in 5 or 6 different systems, and every time the data must be entered manually, and it costs clinicians time.
- The key challenge is how to integrate legacy and new systems. We cannot burn down the existing systems and start fresh, so the interplay is always going to be there. How to fully utilize the current systems is a challenge. How to have interconnectivity between the existing systems is a challenge. Some of the old legacy systems are difficult to link to the new systems.
- The HHS doesn't work together, and the systems don't work together.
- There are multiple systems provided providing the same of similar functionality due to integration issues.

- MyHealth record does not have all the information that a clinical record would have, so if a patient moves to different hospitals, there are multiple artificial handovers with multiple UR numbers.
- Every click lessens the chance of clinicians using the system. One integrated system enables building forcing functions for clinical pathways. The clunky systems, don't talk to each other are unhelpful to a clinician.
- People are still very hospital four walls approach and not a patient-centred approach.
- System design is an issue for clinician's acceptability of the systems.
- Patients can book an appointment with their hairstylist online, but they cannot make a specialist appointment.
- There is a gap in information between the primary care and the hospitals. If the patient were controlling their information, then we would be able to access both primary and secondary care information.
- Systems are not intuitive, and some of the data is live, and some of the data is not. Some functions can be performed in some systems, while others can't be performed. Some systems are hard to search for information.
- The usability of current systems is a challenge for clinicians. If there are more than two pages for a clinician to open, then you have lost them. Systems are confusing, and nurses end up doing stuff for the doctors.
- Every department is getting its own electronic health record. There are a lot of forms, which capture the same or similar information. There are 700 forms in the hospital. There are a lot of different systems and doctor coming in for three months is unable to learn all these systems. Pathology, discharge summary, imaging, mental health, maternity information, cancer care information is all kept separate from each other.
- A lot of money is wasted fixing problems retrospectively. There are a lot of workarounds in place with the current systems.
- When the departments integrate structurally, it leaves a gap in system integration.
- HIBISCS is an old and outdated system. The systems that we get from the government are ten years behind the current software and interoperability standards
- The current systems don't integrate well with the revenue streams. The information in the existing systems is not well summarized. The challenge with integrated system design is, different clinicians have a different aim.

- Older patients may have challenges in maintaining their patient records. Clinicians know which information is important to them, whereas a patient may not know that.
- Radiology systems are sometimes slow to load the images and import.
- Clinicians don't like to type information into the system. Everyone wants useful information from the systems, and it should be made easy to input information into the systems.
- Old systems have a lot of data in them, and it is complicated to extract data out of old systems as they are slow.

5.2.2.1.2 Facilitators for system design

Some of the key findings identified by the participants, which will enable improving system design in the healthcare sector are:

- Systems should be designed, considering the clinician's usability.
- Systems should be designed such that the information is available at the point of care, including diagnosis information, and everyone should be able to access this information.
- The majority of patients want to participate in their care. Part of the participation is having access to their records. There is a need to design systems that can bring the patient into their own care.
- It would be good to have third-party apps securely integrated in some way for patient care. The pathway that health services are on in terms of bringing patients and including them in their care will fundamentally change the way clinicians write notes because they will be much more inclusive. It will be a paradigm shift in taking notes once clinical staff knows that the patients will have access to at least an element of their clinical record.
- There are great things that can be done in the patient portal space by building interactive portals. The patient portal needs to be clear and straightforward, assuming people have different health literacy. There should be a patient portal within the hospital, where patients can access some aspects of their records. Patients should be able to self-manage their information as much as possible.
- Patients feel disempowered when they come into the hospital. A better job can be done at empowering patients. The patients need something different and not what is currently designed for the various individual groups

- People should be able to visualize what is coming in terms of technology changes.
- There should be a centralized run program where patients can provide consent to information, but not be allowed to enter complex clinical data. Doctor shopping and drug-seeking by the patients should be made evident. There should be a patient portal at the bedside in which the patient or his family can provide information access.
- Patient safety is at risk if IT systems do not talk to each other across different care providers, i.e., primary care, secondary care, and tertiary care. IT systems will have to be designed for integration between various care providers. The information should flow between primary, secondary, and tertiary care.
- The IT systems should be implemented that work for clinicians rather than going with cheaper options.
- Voice-activated scribes could help in the future for data capture. It will fundamentally not make things faster for the clinicians unless voice recognition becomes integrated for data entry.
- As a patient, being able to take the information with you is important. Discharge summaries, diagnostic test results should be uploaded into myHealth record so that that patient can take their information with them. The one system where we can all see, rather than one system which we all use is more feasible. For clinical information, a central system with automatic update of data, rather than patient-driven or healthcare driven is the best way to update information.
- As user interfaces and integration improves, things will get better. Currently, clinicians must search for bedside folder, electronic records by the bedside will be a significant improvement in technology use.
- Pathology has electronic records, 30 or 40 years ago, and the systems should be designed to store archived data, for an extended period.
- Understanding the data flows at to what happens during the patient's journey is critical to system integration and design. The patient interacts with various units until discharge, and then there may be ongoing care of patients. The systems should help with continuity of care where we have different doctors seeing the same patient.
- IT systems should be designed to provide better clinical outcomes.
- Clinicians need systems that are intuitive to be able to access the core knowledge and the core patient-related information quickly. Clinicians' brains think differently, and they are looking for different information.

- The healthcare system is currently designed to be paternalistic. Patients should be given informed knowledge and made accountable. It would be good for the patient to control some of the aspects of their health records, like booking appointments. The patient should hold the information and transmit their information, where they are going to participate in their care and well-being.
- The systems will have to be designed with different levels of clinician access to patient information. The outlay of design should be user-friendly and should address clinicians' needs.
- The patient needs to be involved in the system design, and their requirements will have to be considered. The system will have to be designed for patient interaction, especially using smartphones, mobile devices, and tablets.
- If patients can update the systems, it will be of enormous benefit to the clinicians and admin staff. The design could be hybrid, about letting the patient maintain some of their information.
- From a usability perspective, systems could have a different summary tab, for example, cardiology, respiratory, endocrinology, radiology, pathology, and blood test. Having one portal with all information streamlines patient assessment. Frequency and familiarity of the system, make the system easy to use.

5.2.2.2 Platforms

Platforms was one of the key categories that were identified from the data, which was impacting the technology use. This subcategory had nine references from the regional hospital and ten references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Health services having standard digital platforms for infrastructure delivery, which was quickly configurable and interoperable improved technology use.

Table 5-13 Platforms construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Platforms	9	Platforms	10	19

5.2.2.2.1 Internal challenges for platforms

Participants highlighted the following internal challenges concerning platforms:

- The staff doesn't understand the department of health's support for different platforms and how they interface with the business units.

- We have platforms where interoperability is less. Different HHS do not talk to each other with the transfer of patient information.
- There is a lack of capability around the executive level and the technology level around what robust technology platform is required to support the hospital.
- We all run on localized infrastructure, and healthcare networks are not joined up well.
- A lot of vendors indicate they have seamless data flow interfaces, but they don't have it. We shouldn't be hitching our wagon to a single vendor.
- Currently, there are no national-level legislative policies that govern digital platforms.
- The magnitude of the digital platform at the national level will be enormous.
- There will be a heavy reliance on the digital system, and it will be a risk if the digital platform fails since staff will be used to digital systems.
- Rural sites may be disadvantaged if they are unable to use the digital platform.
- It is a challenge to identify which technology or which company is the best suitable for digital platforms.
- The interoperability of systems and having the right middleware in place for interfacing with different systems is still a developing segment for integrated platforms.
- Having a standard digital platform across the geographical reach is a challenge.
- The ability of smartphones and how the patient interacts with the information from their computers and smartphones are underestimated for mobility platforms.

5.2.2.2.2 Facilitators for platforms

Some of the key findings identified by the participants, which will improve platform support in the healthcare sector are:

- In the 21st century, since all hospitals are slowly moving to digital, having a standard digital platform becomes evitable. Standard digital platforms must be built, which is reliable, secure, and accessible to clinicians. The digital platforms should be accessible to the patients.
- The digital platforms should make the information accessible at the point of care for the clinicians.
- The digital platforms should be flexible in terms of models of care change.
- Digital platforms require interconnectivity between systems. Digital platforms should allow for data interoperability. The digital platforms should support data interoperability and systems integration between multiple vendors.

- Digital platforms should allow greater sharing of data between different health service providers.
- The digital platforms should provide seamless interfaces for information flow.
- There is a need to become platform agnostic and more cloud-oriented and worry less about infrastructure barriers. Move to cloud services and cloud-based activities will provide more impetus to data sharing.
- IT should understand the business needs so that they can build the right platforms.
- There is a need over an overarching legislative principle around which the digital platforms are built and governed. The digital platform should address security and confidentiality issues.
- The digital platforms need to be accessible to the regional areas and should have the geographic reach.
- Digital platforms should support a standardized approach to operations management, information management, and application management.
- Financial support should be provided to roll out the digital platform at the national level.

5.2.2.3 *Leveraging ICT*

Leveraging emerging technology and innovation was one of the key categories that was identified from the data, which was impacting the technology use. This subcategory had 191 references from the regional hospital and 128 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Fostering innovation within the organisation, keeping technology updated in line with the technology changes and how it is used outside of the workforce, such as, social media, WhatsApp, and using technology to enable clinicians to improve clinical outcomes were identified as important to enhance technology use.

Table 5-14 Leveraging emerging technology construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Leveraging ICT	191	Leveraging ICT	128	319

5.2.2.3.1 Internal challenges for leveraging ICT

Participants highlighted the following internal challenges concerning leveraging technology and innovation:

- Data and technology are essential for innovation. We need to put the house in order before we start looking at innovation. Some of the existing systems at the hospital are outdated. We are running services on the Access database, which has the risk of failing.

- People end up passing the IT system because they don't get what they want from it. Staff use applications like WhatsApp, because there isn't a problem solved elsewhere. If IT fundamentally does not meet the needs of the clinicians, they will go around it.
- We need to understand the model of care and how clinicians' practice, so that the devices and access points meet their needs. Things need to be simple, like writing on the iPad and not bug people with carrying trolleys for computers.
- AI technology is not there in a way, which is affordable and accessible.
- We always don't have the money for innovation. We need to get better at doing the proof of concepts, getting the idea up and tested much more quickly. We need to capitalize more on the funding that has been put up by the department and CSIRO.
- We are still reliant on personal computers, and we need to move into the space of mobile devices, smart solutions, and smartwatches much more quickly. Everyone has a smartphone, and we expect our staff to share a computer between 4 people. Society has rapidly moved, to what people do personally in their lives to what we offer them in our environment. We have a generation that has used only a touch screen and social network to communicate, and we cannot ask them to go back and complete stuff on paper. The solution needs to be congruent with what is available in the rest of society. You cannot have someone operating the computer, i.e., CoW's all the time, rather than being able to flip a chart.
- Consumers who spend a lot of time out of the workforce in society have very different expectations.
- We can probably be getting more out of things like Skype. Some systems are not utilized to their full capacity. Technology such as smartphones, Skype, and video conferencing should be used more. Some of the technologies, such as SharePoint are not used to their full capability. Existing systems are not used to their full capacity, and some staff doesn't know what systems are available.
- Innovation is not very well understood, and we don't have a robust approach to innovation. We fund capital projects, but no approach to innovation. The clinicians and not the administrators have driven some of the innovation.
- With the changing conditions of staff, it is hard to implement technological innovations.
- We are still using an unsupported Win XP operating system. We do not have access to google. Access cards were given to me when I was at school. The IT products that we

are using are inferior. We cannot open documents that are sent from collaborating institutions due to outdated software.

- We are looking at incremental improvements, rather than a dramatic culture shift. I am not aware of a technology that would make a dramatic change in the workplace in Radiology. We are constrained by what is possible from the software.
- We are at the start of the learning curve. We need someone who can apply the technology expertise to a clinical situation. Most people believe that the smartphone has been around since 1995.
- Patient notes are becoming outdated. When progress notes go online, clinicians will have to wait until the previous clinician has completed his task.
- We put up with it, even though we are not entirely happy with it. We have problems printing prescriptions, so clinicians have given up and written the old-fashioned way. Prescriptions do not print well.
- The consultant spends, 80% of the time typing notes, and 20%, looking at the patient. The treatment options are varied, and every patient is different, so relying on technology can sometimes add time to the clinician's work.
- They were talking about electronic referrals 10-15 years ago. Being lagers in technology is costing us money.
- We need to bring in best practice into the hospital, as opposed to running it as a big bubble. IT has consolidated back to less leadership and more operations. A lot of IT's time is wasted on resolving conflicts between the people who own the equipment, telling them what not to do, like streaming videos. IT needs to work with technology like the old scanning machines which are 20 years old and the newly introduced technology.
- Most doctors use Macs and not PCs. Doctors want video editing, imaging to work, and they are not interested in PC vs. Mac discussions.
- Business intelligence and reporting technology connecting various data sources are not available.
- There are still legal protocols in place which states that particular treatment can be only delivered by a clinician and not AI. A lot of technological solutions must be TGA approved for the legal side of things.
- It is difficult to show return on investment on technological expenses. The technological innovation side of things is challenged in Health service, and we are in maintenance

mode. The timeline around what can be achieved with technology is mismatched. Daily operations take priority over innovation. We end up using a lot of physical resources because we don't use technology well. The ability of mobile devices to assist has been underestimated in healthcare.

- Picking the right long-term solution is a challenge to healthcare. It is always a fine line between innovation and longevity, security, and interoperability.
- The information in the technological solutions will have to be continuously updated and kept current; otherwise, it may put the patient at harm.
- It is tough for small innovative vendors to get a market share since the world thrives on prominent vendors, for example, Microsoft.
- Innovation is contingent upon having the right skills, the right infrastructure, and the right framework in place for the future. There is a lack of serious R&D funding by the government in healthcare. Private organisations incentivize to be adaptable. The current model of care is a barrier to innovation. Currently, there is no process to support technology innovation in healthcare. Individual business units have developed systems to meet their own specific needs. There hasn't been a single coordinated effort.
- The use of digital systems put reliance on technology, and workaround needs to be figured out in case of a disaster.
- The community needs to have confidence in the technology that is being used.
- Sometimes the system is inflexible in using technology and sending doctors or nurse practitioners to the location where the patient is.
- The young generation would prefer to be paid for the work that they do on innovation.
- Nurses don't know what they don't know if they have worked in only one hospital. Doctors may put limited effort into learning about computers. There is no point in having an electronic record if the doctors are going to handwrite notes and scan it into the system.
- Technology is behind times in some hospitals. Technology needs to be kept updated so that it does not get outdated.
- Technology does not always make it better, and sometimes, it makes it worse. We don't know if better technology is out there. Sometimes for what we are suggesting, technology may not be out there in the market. We will not be surprised if there are systems that exist and gives us useful information, and we are not aware of it. We don't know what we don't know.

- Once the key champions who know how to use the system move on, it gets forgotten about.
- People are humans, and they like to connect and talk face to face.
- Technologists and managers have very little insight and knowledge on how the clinicians work at the ground level work. The manager doesn't have clinical insight like an ICU boss or a surgeon. There is a lot more that can be done with the technologies that are out there.
- Innovation capabilities within the existing staff are not harnessed. Newer technological concepts need to be embedded in the organisation. Some unwritten ground rules need to be broken. With vibrant, interconnected societies, people need to be more open to ideas. The attitude of people needs to be changed to support new technologies.
- We are not using the technologies that the customers want us to use.
- Digital change is a cultural change in how people operate. Nursing staff doesn't have a lot of access to computers.
- It feels like there is a system for everything. We seem to be data-rich and information poor. A lot of time is wasted transferring data manually between the systems. We are not doing a lot more with all the information that we have.
- Managers expectation of reports exceeds the capabilities of the system. Sometimes the expectation of the system exceeds the capabilities of the system.
- The older generation of staff are very technology averse.
- The same product in 2 different locations can look completely different. In a region which is very geographically diverse, it is challenging to implement the required technology at all site
- If you are a lone voice, the idea might fall into deaf years. The innovation group needs to be inclusive across the organisation.
- People sometimes need something tangible to work with like actual books, rather than read eBooks. There needs to be a balance between things that change and things that don't, hybrid. People are very transient.
- There are barriers to using innovative apps. Health services not innovative enough, because they cost money to innovate. Trial and error sometimes cost money. Senior management does not have enough faith in the team underneath.

5.2.2.3.2 Facilitators for leveraging ICT

Some of the key findings identified by the participants, which will facilitate ICT innovation in the healthcare sector are:

- Doctors pursue excellent knowledge of ICT in their areas of interest. Doctors are principled, logical, scientific thinkers. The organisation needs to bring in technologies, that will help patients. IT needs to know what technology the doctors are interested in and bring in that technology.
- Having all patient information under one portal or one location should be the aim.
- Innovation needs to happen in health apps, education apps, and in patient controlling their data.
- Entering data into the systems should be a 3-way conversation between the system, patient, and the doctor, rather than having the back to the patient while entering data.
- The organisation could do much better with mobile digital technology. Healthcare is not very good at reaching out to its customers. The future is all technology-based, i.e., telemedicine to offsite patient monitoring, to diagnostic evaluations.
- We need to empower people to bring ideas to the table. We cannot underestimate the power of champions or leaders coming up with all those ideas.
- Technological innovation should be funded as a strategic priority by Health services so that some of the technology advancements and enhancements can be implemented.
- Health services need to build capability in what is possible. They need to develop capability in leadership and innovation. Working with corporate organisations who have got funding for innovation has been a successful model for Health services. There is a bit of innovation that comes through research.
- Health services need to note that people will make mistakes. They need to be providing an environment to take safe risks.
- The diagnosis is pattern recognition. Artificial intelligence may complement some of what clinicians do today. AI could be able to do a scribe's role in the future. AI could assist in decision support and decision assistance for a clinician and where it is a filtering mechanism.
- Innovation comes down to how can health services find a clever workaround or a solution to a problem. A lot of innovative solutions are technology-based, data-driven, and driven on research. Health services need to leverage the learning of other people

who have successfully implemented innovative solutions. Big data technologies should be leveraged for data-driven research.

- Some of the benefits of technology are, they have enabled the clinicians to view the radiology information from anywhere. The phone app seems to be an excellent way of having information available anywhere.
- Scanning notes work well rather than typing notes. Doctors don't type very well. It will make things faster if a clinician can dictate notes, rather than type it. Some health services have employed scribes to work alongside doctors. Voice recognition and automation could assist the clinicians with a lot of menial data input and admin tasks.
- Clinical informatics has a lot of potentials. Health services need to bring patients into their care. Including patients in their care will fundamentally change the way clinicians write notes. As the integration and interfaces improve, patient care will get better.
- Innovations have been currently implemented based on clinician's needs, consumer needs, complaint data, frustrations that people have with the system. Innovation should be driven by the organisation with a framework around driving and implementing innovation.
- Health services have strategically partnered with Telstra, CSIRO to work on innovative projects. There is a potential to lift and spread innovative solutions across the industry.
- Health services have got less money, so they need to be more innovative.
- Health services need to be able to leverage the principles around the use of data, research, technological smarts that are used for creating innovative solutions.
- Innovations like ordering medical investigations will improve efficiency. Online clinical notes and clinical photography would provide significant benefits in terms of efficiency and reducing errors. Leveraging ICT using HR reports is also useful.
- Health services need to incorporate information technology to provide the best patient care. Technology will enable doctors in critical decision making.
- There is a lot of opportunities for technological innovations such as patient data control, health apps, education apps, the patient being able to book their appointment, and a single portal for all information. Education apps enable school-based nurses. Health apps help in educating patients.
- There are innovation opportunities for providing health literacy. There are innovation opportunities for doctors being online and being able to answer some of the patient's questions. Health informatics can help with educating and compensating the public.

- Online trusted resources can enable a clinician to keep their knowledge current. There is a lot of information on the internet, but there is no validated and verified site where the patients can refer to information.
- Digital is more than electronic health records, and it is digitizing the process such as patient admissions. IT will be an enabler for providing outcome-based care and for augmenting technology with nurse practitioners. Technology will change the model and delivery of care. Work can be productive by adopting new technologies. Technology can stop human errors.
- Algorithms and AI will keep the patient safe by helping the clinicians with their decisions. Guided prescribing would help cut down errors by junior doctors. Innovation can be used for automated prescriptions to patients using biometric authentication.
- Mobile devices and devices permanently at the bedside can help clinicians immensely rather than always having to go back to a central location to update data. Mobile devices with bedside monitoring and sending live biometric data will assist the clinicians.
- Live monitoring of activity will help the hospital administration rather than receiving reports once a month.
- Technology should be made a bit more personable and entertaining and congruent with the expectation of society.
- Booking a specialist outpatient appointment from the GP practice will help the patients.
- Telehealth opportunities can help treat patients remotely.
- Technology can help community health workers do their jobs more efficiently by redeploying them, where they are needed more quickly.
- Technology can help in seeing patients quickly, rather than getting their records faxed over from other places.
- Clinicians get lost when there are too many clicks to get to the information that they need.
- Innovation makes efficient use of things that are already available.
- Innovative models of care must be leveraged, where traditional models cannot be built. The model of care must be contemporized. Young generation clinicians need modern technology.
- Technology enables the clinicians to take their office with them. Robotics and telehealth will enable clinicians to perform operations from a distance.

5.2.2.4 ICT operations

ICT operations were one of the key categories that were identified from the data, which was impacting the technology use. This subcategory had 200 references from the regional hospital and 265 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. ICT infrastructure issues, ICT process, lack of facilities for computers, and Service desk issues were impacting technology use in healthcare.

Table 5-15 ICT operations construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
ICT operations	200	ICT operations	265	465

5.2.2.4.1 Internal challenges for ICT operations

Participants highlighted the following internal challenges concerning ICT operations:

- The critical issue is the ICT infrastructure. It is hard to leverage the benefits if we don't have the fundamentals like infrastructure in place. It is a lack of fit for purpose equipment. We are not going to pull off the new stuff with the existing infrastructure. With the WIFI's, we were constrained by the internet coverage.
- We could not save an Excel file.
- People are continually calling the help desk and complaining about various things. We called the IT help desk, and they said we couldn't help you and we need to be on the waiting list.
- There is a web of different systems and associated processes. We don't have a fully electronic medical record. Hence, we seem to have duplicate systems.
- We pay our staff, and everything else is manual in HR.
- We are not enabled through our technology. There is no way of forecasting the workplans. We are over-servicing in the wrong areas. Nothing is connected to the business units. Just the basics aren't there yet. The technology is not up to date with the work that needs to be done. There is a breadth of people who work across health services; for some people, it is just getting the basic stuff working. We need to have the essential thing and start building on that. There isn't enough hardware, and we are trying to move towards an IT solution. There aren't enough computers.
- It takes 5 mins to get the computer up and going. The systems are slower and less responsive as more and more clinicians access the systems. We have old hardware that

makes the current applications run slow. We are behind in hardware and software upgrades.

- Each area tries to develop their type of scheduling, and then we end up doing it manually in Excel.
- Cost seems to be a significant barrier to IT infrastructure.
- There is an assumption that people have their computers and everything is setup.
- The technological system must be capable enough to handle sophisticated imaging. There should be enough network bandwidth to handle technical equipment. In radiology, images are not coming up with enough clarity.
- We need to get data from different sources to ensure that we are making the right conclusions, and it is a very erroneous process.
- We are still using paper slips in outpatients.
- There are barriers around people using their own mobile devices like tablets. There are hygiene and confidentiality issues with sharing devices.
- There is an inadequate scoping of IT projects. Assumptions are made around staff and patient workflows on how they work during project implementation. The fully integrated understanding of how patients get booked, arrive, and undertake surgery is not understood. Multiple arms feed into how a patient is being placed into Surginet.
- We have some elements on paper, and some are placed electronically, and the two are meant to come together to proceed with patient care.
- The end to end workflow of how we need to function in a system is not understood. The current HIS has gone the other way. This is the system, now how can we work with this to use it in our hospital.
- Bedside ICT interfaces in the ICU continue to stymie workflows. There are dual systems used for managing ICU staff.
- The log on takes a long time, the system is slow, and Wi-Fi is not accessible.
- We had to go to great lengths to understand who in the hospital fixed the computer on wheels. People get fatigued trying to address these things and carry on.
- We must manually ring GP and other hospitals to get the notes sent over. Following the death of patients on Warfarin, most hospitals now ensure that they send out a separate note on Warfarin. We don't have the IT infrastructure for the GPs to read our notes.
- When contacted for patient information, the requested information goes to communal fax and then to patient files.

- There are annoying little things like downtime. There are computers in the ED, which are on 24 hours a day, without updates. The lack of devices is also due to the lack of space to put computers. Most of the computer has insufficient space. We are using hardware and software that is now unsupported.
- There is no out of hours IT support, and the hospital operates 24 by 7. The computer and printer issues are not fixed in a reasonable amount of time for remote locations. We don't get a response when we have had problems with access cards. Each CSU should have its own IT specialist to go to when experiencing issues. We must go through multiple people to get the right level of expertise.
- Senior management does not have a great deal of confidence in IT.
- Many computers will not accept the security card login. Most of the care is documented late as we have no access to the computer.
- There should be one program, instead of Medtrack and HIS
- ICT and front-line processes are poorly aligned. More thought needs to go into the impact of ICT on processes.
- Whenever I need help, IT takes a long time to deliver. Ongoing technical problems make work more difficult. IT provides a hopeless service in response to assistance.
- Letters in the keyboards are missing. There are several instances when computer systems are not available or when it crashes. There need to be improved computers to staff ratios. Bedside computers are inadequate for the job.
- Having to use one computer means medical staff cannot do two things at the same time, change medication and order investigations. The computer needs upgrading and better access to printers. Average computers are not equipped with better sound. Internet Explorer's version is outdated for video delivery. There are ongoing issues with the printer setup. ICT is blocking content delivery such as YouTube.
- There is double or triple documentation when we are working with hybrid systems. There is a requirement to map what staff and patients do and where can systems be integrated. There is a lack of input on the process from the ground level to IT.
- There is a lack of space within the hospital for IT infrastructure and desk space.
- The system gets entrenched in the business that it is hard to replace. The old Patient administration system was put in 25 years ago, and it has a lot of data. Multi-million dollars will have to be spent on replacing the patient administration system.

- With IT infrastructure, Wi-Fi is a challenge since it is used in a lot of devices for patient telemetry. Wi-Fi needs to be denser, i.e., clinical-grade and needs to ensure that there are minimal black spots within the hospital.
- There is no good catalogue of a ratified solution, and it seems like they are reinventing the wheel every time.
- There are long wait times at the Service desk. There is limited troubleshooting at the service desk, and a call is logged to the vendor, and there may be a delay in call showing up in their queue. The help desk team doesn't have the continuity with the work assigned, and sometimes it breaks down in the middle.
- The devices need to be portable or placed permanently at the bedside, and clinicians don't have to drag the device around. There is a lack of computers and devices for clinicians to access, like the lack of computers at ED bays.
- Biomedical equipment's, for example, ECG is now stand alone.
- With shadow IT or IT is running in parallel within the business units, clinicians can quickly put an app together, but the solution will have to be TGA approved. Otherwise, it is putting the patients at harm.
- There are 100 local solutions and 60 enterprise solutions.
- There are infrastructure challenges in going digital, i.e., a lot of the servers will need to be upgraded dependent on technology.
- Upgrading infrastructure across the wide geographic spread is a challenge. Certain parts of rural Queensland have no telephone signal. Getting a digital landscape across the geographical reach is a challenge.
- There needs to be the right IT framework and the right IT skill sets. Redesign jobs and skills is an opportunity and a challenge.
- When you are building the IT platform, you will have to think through the interruptions that may come in 20-30 years, since the infrastructure needs to be built to at least a 60-70-year life span, this is more art than science. The sheer enormity to support all the systems nationally is massive.
- IT can't stand alone without infrastructure, and there is severe competition for capital investment. Having IT infrastructure at the broader regional areas will not justify the cost based on the population.
- Knowledge of the existing digital process is a challenge. The clinical delivery processes will change with digital.

- The systems are not intuitive, and they do not follow the same clinical process. The processes, for example, in outpatients, are quite complex. IT and Clinical processes are disjointed between multiple systems.
- There is a manual and artificial handover of patient records. There is no single record of what are all the systems available, and which systems talk to each other and who is the owner.
- It took a week to get the printer port activated. Brisbane logs a job for the region, which takes time to get the IT issues resolved. It took nine days to reactivate the user account. If we call a local vendor for printer support, they come in straight away, whereas if we call IT, they may take a few days.
- IT systems and computers are slow, and it makes clinicians time unproductive. There is no resolution to slow systems, they say we will be given new laptops in 6 or 9 months, and that may make the system fast again.
- The computers are old and do not keep pace with changing technology. Sometimes, we don't get emails for 2 hours. The old phone system does not talk to the new phone system. Wireless headsets, sometimes drop out.
- IT is quite slow to respond. The printers are old, and there are insufficient printers. Video conferencing applications are beginning to take more network bandwidth. Network bandwidth is an issue for video conferencing. Things that are old and get used a lot and needs to be upgraded. Essential equipment like headsets is sometimes not available. Mobile or internet network cannot be connected easily. Wi-Fi does not connect properly and keeps dropping off.
- The service desk is not quite aware of what they are doing, so it may take a bit longer to respond. The service desk seems to be spreading thinner and thinner. We got to go through a lot of filters to reach the Service desk. Sometimes ServiceDesk has closed the jobs without completing it.
- Sometimes it is just easier to call the local IT to fix the system, rather than dial the 1800 number. Jobs generally get completed, but not within SLA timeframes. Sometimes we must log multiple jobs for the same issue. There are long wait times at the ServiceDesk. People who call the service desk are not very knowledgeable. The service desk sometimes does not complete the job correctly and close the job, and a new job needs to be logged, while the previous job is not completed correctly. Sometimes it is an

overkill of the process to log jobs for everything. The IT service desk sometimes does not understand what is needed.

- There are specific applications that are only used at the regional hospital, hardware, and software upgrades for those applications become a challenge.
- Some clinicians don't have the equipment to take with them, and they must come back to base.
- Sometimes it is challenging to get straight answers from IT. Some of the IT applications like STATA cannot be used, and there is no support for that application. There are technical issues in utilizing video conferencing facilities. The staff doesn't know how to use the existing systems, and there is not a lot of support out there internally.
- There is a disparity in how fast we can move with some internal systems, external systems, and the platforms available to us. Sometimes it can be a week before we get our IT request serviced.
- Some applications are managed by internal business units rather than IT. Sometimes it is personality issues.
- IT is unclear about the requirements of the business units.
- For the breadth of work that is done in health service, they will always have to use multiple systems.
- It has taken time to improve the workflows and make the system more user-friendly. Some clinicians do not know what process to follow between multiple non-integrated systems. IT systems are disjointed to varying degrees with the process flows.
- Some of the IT position is part-time when it should be full time.
- It is cost-prohibitive to acquire additional infrastructure like the servers. There is a capacity issue with the storage of documents. Old technology which has not been upgraded slows you down. Outlook application has capacity issues. Doctors don't have the server capacity to store images, so they save it on their local desktops.
- Clinicians must wait for a computer to be available to do their documentation. There are not enough computers. More mobile devices will save clinicians time in the ED instead of having to go back to the computer and type notes.
- The information available on the intranet is not updated regularly.
- There is a lack of process knowledge with some staff. We are using our processes which may not be up to benchmark. There is a duplication of processes in the IT systems, and there are gaps in some clinical processes to the IT system process.

- With the advent of technology, more work has been pushed down to staff and managers.
- Some of the new software solutions are not compatible with old hardware.
- Infrastructure is a huge cost implication.
- Staff who don't use IT as part of their roles have difficulty accessing the IT systems and the information. It sometimes takes up to 4 weeks to get the access pass and access granted to IT systems.
- Some of the processes are long-winded, and it can take 3-4 weeks for approval.

5.2.2.4.2 Facilitators for ICT operations

Some of the key findings identified by the participants, which will facilitate improving IT operations in the healthcare sector are:

- ServiceDesk is paramount for continuing care to patients. Service desk support needs to be 24 by 7. Service desk skills and turnaround times should be improved. SLA's and OLA's must be monitored for job handover and job completion. The structure and skills of the Service desk should be reviewed and improved.
- Wi-Fi infrastructure should be improved to support clinical-grade devices. Network bandwidth must be reviewed for video conferencing devices. Patients should be allowed to connect to Wi-Fi. Staff should be allowed to connect to the Wi-Fi and work from the ward.
- IT processes are not aligned with clinical processes, and this renders the IT system unintuitive. Clinical and IT workflows should be reviewed and aligned. It is a smart approach to involve clinical staff in the design of the IT workflows.
- Issues with lack of devices, unsupported technology, and software, lack of enough computers for clinicians to be able to perform their tasks should be addressed.
- The usability of IT systems will have to be improved so that the clinical workflows are smoother.
- Infrastructure issues across the wide geographic spread need to be addressed using standard digital platforms.
- Lack of physical space in the hospital for computers is a challenge. Technology space should be part of the clinical space. Facilities need to be reviewed and planned to incorporate technology space such as computers, mobile devices, and servers into the clinical area.

- Technology can free up clinician's time for patient assessment. The right technology should be implemented in consultation with the clinician.
- There needs to be clear thinking about the IT systems that we are going to have in 10-15 years, and technology service delivery should be planned to support the long-term objectives.
- IT systems are slow, performance issues with IT systems should be addressed. Slow IT systems make clinicians time unproductive.
- The right framework should be implemented for IT Operations management with the right technical skills who can support the clinicians.
- Only some clinicians know what to do when there is a system outage. Business continuity plans should be developed to address unexpected system outages. All staff should be trained in operating business continuity plans in case of a system outage.
- More holistic IT solutions for working with and managing clinical workflows should be designed and implemented.
- Routine maintenance visits from IT to the clinical areas will benefit the IT department in understanding the technical issues that the clinicians are experiencing and their technology requirements.
- Partnership opportunities should be explored with NBN to utilize the broadband infrastructure for building standard digital platforms.
- Satellite centres with capable infrastructure will have to be built to address the issues in the regional areas.
- If there is one system to do everything, then it must be very well maintained. It is having systems aligned and integrated will benefit the clinicians. Open interfaces will have to be developed and used for system integration.
- Clinicians should be assisted in timely with technological issues and innovation. IT should support to clinicians in technology-related innovation, such as supporting the development of web pages and mobile applications.
- Better document management systems can help in managing the size of emails and version controlling of the documents.
- All the existing systems should be catalogued with their owners identified.
- A chatbot could help in speeding up some of the service desk issues. Process automation bots can assist with some of the data entry tasks performed by the clinicians.

- Bureaucracy and red tape should be removed from process workflows. The approval workflows should be simplified.

5.2.2.5 *Information management*

Information management was one of the basic categories that was identified from the data, which was impacting the technology use. This subcategory had 189 references from the regional hospital and 142 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Privacy, security, confidentiality, access, and data integrity issues were some of the key themes identified with information management in healthcare.

Table 5-16 Information management construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Information management	189	Information management	142	331

5.2.2.5.1 Internal challenges for information management

Participants highlighted the following internal challenges concerning information management:

- There is lots of information from various data sources, and it becomes a challenge to put that information into the strategic plan. It becomes difficult to analyze what type of funding is available for each category, for example, there is workforce data, incentive data from the federal government, and there are multiple training hub pathways with education providers.
- There is a lot of data, and it requires assistance to interpret the data and generate reports. Business managers should be able to go in and easily extract the data that they need. Clinicians look for clinical reports and management may look for financial reports and the two may not necessarily line up.
- Clinical staff until now have been only focused on patient care and not on capturing data into any electronic record system. Clinicians enter fields into the system, not knowing where and how will it be used. It may be a challenge when we require patient information in real-time, as clinicians don't see entering data into the systems as part of their job.
- There are security issues. Security is a concern and a challenge. Security and privacy are a key barrier in making the information available to other partners and providers. The level of security required to data, i.e., commercial in confidence adds a layer of

complexity to data sharing between private providers and other healthcare entities. There could be security issues when the data is being manipulated manually.

- When people leave, sometimes the access to the system continues. Locums sometimes use other junior doctors' access, and this is a security concern.
- There are lots of forms, and some data is kept in word directories everywhere. Emails are used to share documents, and there is no document management system.
- There are security concerns with using an unsupported operating system like Windows XP.
- Information is held on non-clinical servers. There are security issues across the network. We have generic passwords, and this is a security risk.
- Some recommended apps cannot be installed on the computer due to security concerns.
- Backward compatibility is a difficult demand to address in security.
- The legal side has not caught up with data sharing protocols that should support innovation. Legal requirements have not caught up with the digital age. There is a lot of stringent requirements around storing patient data, retention of patient data, and access to patient data. It requires storing patient data for at least 80- to 85 years. The confidentiality of data is a concern. Some of the policies around the information are stuck in the dark ages. Information needs to be shared without breaching medical, legal, and privacy laws. There is a need for some relaxation with the policies and procedures concerning data, which needs to be driven at the Federal level. Protocols for communication of patient information between clinicians need to be defined.
- Privacy, confidentiality, and security of data is a concern when clinicians use mobile applications such as WhatsApp or Gmail to share clinical data. When communicating using apps like WhatsApp, the privacy of patient information is important. Now people just, SMS images on a smartphone.
- The only a narrow range on BYOD devices is allowed. Information needs to be securely accessible for a different suite of mobile devices.
- The information needs to be flexible in terms of models of care.
- There are internal clinical reporting requirements and state-wide clinical reporting requirements, but this is not standardized. There are data analysis and reporting team, who create the reports, but healthcare is very data naive, and there is a lack of skills in this space. The focus has been primarily on patient care and very little on data analytics.

- Some of the reports are currently generated manually once a month. Data in some of the platforms is live and, in some platforms, it is not, so the systems are not very intuitive. Some of the data is stale, which is not very useful and can be detrimental. Data is not integrated with all systems and applications. The important or the key data may be missing when the data is transferred between systems. There are data integrity issues due to duplicate processes.
- The key patient identifier, i.e., the UR number alters between hospitals, health services, and the state.
- The systems are not standard across different hospitals, and doctors make errors while entering data into these systems. Doctors rotate and sometimes are only there for three months. Human errors are made during the data entry process.
- Health service is probably ten years behind the data interoperability technology that is currently available in the market. Inter-operability of data between systems is a key challenge. The data does not flow between the systems in the same hospital, forget the data flowing between health services. ED does not know if the patient has visited mental health and vice versa.
- There are too many systems and too many user names and passwords to remember. Clinicians sometimes cannot remember their user name passwords and will not be able to log on to get critical patient information. If we can't get on to the system, then we cannot work. Waiting for access to different systems can be time-consuming. Not everyone has access to all the systems. Not every clinician knows, which are the systems that he will need access for, there is no one-stop to go for all information.
- Clinicians do not get timely access to all information. Some clinicians have nine different logins. Access to systems takes time, and this has impacted staff productivity. It is getting access to multiple systems becomes hard for locum staff. Access to the systems, can some time prevent the staff from getting crucial reporting data. There are several systems that we need to log on from an operational performance report point of view. It takes a long time to log on to systems, and sometimes the users are unable to log on.
- Data integrity issues have been identified in the ICT systems. The data is not consistent, and there could be multiple sources of truth.
- There will be data inconsistency and errors when comparing the two different systems. Data duplication with multiple names is a challenge and a concern. Currently, there are

paper-based systems, which makes it extremely difficult to extract information. Sometimes patients provide incorrect information to health service providers. There are data integrity errors with the recruitment systems.

- It is tough to search for information in QUIPS, and the information is not complete and current.
- Entering data into multiple systems is duplicate work and waste of clinician's time, and sometimes the key information will be missing. Data is only as good as the person inputting it, and that is an issue.
- Fatigue or the sheer volume of documentation can lead to data integrity errors. Good document control is missing, and someone can accidentally delete information. Some of the old information gets deleted, and it is impossible to backtrace them. There have been issues in the differentiation of one clinician from another in some systems.
- Sometimes the decisions are made locally on how to record information. There is no standard to capture data input into different systems
- Because the data is not presented live, by the time it is being reported, it has changed. There could be data integrity issues because the data is taken and is manipulated for the reports. Lack of systems integration causes data integrity issues. There have always been pockets where the information has been unreliable.
- Information is not recorded entirely in the clinical systems, leaving gaps in the data. There is no tracking for data omissions in the EHR systems. Duplicate data is recorded manually and in multiple systems.
- The UR number can be accessed in some areas of the system but cannot access certain other areas.
- Information standards are not considered during the merger of health services, i.e., drug and alcohol, with mental health.
- The data available is not in a user-friendly format. It is difficult to access and navigate information. There is an abundance of information available. We have not used our data to make better business decisions and manage performance.
- The state needs to play a leadership role in defining the information management framework. The state needs to help individual health services navigate the legal.
- We are in breach of privacy, and everybody can see everyone's performance data, immunization data. The basics are not there yet.

- The patient record needs to be secure. Privacy issues need to be resolved with access to patient information. Patients should be able to access their healthcare records and maintain a portion of their records. Sensitive patient information needs to be protected.
- We don't have a very sophisticated way of managing data at the enterprise level. We have a lot of data that is being collected in various formats. There is a lot of data requirements that we need to submit to the government. Some of the data is held in people's computers.
- We spend a good amount of time trawling through the data, to get the right information that we need. Information needs to be meaningful for a widely disparate group of audience.
- We need more discrete data from a different lens to inform decision making. We have our finance data sitting in a whole lot of different systems, and it is a separate process as compared to our clinical data. Quality and safety data sit in one system, clinical data in other system, finance data in another system, and HR workforce data in another system. We need a balanced, scorecard approach for reporting. The challenge is to get different data intersects to operate in an Enterprise program. We need business heads to go in and interrogate the data and be able to extract the information in a reasonably simple way. People pull the wrong bit of data and make the wrong decision around the wrong things.
- We are bound by a lot of legislation and privacy acts. It is difficult to share information, and we need to be mindful of what information we share with our partners. There is a lot of consideration we need to give in terms of intellectual property. The data that we are passing on needs to be de-identified. We need to ensure that the information going through is fit for purpose.
- We need to be mindful around dealing with sensitive information around people's health & well-being information and personal confidential information. There are confidentiality issues with information sharing.
- We have not been very well in getting the required reports out of the systems. We are not very well in defining what the reports that we want out of the system and in defining the data update points that are required. We are not exploiting any of the efficiencies that we can get via information reporting.
- GP's don't have access to the hospital system and vice versa. Patients are at risk when there is a delay in critical information being communicated from the GP's to the

pharmacists to hospital services. The state does not have any strategy to solve the data communication issues between the GP's and the hospitals

- A lot of patients don't know how to handle the data. Patient-controlled record, which has a poor uptake is useless to the healthcare professionals. It depends on what we call patients managing their records, and it is different from patients typing in their health state, and pathological results.
- Sometimes there is no data, lack of data, or delays in the transmission of data that is being transmitted, which impacts patient care. Sometimes wrong patient's data is transmitted due to user error.
- Currently, multiple systems provide clinical data. Data handling in multiple systems has increased margin for error. Misleading record is more dangerous than nothing at all. The computer booking system has led to seriously missed attendance from patients. There are user errors, like picking the wrong names or ordering the wrong tests for the patients. Currently, a clinician must ring other hospitals to get the information faxed, which often isn't the correct information.
- Systems from other hospitals that are different don't link up. There is a loss of information when systems do not talk to each other. IT systems change when you move from hospital to hospital.
- eHealth record is not a solution for interoperability.
- Sometimes there is a loss of data. Staff must input data into multiple systems. We have a lot of errors due to the user not entering the data correctly.
- When IT systems do not work, patient safety is at risk. Non-linking systems are a risk to the information flow of patients and hence to overall patient care.
- PC generate too many errors. IT is blocking content, so rich media from other hospitals are inconsistently delivered.
- The data needs to interface for blood tests ordered by the hospital with the external service provider.
- We have two databases, one internal and another one going to the National health service directory, and sometimes there are errors due to data mismatch. The national health service database needs a more reliable data source. We cannot trust the NHD data.
- Sometimes the patient information is delivered to the address where the patients no longer reside. Clinicians sometimes input the data without collecting the information.

- If a mistake is made, we don't know how to go back and fix it. Sometimes the scanned medical records are not scanned timely, sometimes until the patient leaves the hospital. Sometimes we have no way of knowing if the information should be there or not. Sometimes we are in such a rush that we adjust the data like timings into the system. If the hospital is relying on timing information, then the data there is not correct.
- Sometimes we may report the wrong cases. If there are errors in the information presented by the computer, then it is not evident.
- When there is a system outage, the accuracy of the data evaporates.
- It takes time for the patient's progress notes to be scanned into the system. Sometimes there are delays in having access to patient information. 9 out of 10, relevant information is buried somewhere in the progress notes, and it is lost.
- There a lot of little systems, but the bucket load of patient information sitting in them, where it shouldn't be residing.
- At the ward clerk level, they don't understand the importance and criticality of information management.
- The emergency contact person is recorded in Trackcare and not updated correctly in HIS.
- It is not possible to retrieve information about a patient's journey. It doesn't help if we cannot exchange information transparently with other organisations. Sometimes the internal patient transfer process leads to data gaps.
- Hybrid systems, i.e., some of the process on paper and the remainder of systems lead to data errors. We are not doing well in the exchange of clinical information electronically.
- We have not resolved the privacy issues adequately.
- Some information is stored on personal disks. Information stored on disks can be lost or compromised.
- It took us 15 mins to log in. We had abandoned the outpatient session because we could not log on.
- People have the habit of logging on to multiple systems and never logging off.
- Is the information genuinely robust, and is it the accurate reflection of what is going on is questionable?
- It is easier to input data into paper then get it online. If you put crap into the system, you are going to get crap out.

5.2.2.5.2 Facilitators for information management

Some of the key findings identified by the participants, which will facilitate improving information management in healthcare are:

- Clinicians are not able to access important patient information due to login issues, or it takes a long time to log in. Multiple logins are an issue for clinicians. Access to the systems should be made easier using technology such as biometric authentication, rather than the use of multiple passwords.
- Multifactor authentication will be required for logging in to reduce security issues.
- 90% of the complaints within the hospital are due to communication errors. Communication errors should be minimized using systems integration.
- The data in the systems needs to be auditable because a lot of people touch the systems, which could lead to data integrity errors.
- Having timely access to patient information is vital for clinicians. Clinicians should have access to relevant patient information, example doctor should have access to blood test results and drug information, but not necessarily the information pertinent to family abuse. All clinicians should not have access to all types of data. Only relevant information should be visible to the appropriate clinician. If the information is directly related to healthcare and the safety of the patient, then the clinicians should be able to access patient history information. It could be patient providing the level of consent to the clinician.
- There is a disconnect in the data and the information that the system generates and how it is consumed by users and the capabilities of the individuals consuming the data. There is a gap in understanding what information is available and how to use that information to make decisions. There is an untapped potential around what data can be extracted out of the systems and how to use that information to improve care. The capability should be built around data analytics and information management.
- There is information from multiple important data sources such as the government, department of statistics, and patient information. All the predictive information should feed into the strategic plan. Management will need help in putting the information from various sources into the strategic plan. Innovation in the data analytics space is best invested.
- Document management systems should be implemented so that important information is not misplaced or lost.

- There is a heightened level of cybersecurity that needs to be in place concerning the privacy and confidentiality of data. Clinical data has been classified as commercial in confidence, so there is the highest level of security for the data. The data retention period for healthcare is a lot longer than 5 to 7 years, and it should be at least for the patient's lifetime, i.e., 85 years. The national framework should be built around data retention, privacy, and confidentiality of data.
- Security is a crucial requirement for the digital platform. A lot of people access the systems for lots of different reasons, so health services need to be mindful of the security issues. The patients should have more control over the data and what happens to them.
- Disparate systems can cause issues with patient safety due to data integrity errors. Data errors are caused due to user fatigue, multiple entry points for the same information, and hybrid process, i.e., some paper and some manual. Currently, there are errors in labelling and patient identification, which causes risks to patients. A key patient identifier, such as the UR number, is different in different hospitals. Unifying systems should reduce data integrity errors. There should be an obligation to use standard computer language, which is interoperable between systems. Currently, different systems are using different languages, and most of them do not integrate well.
- Most of the records, for example, finance and passport, are digital. Health records should be made digital as well. Better healthcare data will lead to better healthcare outcomes.
- The data management cannot be offshored, because there is a lot of stuff governed by state and federal laws, and this can be managed jurisdictionally. Principles around accesses of data from onshore, nearshore, and offshore should be defined.
- Portal, where all the required information is available, will be useful, as well as the available funding opportunities. This will help healthcare management with strategic planning.
- Data sharing protocols on the legal side should be improved, which could lead to better standards in information management.
- Team leaders and directors should be driving their staff to capture data into the EMR system to reduce data integrity errors. The clinicians require ownership of data entry. Clinicians need to understand the possible reports that are being generated and why data entry is so important.

- Live dashboards will enable for monitoring specific key metrics across HHS.
- Forcing functions in the system can decrease data integrity errors. Audit functions can reduce data integrity errors. Data entry errors should be made identifiable in the electronic system.
- Patients need to understand what their rights and responsibilities are, in the control of their data. The patients also have a responsibility in the confidentiality of their data. Patients should be able to provide informed consent regarding their information.
- Some of the data integrity errors happen due to a lack of standardization in inputting data into the electronic system and lack of training. Lack of system familiarity can lead to data integrity errors. Paper-based systems can lead to data integrity errors. Staff should be trained in data input and data management.
- An information management governance framework will be required. The national framework around data sharing will be necessary. Patient data will have to be classified based on information type.
- Medicare number could be used as a standard patient identifier. The national health service database should be sourcing information from the Medicare provider database, which is more accurate.
- The privacy of information is essential. Privacy is a bit of risk assessment in healthcare. Sharing of information with another health service will increase privacy concerns. Privacy protocols need to be defined when communicating with doctors. The information needs to be secure, reliable, and accessible, not just to the clinicians but also to the patients. Data exchanged between systems should be encrypted for security.
- The data presented by the systems must be trustworthy and needs to be the source of truth. The data exchange should be interoperable. The interoperability of data between vendors needs to be solved and standardized.
- There should be an integration of information between patient databases. Patients need to be given a unique and universal patient identifier. There should be a centralized data collection program based on the information management governance framework.

5.2.2.6 Agility

Agility was one of the key categories that were identified from the data, which was impacting technology use. This subcategory had 14 references from the regional hospital and no references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Mobility of the

clinician's, care closer to home, and the ability of the patients to access data from mobile devices were the key themes highlighted which would improve technology use in healthcare. Agility was a dominant theme in the regional hospital. This can be attributed to the remoteness and wider spread of the regional hospital.

Table 5-17 Regional hospital participants

<i>Regional hospital</i>	<i>n</i>
Agility	14

5.2.2.6.1 Internal challenges for agility

Participants highlighted the following internal challenges concerning agility:

- Clinicians need to be given systems that can be used on their iPad or mobile devices. More mobile equipment like iPad and tablets with wireless capability is required. The computer systems like CoW (Computer on wheels) are currently manned.
- There are fewer devices, and clinicians must wait to input data into the systems.
- Sometimes clinicians like to go back to their desk sit down and write, and sometimes they need to access information on the run, agility in technology is required for the clinicians
- A computer screen at every bedside is needed.
- There are not enough computers to look at patient information for the clinicians.
- Patients are not able to book their appointments with a specialist.
- The patient is not able to carry their information with them and access it via the internet or a mobile device.
- There is no signal to access mobile health records in rural areas.
- Certain areas do not have a telephone signal.
- There are issues with Wi-Fi and network bandwidth.
- Changing work practices is required to get the maximum benefit from technology.
- Security is a challenge in using mobile applications.
- There will be issues with the compatibility of mobile devices and smartphones in supporting mobile applications.

5.2.2.6.2 Facilitators for agility

Some of the key findings identified by the participants, which will facilitate improving agility in healthcare are:

- There should be a single digital record that should follow the patient and should be available at the point of care so that the information can be accessed by the clinicians and the patients at the point of care.
- Mobile devices and smartphones should be used to make clinicians and patients more mobile, concerning accessing and providing care. People are smartphone savvy, and health apps should be developed that provide patient information and provide prompts to patients for taking medication. Mobile apps can improve healthcare outcomes and improve health literacy.
- The care should be provided closer to home so that the patient does not have to travel to hospitals. Telehealth can be used to benefit regional areas and for emergency assistance, by applying it to a wide range of services such as renal. IT is an enabler for clinicians providing care close to home and remotely.
- Flexibility in technology and access to digital records will allow clinicians to work from home, potentially leading to cost savings. Mobile devices allow the clinicians to take their office along with them. Mobile devices enable notes to be updated at the bedside, thus minimizing double entry. Technology should be developed to make clinicians more mobile. Mobile applications also allow community health nurses to provide education and care closer to patients.

5.2.3 *Strategic alignment*

The strategic alignment was identified as one of the core categories from the interview data. It was highlighted from the participant interviews that strategic alignment factors impacted the technology use and strategic intent of the organisation. The strategic alignment was a dominant theme that was supported by sub-themes such as governance, procurement, organisational learning, digital transformation, sustainability, investment, and measurements. The dynamic nature of the technology environment requires the continual assessment of strategic priorities and strategic intent. The organisations should reposition themselves externally and rearrange internally to adapt to the dynamic environment. They should be able to evolve from one perspective to the other and be able to learn and adapt. Therefore, the strategic alignment perspective becomes important because, with the lack of alignment, the value of IT investments cannot be realized (Henderson & Venkatraman, 1993). Strategic alignment contextual factors also influence the business effect of technology (Kearns & Sabherwal, 2006). Wu, Straub and Liang (2015) state that governance mechanisms can facilitate better alignment of IT and

business strategies and can lead to better organisational performance. Measurements are essential for strategic alignment.

Measurement systems are important for organisations to survive in the information age, which is derived from strategies and capabilities (Kaplan & Norton, 1996). Gerow, Grover, Thatcher and Roth (2014) identified that the commonly researched variables around alignment are environment turbulence, governance structures, and IT investments. Environment turbulence is the degree of uncertainty that exists in the external environment and includes concepts such as information intensity and transformative industry behaviours (Teo & King 1997). Pollalis (2003) argued that if ICT was viewed as a strategic component, rather than a support component, then strategic alignment could produce positive impacts for organisations.

Organisational learning improves strategic alignment. Knowledge management, through continued organisational learning, could create a sustainable competitive advantage to organisations (Meso & Smith, 2000). New knowledge from the process of organisational learning creates continuous innovation which assists in the delivery of the strategic intent. Improved procurement leads to enhanced strategic alignment.

Baier, Hartmann and Moser (2008) suggested that the relative fit between business strategy and purchasing strategy, labelled as strategic alignment, and between purchasing strategy and purchasing practices referred to purchasing efficacy, leads to better financial performance. More research is required around IT-Business alignment and the corresponding coupling processes between strategic alignment (Obeidat et al., 2015). Delivering the strategic intent of the organisation and improving technology use was dependent upon how well the strategic intent and technology use constructs were strategically aligned with each other. The following sub-categories were identified under the core category strategic alignment:

- Procurement
- Governance
- Sustainability
- Digital transformation
- Organisational learning
- Investment
- Measurements.

All the above subcategories formed the core category of strategic alignment. The strategic alignment was a dominant theme that was supported by sub-themes such as procurement,

governance, sustainability, digital transformation, organisational learning, investment, and measurement. Barriers and facilitators for each of the sub-themes were identified. Barrier and facilitators enabled this study to understand the primary strategic alignment construct in detail. Participants expressed some of their challenges under each of the subcategories which were required to be addressed by the hospital management for achieving strategic alignment. The references from clinical, administration and executive management, for the regional and metropolitan hospital, is shown in Table 5-18 below:

Table 5-18 Strategic alignment construct coding

<i>Regional hospital</i>	<i>Strategic alignment</i>	<i>Governance</i>	<i>Measurements</i>	<i>Organisational learning</i>	<i>Procurement</i>	<i>Sustainability</i>	<i>Digital transformation</i>	<i>Investment</i>
Administration	317	116	18	91	5	0	74	27
Clinical staff	223	92	6	50	12	0	49	25
Executive Management	152	38	26	12	21	72	19	16
<i>Metropolitan hospital</i>	<i>Strategic alignment</i>	<i>Governance</i>	<i>Measurements</i>	<i>Organisational learning</i>	<i>Procurement</i>	<i>Sustainability</i>	<i>Digital transformation</i>	<i>Investment</i>
Administration	178	87	4	39	3	0	27	25
Clinical staff	158	58	9	48	3	0	18	31
Executive Management	155	39	8	13	16	20	28	54

5.2.3.1 Procurement

Procurement was one of the crucial categories that were identified from the data, which was impacting strategic alignment. This subcategory had 44 references from the regional hospital and 22 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Excellent vendor management approach, strategic procurement, and proper contract management were some of the key themes highlighted which could improve strategic alignment in healthcare.

Table 5-19 Procurement construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Procurement	44	Procurement	22	66

5.2.3.1.1 Internal challenges for procurement

Participants highlighted the following internal challenges concerning procurement:

- It takes up to 12 months to procure any technology hardware, and ICT is changing very fast.
- Procurement can take four months for approval.

- There are a lot of legal requirements to be considered while procuring healthcare solutions.
- The world thrives on large players, and it is tough for small innovative players to get any market share.
- It is easy to articulate the benefits of adding modules to one goliath system rather than interfacing multiple different vendors.
- It was thought that few things were included for the price of the product, but it turns out that they had to pay extra to get the additional features.
- During joint procurement, if health services want to change certain features, but another HHS hasn't changed, and it becomes a challenge.
- In joint procurement, when we are making changes to the product, every other organisation must agree to the change.
- With experience, we learn to expect not what we see in the sales demonstration. During system implementation, we get told that some of the items are not included in the package, and we will have to pay extra for it.
- HHS is constrained by what is included in the package in the state-wide rollout of the solutions.
- We can never think of everything that we need in the procurement exercise.
- We cannot trust the company sometimes when they say that the system will do everything.
- We might not have enough knowledge of the system that we are procuring. Sometimes there is a lack of understanding in what we are describing and what the vendor is selling.
- The vendor might have invested a lot of money on R&D and would like to make a financial return. Most of the research is purely aimed at profit.
- The HHS is under different levels of maturity and is reaching out to buy the best systems for themselves.
- Vendors may be aiming for their product lock-in. IT companies do patch protection and do not share information well.
- Vendors want us to buy all their products. We may find only one company that fits across all the disciplines and units.
- The ongoing support for the system after implementation is sometimes missing.
- Sometimes we have no say in systems procurement, and users got what was available.

- Sometimes the length of the contract determines, how long the system that we put in stays.
- Sometimes there is a lack of knowledge around what else is out there.
- With the current funding type, it is easier to fix the existing problem then think of long-term solutions.
- Finding vendors who service the regional areas sometimes becomes a problem.
- Procurement is a piecemeal approach because we don't have an overarching strategy.
- The current ICT team does not have the knowledge or background for strategic procurement. We need the right composition within the group, to be able to provide that advice. We have clinical procurement advisors to help us procure clinical products, and we don't seem to have that capability in technology. We are unable to get advice on a technology procurement problem, and we are not technical experts.
- Health services are not sophisticated in procurement. We don't strategically leverage purchasing power. We do not maximize our procurement process.
- We sort of taking what we are given. Getting the high-cost items wrong can be expensive.
- Procurement in the past has been ad-hoc and not commercially savvy.
- The preferred vendor has benefits and has risks. We shouldn't be hitching our wagon on a single vendor. We don't have to choose a single vendor, as long we recognize the technical sides of how things talk to each other.
- The Department of Health in Victoria does not take a very global view of what is going on.
- The Health service is locked into vendors. There needs to be an overall decision made reasonably around vendor selection. It is tough to change once the vendor decision has been made because we cannot pick and choose products from different vendors. We got no leverage once we choose the vendor, and all our leverage is upfront.
- It is tough to change the vendor when the business has used the solution for an extended period of time, and the business process is engrained. It is not about technology; it is about the business process flows. It is too much money, or the cost is high to change vendors.
- We don't have proper vendor management now. We are not good contract managers.
- People get into personal relationships with the vendor.

- We must rely on the vendors to fix the application issues. The vendor doesn't seem to do a fantastic change management process. In the next version, they miss the changes that have been already done, and suddenly, the thing doesn't work.
- We have limited ability to impact vendor changes. We have no visibility on vendor change priority.
- Changing to a different vendor would be a big step to the unknown. When we are buying a new product, there is limited insight into how the product is going to perform and integrate with the internal workings and with other vendors, and this makes rational decision making difficult.

5.2.3.1.2 Facilitators for procurement

Some of the key findings identified by the participants, which will facilitate improving technology procurement in the healthcare sector are:

- Standardizing IT procurement practice across the state is needed, as multiple vendors provide similar services. Sometimes it is about picking the right solutions as patient data, and the infrastructure will have to exist for at least 80 - 85 years. Hence, the data needs to be easily transferrable to other solutions.
- A well-defined path to purchasing and commissioning of new systems is required. The process is currently ad-hoc, i.e., if someone wants something, they get the funding without talking much to IT. The standard path to the procurement of technology solutions is required.
- Sometimes the solutions are sold on maturity. Sometimes it is the fine line between innovative solutions to longevity and security. End-user is the only person who can tell you if the system is fit for purpose. Benefit analysis needs to be performed during system procurement.
- There are multiple providers, and procurement is not centralized. Centralized procurement could be slow. The procurement process should be made faster, and IT needs to enhance their abilities in procurement.
- The interoperability of different products is becoming less of an issue. The vendor must be chosen who allows for easy interoperability of data between different systems. Smart vendors, especially integrators, are now seeing the opportunity.
- Health services have more significant opportunities for leveraging economies of scale with strategic procurement. Procurement needs to be vendor agnostic. With economies

of scale, Health services could be able to influence better outcomes. Health services get better bargaining power if there is a standardized approach to procurement.

- The government is weak at leveraging vendor contracts. Health services need to improve in the contract management space. Vendor contracts should be reviewed properly to ensure that the vendor provides all the product features that he has promised at a price quoted.
- The procurement system can be easily exploited due to the weakness in articulating benefits for one goliath system. Health services need to put the right levers in place upfront to protect themselves over a longer-term vendor contract lock-in.
- Health services need to make sure that they are tied to the right type of vendor for the right reasons. Procurement practices should be ethical.
- Health services should have an appropriate plan and open standards for data management, integration, and interface management so that they can be vendor agnostic.
- The healthcare solutions must get critical updates or will cease to function correctly. Health services need to adjust the vendor contracts for the outcome that they are seeking.

5.2.3.2 Governance

Governance was one of the key categories that were identified from the data, which was impacting strategic alignment. This subcategory had 266 references from the regional hospital and 204 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Ethics, organisational structure, accountability, and risk management were some of the key themes highlighted from a governance perspective that will improve strategic alignment.

Table 5-20 Governance construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Governance	266	Governance	204	470

5.2.3.2.1 Internal challenges for governance

Participants highlighted the following internal challenges concerning governance:

- We have a very decentralized health model in the state. There is no unified system of governance from the corporate office. There is no enforcement of unified rules, regulations, and IT systems. No one has taken a national role to sort things out.

- Hospitals operate in political cycles. The government department is very reactionary because of the political system.
- There needs to be enablement in information sharing without breaching, medical, legal, and privacy laws. There need to be better mechanisms for communicating and coordinating data.
- There is a web of systems, processes, and associated policies. We are very decentralized, the uncoordinated web of technology, and this is replicated across the hospital network, and everybody does their own thing.
- The existing policies are the old-world policies that maintain the status quo. The current policies are not forward-thinking in any way.
- There are inefficiencies and duplication of the process in the current structure. We need to be able to leverage the organisational structure better vertically as well as horizontally. The middle management positions do not add a lot of value. This money is best invested in ICT.
- Ownership of the IT systems is not very clear, and multiple owners own multiple systems. Implementing changes like system upgrades is hard when we have multiple owners.
- IT department is more driven with a focus on infrastructure, and there is not enough focus on information and clinical information.
- Clear accountability within the central IT team is lacking. The governance of technology systems is not very clear. There is no central governance for patient management systems.
- It is not very clear on who is responsible for what. Who decides what the priorities are is less clear to the staff. We are not sure about how the work is prioritized, basically where we sit in the organisation is how quickly we can get the job done.
- Everyone keeps buying around their service.
- Governance is not resourced well enough, and it is an afterthought.
- Systems are sophisticated these days, and IT needs to be sustained. The department does not take a very global view of how we spread sustainable solutions across the sector.
- Succession planning is an issue, as the people are getting old, and we are losing intellectual knowledge.

- The governance of the systems is not right, and there seem to be some assumptions made.
- There is no risk register for managing technology-related risks. The computerized booking system has led to severe miss attendance. Not everyone uses RiskMan. Some of the risks entered RiskMan seem to disappear into the ether. There is no audit of who did what changes to the patient information in the ICT systems. There are patient risks due to data integrity errors. Risks are not mitigated completely. Sometimes the mitigation of these risks is expensive.
- The governance, the overall planning required to deliver what is needed is not in place. If the ministry drives the vision it drives angst, and if health service drives the vision, there will be a lot of costs, we need something that is in the middle.
- We would have CIO reporting to the CEO. Leadership is also about governance. We need someone who can work with the clinicians closely and drive the strategic part of the organisation. We need IT members who understand clinical.
- We are not structured from an enterprise delivery perspective to deliver the technology construct.
- With the data protection requirements, it makes it hard to share the right information with the right folk. We have over-regulated data control in the health space and made it hard for ourselves. There are federal overlay requirements, state overlay requirements and hospital overlay requirements, and none of that line up very well vertically or horizontally.
- The patient can't get access to the data that the GP has, and this is a fundamental flaw.
- There are different repositories of medications at hospitals, pharmacists, and GP services.
- There needs to be risk management for patients across the transition of care since patients die across the transitions. There needs to be risk management from the patient perspective. There is RiskMan to capture individual errors, but there is nothing for root cause analysis and when things go badly for the patients. Some of the requirements, like managing patient risks, should be mandated at the state level.
- In the online drug system, the current drugs are masked by expired drugs
- IT at the hospital solve small nitty-gritty problems, rather than developing strategies and the big picture. The IT team at the hospital doesn't have the power to address more

significant issues. The hospital executives should take the issues with local IT to the state level.

- The health department IT policy has been poor over a decade. The department should be responsible for Unified IT systems across the health service.
- The patient chosen substitute decision-maker cannot be identified, and this is a considerable risk to the organisation. There are inherent dangers in using multiple information systems and is putting patient safety at risk. Cheaper systems have encouraged workarounds and do not make things safe for the patients. Hospitals basic platforms are no longer supported and are a risk to the patients. GPs may not be getting the right documentation to carry on with the patient's treatment, and that is a considerable risk.
- Improving current systems is critical, ahead of engaging any new ones.
- The ICT department needs to be accountable for patient outcomes. ICT department shouldn't have the gatekeeper role.
- The cost of data accumulation should not affect patient safety.
- The application support group should support the applications. If we call the help desk with an issue in HIS, the call is redirected to another support group.
- IT management does not seem to line up with the standards.
- We don't have good project management skills. Projects are not appropriately scoped. Project management and reporting against timelines need to be improved. They should use proper business analysts and project managers instead of nurses. There is a concern in the way how projects are managed.
- There is a lack of proper project management office, and change management is done poorly. It takes months to get any small changes done to HIS from the health services department.
- Clinical informatics should be part of the application support group. One person supports some applications locally in the business unit. We don't understand why we have separate application support teams.
- We don't think the management structure is adequately utilized. There has been a lot of movements in IT, and the structure is very fluid. IT is not structurally sound, and the people don't have the knowledge that they need. There are meetings done by the business units in isolation to IT with the vendor to resolve system issues.

- People are protecting their little plot and forgetting that they are part of a larger plot. They are empire building. There are several layers of bureaucracy.
- People have self-interest and act in self-preservation because they don't have the skills and feel vulnerable. People with no qualifications are hired for senior positions. A lot of qualified people are undermined, and people with no skill get the job. People with no skills form opposition to skilled staff. They don't follow through care and integrity, basically, talk about it. People have their vested interest to push up.
- Sometimes deals are done between people without enough consultation. There is no transparency on how the money is spent. There are high-level decisions made which are difficult to justify.
- The current governance structures are not timely. The existing governance structure is large.
- IT companies have no obligation towards patients and the sharing of information for delivering improved healthcare outcomes.
- Decision making is not transparent, with lots of smokes and mirrors on who is going to get the contract as there is a lot of money involved. Companies make money by not integrating systems. There is a risk to patient care as all information about the patient may not be in the system.
- No one wants to work together because each unit has got its vested interests and push up. Deals are done between different people at different times, who don't understand the requirements. There is a lack of transparency on how the allocated funding was spent.
- There is no unified governance from the corporate office. There is no uniformity in the enforcement of rules and regulations. There is the bureaucracy involved in getting basic software for computers. The governance structure for IT is not very clear, i.e., who is the go-to person for what. There a lot of red tape policies and procedures to go by.
- The risk management system is quite discouraging for staff to use it. Risks are sometimes not appropriately escalated.
- Small departments get forgotten in the big system. Some of the departments are undermined and not treated with respect.
- There are a lot of meetings without achieving and real outcomes. A lot of decisions are made by people who don't have to do the job.

- The hospital service does not know what services are being delivered by community health. The hospital services don't understand public health services. They don't understand the risks and keep cutting the budget. There is a risk because the staff are not consulted.
- Patient complaints are very disjointed. The quality and safety of the hospital are poorly done.
- They have a lot of bureaucrats and they just recently hired a lot more, and they have a lot of people around the top of the organisation, and we are not sure that always translates to more efficient work.
- There are unnecessary medical procedures that do not add value.
- There are a lot of IT teams, but no clear, well-defined pathways to get to where we need.
- Business units should be held accountable for IT solutions. There is a lack of ownership in IT solutions, and there is poor practice.
- There is a multi-level structure in the government that impact funding. There is a high level of bureaucracy and red tape in the government, with the accountability of the public purse.
- Management may be looking for financial details rather than patient outcomes.
- Traditionally Australia fails in every change management process. This is the most significant change process, and we need somebody to coordinate the whole thing.
- In changing from an activity-based perspective to an outcome-based model, there is a serious amount of self-interest, loss of power, and status. The role and job redesigns are an opportunity and a challenge.
- We think there are governance elements that we need to consider when digital is the primary focus. Different health services should support the flow of information. Legislative changes will be required in privacy and security.
- Health services are at different levels of maturity.
- We don't know what we don't know in terms of governance and requirements to deliver on the strategy. Governance is quite significant when we are going into a new set of national standards. We will need different people in different positions to support more modern IT systems.

- The current medical system is inflexible. We have unrealistic expectations from healthcare. Clinical directors must go through several bureaucracies to make any changes to the system.
- We mitigate the risk but don't look at the root cause. Risk mitigation is very labour-intensive and expensive. There are patient risks due to labelling errors.
- IT companies don't have the responsibility to share patient information, which is present in their system. Vendors should have an obligation to interface their systems with other systems. The systems are not connected properly, and things can slip through.
- The current structure is fragmented. Adaptability and flexibility of governance structures is an issue. Small units can get forgotten in the big system.
- The admin staff used to report to the medical staff are now reporting to the nursing staff, and some of the nursing staff don't care. If the reporting of the admin staff was made to the admin structure, they could be performance managed better.
- The IT governance structure is not clear and where it sits within the core business. The roles of people in the IT department is not very clear. The service desk is a big central system.

5.2.3.2.2 Facilitators for governance

Some of the key findings identified by the participants, which will improve governance in the healthcare sector are:

- The business units must report to the right functional lines. By making the organisation units reporting to the proper structure, they can be performance managed better. Structural improvements will have to be made to the reporting lines.
- Good governance is about checklists, steering committees, forcing functions for trying to do the right thing for the organisation. Accountability and governance structure of the IT department needs to be improved. IT should be made accountable for delivering improved clinical outcomes. Business units must own some of the IT solutions. Clinical informatics should be implemented and integrated with Allied health.
- Traceability of changes to a healthcare record helps in risk management. Audit tracking for changes to patient data must be implemented to minimize patient risks. Improvement in risk management framework is required to manage technology-related risks and patient risks. Healthcare operates in a risk-averse culture. Taking educated risks is necessary to invest more in the technology space.

- The consolidated layer for technology and information governance is required. Unified governance will be needed from the corporate office. Health services should be strategic in building relationships outside the organisation from an ecosystem and partnership perspective.
- The product needs good governance to sustain. The technology should be continuously updated and maintained.
- There needs to be guided in terms of investment in technologies from the government department. Health services need to prove to the politicians that the systems will be reasonably well managed.
- There is an opportunity for health services to reorganize in a better way, based on strategic intent. Organisation structure should facilitate a more collaborative approach to working. The structure should facilitate for someone like account managers who can build and maintain relationships with patients, internal stakeholders, and partners.
- Ethical guidelines need to be established in the organisation concerning transparency, vested interest, and organizing deals without proper consultation. Currently, decisions are made by people who don't have to do the actual job. Decision making should be made transparent and should involve staff who use the systems every day.
- Red tapes in policies and procedures need to be removed. The policies and procedures will have to be reviewed and updated to be in line with the digital change.
- A project management framework should be implemented with the project management office structure.
- The framework should be developed for information management and data governance. Governance around technology should be about keeping the patient safe. ICT solutions should be set up to guide the clinicians and the patients and minimize patient risk.
- People with the right qualifications should be hired for the job, rather than filling gaps. Governance frameworks should be developed around managing people's capabilities.
- Current governance structures should be streamlined to minimize middle management and remove inefficiencies.
- The roles and accountabilities around technology governance should be clearly defined.

5.2.3.3 *Sustainability*

Sustainability was one of the key categories that were identified from the data, which was impacting strategic alignment. This subcategory had 106 references from the regional hospital and 20 references in the metropolitan hospital. These references have been summarised through

memoing as internal challenges and facilitators to illustrate the theme. Development of prevention programs to control the demand side of healthcare, investment in technology to generate better clinical outcomes which can reduce healthcare costs, faster processing of patients, and providing care closer to home were some of the key themes highlighted that would improve sustainability.

Table 5-21 Sustainability construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Sustainability	106	Sustainability	20	126

5.2.3.3.1 Internal challenges for sustainability

Participants highlighted the following internal challenges concerning sustainability:

- Technology needs to be affordable and accessible. People end up passing the IT system because they don't get what they want from it.
- There needs to be good governance to sustain the product or the system that has been implemented.
- There is a lot of short-termism in terms of expecting benefits from ICT. Staff will have more time to do other things is a hard sell. If we have IT operating in the right way, we can enhance the sustainability of the organisation. Without technology, there will be slow processing of patients and decisions being made in a vacuum. There is a considerable amount of duplicate documentation now. A lot of effort and time is invested in patients who shouldn't be presenting themselves to the emergency department.
- Currently, there is no framework to leverage the innovation other health services have been doing.
- Technology and information change daily. Using AI may add to the clinician's time, and it could make the diagnosis complex.
- Showing return on investment for new technology is a challenge, because it may not result in extra income coming through the door. The newly introduced technologies never give the expected return as promised. IT systems should be able to generate better clinical outcomes and better care.
- It is difficult to justify the benefits of technology investment. Technology should make clinicians' life easier. Clinicians can see the benefits in ICT but are stuck because there is a lot of upfront investment. Ethically we should be looking into smarter technologies and productivity improvements.

- Challenge for community services is that it is hard to put our finger on the benefits. It is challenging to measure the benefits of prevention. It takes very long to get the benefits in prevention. If we are investing in prevention, then the gain could be in admissions.
- The funding mechanism is only for three years, whereas benefits to be realized in prevention can take ten years. The government needs to tune into a health and well-being strategy to control the demand side.
- Population spread and geographic spread is a challenge to cost sustainability. The community has extreme standards of age, both very old and very young infants.
- People not knowing what to do with their health records is a challenge. It should be an education thing starting from schools. Significant health literacy needs to be developed in the early years, i.e., Kindergarten, schools.
- People don't actively manage their health as they actively manage their money.
- IT infrastructure is a challenge to cost sustainability.
- Sustainability development programs in leadership is a challenge.

5.2.3.3.2 Facilitators for sustainability

Some of the key findings identified by the participants, which will facilitate improving sustainability in healthcare are:

- Technology can provide good patient outcomes and divert them out of hospitals and provide a sustainable model for healthcare costs. Technology will reduce clinical risks, make clinicians jobs more comfortable, increase efficiency, and will enable clinicians to make better-informed decisions. It will facilitate a collaborative way of working, reduce duplicate efforts, and enable management to use people more wisely. Technology will enable us to reduce the cost of patient care and make healthcare affordable to the community.
- It is not about saving time, but documenting differently, the solutions must be designed for long term sustainability of healthcare.
- Clinical informatics has a lot of potentials. Technology will enable transparency in information. All clinicians will be on the same page when one singular information is carried around. In the long term, the singular record is going to be transformational. There will be an improvement in transparency, accessibility, and accuracy of healthcare records.

- Technology will enable patients to participate in their care. Electronic health records can assist in patient-reported outcomes. A single digital record solution enables the patient information to be accessed from anywhere and not repeat patient history.
- Technology can guide excessive test ordering and ensure transparency in information to the primary care. Technology can assist in having a single source of information across primary care and acute care.
- ICT is a vital tool in sustaining contemporary healthcare. Without ICT enablers healthcare will come to a grinding halt. ICT is a critical part of healthcare infrastructure, and it is going to require ongoing investment for sustainability.
- In order to compete in the long term in terms of price and cost, there should be an investment in technology. Administration processes such as patient admissions can be digitized. When business is working in harmony with the technology, clinicians will have a nimbler, more efficient, more productive organisation that can enhance business output.
- Public health needs to be enhanced. There is a massive benefit in doctors, nurses, and allied health professionals to go out and teach about preventative health in the community.
- There is a lot more that can be done with healthcare data. The technology could benefit by enabling patients to make their booking, asking online questions to healthcare practitioners, and referring patients to trusted healthcare apps and sites for information.
- Having digital records will enable the clinician to make a better clinical decision at the point of care and thus minimize wastage in having to get the information manually, for example, length of admissions.
- Information systems improve the overall outcome for the patient with all critical information being available at one single location. Integrated health records should be able to track benefits by mapping the patient journey information. It will be useful to have access to digital patient records on mobile devices. Digital patient record history should be able to identify if the patient is a mental health patient or has issues with drugs and alcohol when getting admitted to acute care. Better data will lead to better health planning and help to direct the resources where required. Data from digital can assist in improving the current clinical processes.
- The digital process can positively benefit the community. Health service should aim to help people live meaningful lives, i.e., help someone manage diabetes, obesity. Health

service can enable people to contribute more positively to the society and thus have less demand for the service. Digital can enable care closer to home in a sustainable manner.

- Digital can enable flexible working culture for the health service and flexibility for the clinicians.
- A national framework for healthcare sustainability will be required.
- Prevention enables hospital funding to be freed up for something else. Preventative health is the way of the future. Education and injury prevention is vital in helping to drop hospital rates. Health should be covered by the organisations in their OH& S agenda to help prevent injuries and hospitalization. Programs like hospital intervention, hospital avoidance, and prevention should be developed and encouraged.
- We can do a lot more with our money with preventative health. Exercise, diet, hygiene, immunization, health literacy needs to be improved. Clinicians should be doing clinics in the community rather than in the hospital. Prevention helps with healthcare cost sustainability.
- AI can help in decision assistance and decision support and filtering mechanism for the clinicians. The diagnosis is pattern recognition to a greater extent. Doctors will have to embrace AI so that it can help them with their critical decision making. AI can enable doctors to follow the right pathway and help keep the patients safe. AI can remove unnecessary investigations and unnecessary tests being ordered to patients. AI would prevent waste and help choose wisely and highlight to a clinician if anything has been missed. There is a substantial untapped wastage in ordering tests. Algorithms can assist clinicians in the background if specific tests must be ordered, with clinical governance and clinical research. Having decision management systems frees clinicians to do much more with their time. Robotic systems allow patients to do specialist operations from a distance such as microsurgery using optics.
- Right ICT systems can help capture the correct information and help in getting the funding for the healthcare provider. A system that detects early patient deterioration help with patient flow and discharge of patients on time is beneficial to healthcare.
- Financial sustainability is providing care at a cost that has been paid for. Technology can help treat more patients by treating them from home and without adding additional beds to the hospital. Technology can make dispensing of pharmacy drugs more secure and traceable.

- Technology can make a virtual presence for patients. Technology can enable clinicians to interact with the patients at the bedside and send biometric data. Technology can prevent presentation at the hospital and avoid deterioration in patient condition. Technology can help in the reduction of access to chronic services.
- Non-monetary sustainability benefits are, having the clinicians at the right skill level to provide service. It is required to have the right skillsets, right technology, and the right framework, not for now, but into the future. Better patient experience leads to better care. Technology can improve the patient experience. Up to date, technology attracts and retain clinicians. Technology can enable the clinician to provide better service. More significant sustainability benefits can be realized with the outcome-based approach
- It is better to take the doctors and nurses out to patients and treat them from home. Technology has enabled the patients to reduce their travel time and consume less environmental resources and energy, i.e., Telehealth allows patients not to travel long distances for their care.
- Technology has enabled patients to search for information before meeting with the doctors. Technology can allow patients to manage their health, within the community without getting admitted to hospitals, by educating themselves. Health apps should enable the patient to tell them how to look after themselves. Educating families helps prevent injuries. There are a lot of benefits that technology can provide for long term healthcare sustainability.

5.2.3.4 *Digital transformation*

Digital transformation was one of the key constructs that were identified from the data, which was impacting strategic alignment. This subcategory had 153 references from the regional hospital and 85 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Organisation change management, digital workflows, organisation size, trialability of the systems, project management, and technology upkeep were some of the key themes highlighted from a digital transformation perspective that would improve strategic alignment.

Table 5-22 Digital transformation construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Digital transformation	153	Digital transformation	85	238

5.2.3.4.1 Internal challenges for digital transformation

Participants highlighted the following internal challenges concerning digital transformation:

- Some projects are implemented well, and others aren't. It depends on the capability of the change manager. We think it depends upon the person who does the implementation.
- There will be resistance to do things differently. Technology projects be a threat. We don't think we have an excellent organisational-wide change management strategy. We are rolling out changes that are broader than IT, so how do we do that, we are not sure. Change management to lead to our strategic intent, and it is difficult to do that in our current system. Our systems are not appropriately set up to support complex change.
- We have all sorts of people other than nurses and doctors in the organisation, and we need to involve them in the change. People need to be involved sooner rather than later.
- There were significant problems with how the outpatient booking system was envisaged and developed and rolled out. The project had worthy goals, but they did it without talking with patients and staff in outpatients. They consulted narrowly and administratively. The project suffered severely in terms of uptake and upkeep. The tweaking or the refining of the system has been set back several years and only is starting to get resolved. Senior doctors, the actual users of the product were not involved in the decision making of the product, and this was an example of the change management process poorly done.
- The assumptions that were made during the project implementation were incorrect and were incomplete in understanding the workflows. We are now correcting a lot of problems in the workflow retrospectively. We have got two project offices allocated to work through the post-implementation issues.
- Information should not be asked when the project is underway, all of that should be understood upfront. When a project is poorly implemented, the ability of the clinician to care for the patient is undermined.
- Much more thought and in-depth analysis are required on how the system might be introduced. We need to involve the staff in the development of the best workflow for the system. People involved in the project struggled with that, and it became quite contentious when the project team was defending their view rather than listening to the staff and the feedback that they were giving them. As a result, we had to make workarounds retrospectively to get this working.

- Change is designed and developed somewhere out there, and as a nurse, we know that the change is coming. There may be a couple of meetings that a nurse may be involved, but don't understand what it means for them. If change is imposed without us being involved, we will find faults, because it does not embed our current way of working. It hasn't accounted for all the things that we need to do at our end and support us in doing that.
- The staff does not get involved in the change management process. Maybe people need some coaching process to accept change.
- When we were moving to the First net, the clinical side of it was fine, but the business side of it was not okay. It feels like things are just introduced, and staff is expected to deal with it, communication is too early or late.
- The changes implemented are incremental and not transformational.
- Technology is not up to date, and we have got a lot of work to be done. The piecemeal approach had an impact on our people to do their job correctly. We have made it harder for people to do their jobs because of the way we have implemented things.
- We are running a service from an access database, which has the risk of falling over. We can't get a new service for application which is on access data, so we keep getting stuff around it. Everyone buys things around their service.
- The world is getting very technologically advanced, and it is very frustrating for a clinician when the computers do not turn on, and they can't use video conference.
- We have a lot of hardware that needs upgrading. We have a lot of substandard hardware, and we seem to be upgraded after upgrade behind. IT systems are so old that we cannot even open some documents or links sent to us by the government department. The availability of functioning hardware is an issue. Printing of prescriptions has been a failure, as the prescriptions fail to print. Systems need to be kept up to date. A lot of servers and technology equipment needs to be upgraded. We don't keep pace with change, and we are outdated. We have done no planning to upgrade the systems. I am sure there would be something out there, which is much better than our current systems.
- Remote control and the ability to remotely log on from home is a failure. No one uses the easy read addressing program. The intranet is out of date.
- We are not early adopters, we are lagging, and it costs us money. The technology we get from the government is usually old.

- The technology construct that we have is far too limited, far too disparate, and not structured well from an enterprise delivery perspective. Capital is predominantly allocated as part of building infrastructure, and technology uplift is part of it. In the past, the project has not been structured, well managed, and well resourced. So, they have not worked well.
- There needs to be a change in the capability and interaction between the clinicians and IT support groups to develop a reasonable approach to strategic direction. IT needs to look outwards for business solutions, and now we have a business telling IT what to do.
- Once the business process flow has become engrained with the vendor solution, it is challenging to change that. If we are going to change the paradigm, it is not about technology, and it is about the business process flows. Just giving the system to the clinicians and walking away does not help. IT got to be with them when the business process flow changes.
- After system implementation, people fumbled through the day to day workflow.
- Even though the government had a vision of the introduction of the systems 20 years ago, HIS has been introduced only to 6 hospitals in Victoria. Depending on who you talk to HIS implementation is a success or a failure. It has taken out some errors and introduced some new ones.
- There is a wide variety of competencies in HIS across the organisation, which impairs the ability of the hospital to deliver new projects successfully. HIS competency needs to be better baselined. We need to get proper change management systems in place that adhere to standards.
- The patient administration system is rigid and inflexible in terms of changes to those systems. The change made to HIS knocked it out for 24- 28 hours, and the organisation was in duress.
- Projects are inadequately scoped. There seems to be a project rollout fatigue. There are not effectively using any stakeholder management.
- Useful documentation for project information and design artefacts does not exist.
- There should be a proper transition of the system from projects to business as usual, and this does not happen due to funding issues.
- We can't get staff doing business as usual work and then implement change. We got to get specialized project management skills for implementing projects and managing

project change. How the Patient choice booking system was implemented with no project management skills has caused so much scarring. There is a need for project officers during technology implementation.

- The systems don't get rolled out as promised, and there is a missed expectation. The system never delivers what you expect, which was presented in the sales presentation. There is a lack of confidence by staff in using the new technologies. A few things that were thought to be included in the software package were not included. Some of the functions promised were not delivered during the system rollout.
- Technology is usually purchased in bits and pieces. People would not have thought through the implementation process properly. Sometimes implementation fails due to the time constraints of clinical staff. Some project implementations don't happen quickly. Staff expectations will have to be understood during project implementation. Communication is vital during technology implementation. Some technology projects take too long to implement.
- Big bang approach will not work. The systems need to be trialled for feedback. Sometimes there are no test runs, and a layperson does not know how to use these systems. Sometimes the feedback window is short, and everyone is busy doing their own thing.
- We invested millions of dollars in the trial in a new system and suddenly decided not to go with it.
- The organisation is large, so there is a lot of difficulty in implementing IT. Systems become entrenched in the business then it becomes difficult to replace it. The data in the legacy systems become challenging to migrate.
- We don't want to appreciate the size of the digital change, that IT can bring for us. Digital will be the most significant change management project in healthcare, and traditionally, Australia fails in any change management process. Taking everyone on a journey with different age groups and different levels of literacy and massive numbers of staff will be a challenge.
- How the technology will be rolled out and introduced will have to be planned in detail. It takes a long time to make any changes to the IT systems. It took almost a year to modify software functionality. They have been in the process of replacing the vaccination database since 2009.

- The technical functionality of the system can sometimes be limiting. We want to change some aspects of RiskMan software, but other HHS doesn't want to, and that creates a bit of a challenge. We are not sure what will be included in the software package delivered by the state and how much flexibility we will have in modifying it to suit our local needs.
- Some of the software hasn't been updated for seven years, like the new drugs in the system. After six months, if they pull the funding, the information systems will flounder. We don't pay for systems to keep them current.
- The hospital keeps designing and generating their forms, and currently, there are over 700 forms.
- There is probably about 30% shadow IT spend. There is an element of control, and people like to control their own decision and their spend. If you provide people with what they want for the dollar that they can afford, then it will remove shadow IT.
- We run a project, and at the end of the project, people go. There is no ongoing maintenance after the project is finished.
- People make decisions but haven't thought about how they are going to implement it.
- Software is old, so interoperability between systems becomes hard. Technology is changing all the time. The technology landscape has changed a lot in the last ten years. It is challenging to keep up to date with everything.
- We don't have a specific cultural change role in health service.
- We are not IT savvy in terms of using, what is already available, like SharePoint.
- IT takes too long to implement IT changes, and no one is ready to implement it.
- There is a lot of difficulty in implementing these systems. Some of the hardware is old, and it makes it difficult to put in new hardware.
- Some systems are morphing into something useful, but it depends on how good your skill base is, and how clunky the system is.
- Technology is a significant driver in the library, but it is not the only driver.
- Some of the systems were not easy to use and got dumped.
- People think this is another system, that is going to be around for a couple of years and then disappears. eHealth records have been around for a while, but still not very well used.

5.2.3.4.2 Facilitators for digital transformation

Some of the key findings identified by the participants, which will facilitate improving digital transformation in healthcare are:

- Having a clear plan and the right people on board is very important. Health services need to be building a compelling vision of where they are going and what does it look like and why it matters to staff and the organisation. They need to articulate what it means to staff and what benefits are in it for them with the use of technology.
- Health services need to get the clinicians involved to champion the process. The power of local leadership and champions within teams cannot be underestimated. There should be a clinical change champion who can link between clinical teams and IT, and there should also be an early adapter who can spread the word. The leadership model must be distributed, and people should be empowered to speak up.
- Much more thought and in-depth analysis are required on how the system will be introduced. Staff needs to be involved in the development of digital workflows for the system. The clinical process needs to link up to IT features and functions. If the paradigm needs to be changed, then it is about the business process flows and not about technology.
- The trialability of the systems before implementation is essential. The application was developed by a clinician and had clinical input, which was rolled out in stages and had clinical leadership and worked fine. It may be better to implement systems at a few trial sites first and get feedback from key staff, before going ahead with full-blown deployment. There should be a beta version, which the end-user is using and providing feedback. There should be some applications that are working in shadow, which the staff can test and provide feedback.
- The clinical staff doesn't want to work in technology without getting paid, and staff should be compensated appropriately for any additional work they put into technology.
- The usability aspect of the systems is essential. Too many windows to open, people get lost. The older generation has issues with systems usability, and young generations have problems in prioritizing, younger generations are intolerant to slow systems. Doctors don't use the system if it is not easy. They prefer to use integrated systems if they are confident with the information and are easy to use systems. Having usable sound systems becomes essential.

- Current systems are not utilized to full capacity, and some doctors still handwrite notes into the system, technology sometimes slows things down, people don't usually read if there is too much information, technology sometimes reduces face to face interaction, people don't want to stand in front of the camera, sometimes they don't know the number or how to use video conference. Considering human psychological aspects is essential in improving systems acceptability.
- Some suggested technology might not be available, and IT may not be aware of all the systems that exist and their functionality. Building enough knowledge in the IT workforce is vital to implement transformation projects successfully.
- Organisation size should be considered during system implementation. A rigorous organisation-wide change management process may be required to implement changes in a large organisation. Lots of good PR needs to happen during technology implementation.
- Some unwritten ground rule exists, which need to be broken. Currently, people use electronic pathways for banks; similar pathways should be developed for patients to use healthcare.
- Technology is moving fast, and everyone is developing their applications, technology adds a layer of complexity into the current roles, sometimes expectations exceed what the systems can offer, sometimes new technologies are cost-prohibitive. Doctors are sometimes fatigued and make errors. Nurses and other staff lack the necessary IT skills. People sometimes get click-happy, and there should be control in there to stop them from typing something silly. Human element needs to be considered in technology use.
- New technology needs to be embedded in the building infrastructure to keep technology upgrades up to date. If new technologies are not being made available due to cost constraints, then it is failing the clinicians. Legacy systems and infrastructure should be upgraded or be replaced. Health services upgrade their MRI, CT scan machines and get better versions. Similarly, IT systems should be reviewed and upgraded regularly.
- Plans to modify the process or IT are complementary and should be part of technology implementation. Clinicians must involve in the implementation who understand coal-face workflow and patient care.
- Resource and project go-live date was a concern for the patient choice booking system. Good project management capabilities are required. The project that has had a very structured, incremental approach with assigned resources had no cost blowouts. An

excellent project management framework must be introduced for managing technology-related projects.

- Most of the organisations do not do change management very well. Standard change management process such as getting people on board, getting them engaged, getting them to see the benefits, being involved in the reasons for it and getting them involved in the build is relatively necessary during digital transformation.
- Change needs to implemented fast, and change must be created for disruption where required. The projects that have had a lot of clinical staff engagement have succeeded. People who are working with the systems and working with people every day need to be promoting the systems.
- Technology implementation should be done in stages. The system rollouts which were done in stages and had clinical input were successful.
- People need to be introduced to technology and taught technology before it is being launched. Past the introductory technology phase, the effort needs to be sustained. Mobile devices and smartphones are useful tools to enable a clinician on a digital journey.
- Stakeholder buy-in is required for successful technology implementation. There was stakeholder buy-in in successful project implementations. The system implementations that were successfully incorporated feedback from the staff during the trial run.
- After six months of system implementation if there are no funding and local champions move on, then the system adoption will not work effectively. A sustained effort post-implementation phase is required for successful technology transformation initiatives.
- If the technology is intuitive and makes clinicians' jobs more comfortable, there will be minimal resistance from the clinicians. If the systems are not clinically intuitive, the clinicians will not be happy in using the systems. Unmet expectations lead to dissatisfaction. Expectations from clinicians should be managed by IT.
- Implementing change is the classic bell curve, some people are early adopters, and some of them resist. Implementing change will be a typical change management process, and there will be standard resistance. Managing change is about understanding people's expectations, providing education, understanding people, and supporting them through the process of gaining skills. Communication, support, and education are significant factors for change management. People will have to embrace digital as part of their daily life.

5.2.3.5 Organisational learning

Organisational learning was one of the key constructs that were identified from the data, which was impacting strategic alignment. This subcategory had 167 references from the regional hospital and 114 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Lack of enough training, lack of training strategy, lack of knowledge management, and document management systems were some of the key themes highlighted from an organisational learning perspective that would improve strategic alignment.

Table 5-23 Organisational learning construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	Total -n
Organisational learning	167	Organisational learning	114	281

5.2.3.5.1 Internal challenges for organisational learning

Participants highlighted the following internal challenges concerning organisational learning:

- If we are not using the system regularly, you may not be across what changes might have happened.
- It appears that we are expected to know how to use the system. We have staff who are 20 years old and consultants who are 70 years plus.
- Dealing with industrial problems is not a strong point in IT. The IT group needs more education in social science.
- Without staff continuity, we don't get the depth of knowledge.
- At the management level, it is mostly a lack of training and understanding. Staff training needs more focus. Management gives them the basics and lets them go and explore. More hands-on is important than training. Staff tends to learn on the run.
- Education and induction of staff to the system is not done well. When people start, on day one, they are supposed to know how to use the systems, but the training is set up to train people every week or later. You can't use HIS until you have done HIS training. One day training in HIS is not enough to order all your significant tests. If we had resources, we would develop training packages where the staff would complete the induction themselves online and then have face-to-face interaction as well.
- It is beneficial for staff to use a single system because they rotate around. We have got several systems, which the staff need to be familiar with. We don't even understand the complete functionality of what we have got. It is very disconnected, and staff cannot be proficient in all systems

- Education is comprehensive when clinical equipment is introduced but not so much when IT systems are introduced.
- The training is not a major issue, and I think the barriers are there are so many isolated systems.
- We haven't learned from our mistakes, but we keep repeating the same mistakes because we don't have the resources to correct our mistakes.
- There is insufficient training for night staff. The training was not tailored to the end-user requirements.
- Many people have not learned how to use the system and do not fill in mandatory information. The staff doesn't know how to complete computer-related checklists. There is insufficient training in new ICT tasks.
- Some staff hasn't had any professional development.
- Training is appalling, and nurses are supposed to take a guess. Shift workers miss out on the training because the training is conducted during day time. Part-time work makes IT training is challenging to come by. There is no support available to part-time staff. Training related to IT rollouts is inadequate. There is limited staff in IT training. Nurses have a patient load and can't take away time to attend training.
- Many medical consultants don't know how to use HIS, and they get the Registrars to do everything.
- New systems introduced are hard for staff to grasp who are not proficient in IT. Aging workforce struggle with the use of complex IT systems, regardless of the training. A proper training strategy needs to be put in place, and we have not seen one.
- A lot of people follow the bouncing ball and don't understand why they are doing it. If a curveball is thrown at them, they fall apart. There are a lot of people who don't know how to use the system properly. Training is more sort of window dressing. If people don't understand why they are going from A to B, they will take shortcuts. The same mistakes are made repeatedly in the way that they are delivered. People make the same mistakes again and again, and we don't think it gets addressed.
- We are not aware of any knowledge management systems. A lot of knowledge seems to reside on one or two hands. A keyword search for a policy does not work correctly. There is a hub that has a lot of information, but no knowledge management system as such. The search function has not been great. There is no comprehensive list of

applications, outlining which areas use that application and for what purpose. Information and knowledge are lost when people leave.

- IT is very weak in recognizing intellectual knowledge. People in IT should keep a log of essential knowledge. Knowledge is captured pre-dominantly by word of mouth, and we haven't seen any systems to do that. The organisation needs to review the technology gaps and learn from them.
- The training was barely adequate for Surginet, and we didn't know how to fix things if the mistakes were made. Our HIS training was with someone for 20 mins, showing me how to use the system.
- A system that can do a lot of things is minus for people who want to learn how to use it. When the program opens, it is very inefficient for us.
- Someone who uses the system every day is comfortable using the system, but not for an irregular user. We have people rotating through, and we have new staff all the time.
- Ward clerks don't understand the information that they put and sometimes input information from their perspective. A lot of clinicians in the ward find it difficult to attend training because of the lack of time.
- Not a lot of thought goes into who should attend the training
- With organisational learning, we have RiskMan. RiskMan is governed by the department of health. Lessons learned are held with experienced people and are not as transparent as they should be. A lot of knowledge is not shared between people. RiskMan seems more of a documentary tool than to improve clinical practice. There needs to be a tool to improve process improvement. Everything we do is no benefit unless we derive some benefit from what has happened. We don't think there is a mechanism in place for management to learn from the health users of the system.
- Documentation and work practices haven't been great at Health services. No one owns the end to end documentation that covers all areas.
- There is a lot of in-house training that happens, but not so much delivered by IT. The older staff are a bit more tech-phobic if there is a steep learning curve.
- We need to have flexibility in terms of how education is delivered. Lesser our engagement commitment to the organisation, the harder it is for us to be motivated to make the necessary investment in training.
- The systems are so complicated we get lost and can't find our way, we need refresher training when we go back. Our concern is the complexity of the system and the time it

has taken us to learn those systems. In some instances, we can narrow the gap, and in some cases, we can't.

- Health service is not adequately funded to send all resources to training programs to be proficient in IT systems. No one wants to pay for the training of casual staff.
- We don't do IT training in 5 different areas, and we are going to centralize IT training.
- Training needs to be online, but the efforts are placed on people's shoulders without enough experience. There needs to be more emphasis on the skills of content creation for training.
- Skills in ICT for staff has been low. All the focus is on patient care, and very little analytics is going on in the background. Clinicians say it is not their job to enter data into the systems.
- The intranet is not laid out well, and information is not searchable. The intranet is supposed to be a state-wide knowledge management system, with each HHS being able to localize them individually.
- We have a cohort of people that are not literate. Individual units work in silos, and they are at different levels of maturity. Some staff doesn't have access to computers or mobile devices.
- Knowledge management on the technical side, about what systems are available and how they interact with each other is currently lacking.
- When we do the training, it seems fine, but when we use the system, we come across issues. There need to be people who can come in and help us with the use of the systems.
- IT systems are covered in 2 days orientation program, and this is not enough to understand the systems.
- There is not enough training, and healthcare is inflexible.
- There are gaps in IT training. Sometimes there is no training, and we are given a manual and asked to read it ourselves. There is no training available for programs like Excel and MS Word.
- We sort of keep repeating the same mistakes. There is no register for lessons learned. There are no knowledge management systems in place. There are no document management systems in place. Lot for positions are temporary, so you don't get the depth of knowledge.

- Some people struggle with technology, while some people don't. The systems are complicated, and training sessions do not cover all areas. People need to work with the system for at least six months before they grasp the full use of it.
- Training is a challenge when there is high staff turnover. Sometimes training is what our co-worker shows us, and they may not know everything or even pass the error around.
- There is only a small team of trainers. Some applications are particular to business departments, so it is challenging to find trainers who can train in those applications.
- Sometimes what training we get is dependent on our managers. There is too much red tape to access training.
- Managers sometimes provide training to staff, and it is not their role to train staff. There is inadequate training given to administration staff.
- The intranet is not user-friendly for finding information, so we will have to be motivated enough and make 5 to 6 phone calls to get the information that we need.
- Sometimes we learn how to use the system by trial and error. Some IT applications have no training provided at all. Skills had to be learnt on the job rather than systematically developing people.
- Staff cannot afford to spend on their training. Some staff must pay for their own training.
- For some staff, there is very little professional development. The time required to complete the training is an issue for some staff. Training videos and guides cannot be forced upon people. Taking time out of the day to do the training is a challenge.
- Don't know if there are suitable knowledge management systems in place. A lot of managers hold their bit of space and their bit of knowledge. Knowledge management systems document knowledge, which is otherwise held by individuals. A lot of information on knowledge is held away in the business unit's dedicated drives. A lot of documents are emailed around. There is a bit of a lesson learned process, but it is not fully embedded. Knowledge is in the heads of the people.
- If the systems are not intuitive, training does not do much good. If we must look through a 600-page manual to look up how to do a specific task, then it is not very useful. Most of the IT training is done by non-trained staff, i.e., people showing each other how to use the system. There is no resource of time available for everybody to do formal training. The organisation is not resourced to train the trainer type model.

- Some of the training contents are very basic and slow. The percentage of staff is not very good with self-directed learning. The staff you don't use PC as part of their role, have difficulty accessing the online training. It is a vast range at HHS, and some staff doesn't respond well to some types of training, like online training.
- There is a good uptake of mandatory training. It is an impost on staff to do the training in their own time. Some of the training is a tick in a box which is very different from professional development. Training for some systems is limited to a sheet, which some people may not fully understand.
- We are controlled to a large extent on what rolls out state-wide.
- Buddying does not work that much, and maybe there should be go-to people. Some staff is guessing on how to use the systems because they have had no training on how to use it.
- Sometimes training is provided, but not to the relevant staff.
- We might not be there when the changes have happened.
- Training content is not targeted to an individual's needs, and the content is just grouped. Some clinical staff is not technology savvy at all.
- There is information overload in the orientation program.
- The administration staff does not have a professional development program. For some clinical staff, it is mandatory to do training to maintain their certification, but for others, there is no professional development, and things get swept under the carpet.
- There should be ongoing leadership training programs developed to train the new cohort of leaders.
- There are not enough trainers in the hospital.
- Previously staff got more training, now a day's they don't, co-worker shows you how to use the system.
- Different areas run their training. Some of the training is just for ticking the boxes.

5.2.3.5.2 Facilitators organisational learning

Some of the key findings identified by the participants, which will facilitate improving organisational learning in healthcare are:

- People should be taught about technology before it is implemented. Training provided just before the systems are being introduced is more effective and not eight weeks before the system release.

- Taking learnings from other projects is essential.
- Issues have been raised on training strategy and follow-up training. All staff members are not IT savvy and may take longer to learn. A training strategy needs to be developed based on individual and business unit needs.
- There need to be people who can come and help staff with system use. A co-worker may not have had proper training and cannot be relied upon to show correct information to new staff. It would be beneficial for staff who they can ring and make appointments when they have difficulties with using a feature of the system. Having super-users within the business unit to train staff is beneficial.
- Training during orientation is all crammed up in 2 days. There needs to be separate training for IT systems. There should be adequate training for new IT systems, as staff may sometimes be asked to do self-learning or look up a manual.
- There is high staff turnover, which impacts training. Staff turnover should be thought through in the training strategy.
- There is a lot of red tape in accessing training which should be reduced. The training strategy is required based on role type and must be associated with their job description. Training is a generic problem at the hospital, which needs to be addressed with people's capability development strategy.
- People need to work with the systems before they can fully grasp the systems. Some people only know part of the system. Training needs to be developed in more real-world situations.
- Some staff does not get professional development training, and training should be linked to the personal and professional development plan.
- Online learning and training videos cannot be forced as people don't have time. Some staff doesn't have the background or skill to do self-directed learning. Human interaction by the trainer is essential, which is missing in self-directed learning. Training should be planned based on an individual's capability and access to computer systems.
- Formalized training will have to be made available for staff, who can then train other staff. Train the trainer approach is required.
- All training records need to be consolidated into one place to find out where staff training needs are based on people's capability development strategy.

- Most people may not understand the training content, some may be basic users, and some staff may be advanced users. Training content should be aligned to the audience.
- Staff needs to be recruited at the right levels with the right level of knowledge.
- Knowledge management is essential in healthcare. Knowledge management applications are seen to improve efficiency in healthcare. Technology knowledge is changing very fast. Knowledge needs to be maintained and must be current with new knowledge. Knowledge management systems must be implemented to maintain organisational knowledge. The clinical knowledge network should be kept up to date. Case studies should be stored in knowledge management systems.
- Training plan and professional development should be part of job description and employment. There shouldn't be red tape to access training.
- Digital themes should be developed to enable users to understand how specific features of the system function and how to use them.
- Online learning should be used for refresher training since people forget how to use the system if they have not used the application for a long time. There need to be human interactions, where self-directed learning is not very effective.
- Document management systems are critical for health services. Document management systems will have to be built so that essential documents are not stored in staff hard drives and not lost.
- It is critical to implement technology initiatives properly. The initial use of technology will be difficult to staff. Staff will have to be supported in using the systems until they are familiar with the systems. Once they are familiar with the systems, they are OK to continue using the systems.
- Training needs to be within a work unit, rather than in a training room. Training programs should consider the aging workforce.
- People have built relationships internally. Health services need to train people first, rather than looking for skills from outside but requires a bit of both. Training programs will have to be developed to improve staff skills and capability. Processes and work instructions must be documented to train new staff.
- Coaching and mentoring programs must be developed. Trained staff can provide coaching and mentor for other staff.

- Lessons learned should be documented for continuous improvement. Lessons learned should feedback into the next project and the continuous improvement cycle. Lessons learned from another HHS will assist.
- Organisational learning is a necessary process to understand where HHS is failing. Learning organisation is a vital part of the digital journey so that health services are continually learning.
- It is essential to learn how to use technology in the models of care. Training programs will have to be kept current. There needs to be the sustainability of training programs. Training programs will have to be tailored based on the organisation's needs. A mixed type of training, some online and some face-to-face would be beneficial. Training resources must be available online when the staff needs access to these resources.
- Increased user-friendliness of the system can help with training. End to end functionality of the systems should be well laid out, so that staff understands which systems to use for which clinical functions. People should be taught why things happen a certain way; otherwise, the mistakes get perpetuated. Training sessions need to consider changes in workflow and system changes to IT.
- People who understand legacy systems are valuable. Their knowledge should be captured in the Knowledge management systems.
- Some of the systems are straight forward to use. An appropriate amount of training depending on the system which is tailored to the end-user is critical.
- Having a forum for people to go back to will help. There are systems of pairing people up and learning on the job. Health service needs to customize training from the base level to more advanced training for each of the modules.
- Staff needs to be involved in re-education, professional development, and personal development. Appropriate programs need to be put in place from a capability perspective in line with the strategic intent.

5.2.3.6 Investment

Investment was one of the key categories that were identified from the data, which was impacting strategic alignment. This subcategory had 68 references from the regional hospital and 122 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Lack of investment planning for the long term, the expectation of the benefits in the short term and lack of consolidated view on technology from an investment perspective from the government and

health services were some of the key themes highlighted that were impacting strategic alignment.

Table 5-24 Investment construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Investment	68	Investment	122	190

5.2.3.6.1 Internal challenges for investment

Participants highlighted the following internal challenges concerning investment:

- There is a chronic lack of investment. Hospital has a self-funded implementation of clinical systems. Another hospital now is waiting for the government to fund EMR implementation, which is just not happening. There is a lack of investment over a sustained period.
- IT has grown organically or opportunistically because there will be a little bit of funding or grant, and that is precisely what happens, and that is not ideal by any stretch or imagination. We must balance what is idealistic and what is realistic. The government is not going to give us 200 million dollars to implement our IT strategy or even half of it. So, we need to be opportunistic in seeking funding for that. It does compromise our well-planned IT strategy, but we must navigate to a compromise.
- Hospitals do not have a longer-term view and tend to operate in political cycles. Clinical managers are not strategic with technology investment. Their priority is now and about patient care.
- Upfront investment will be high even though there will be a longer-term benefit, and it will be beneficial. Getting people to take the risk upfront will be a challenge.
- There is a lack of investment and clarity around strategic areas of need. We have been very reactive rather than proactive in addressing issues. We have taken up the opportunity when funding has arrived in small pockets to take the money and address a local need vs. organisational priority, which may rate in a different way for different things.
- People are very cautious about how they spend because it is critically visible when you spend public money.
- Our understanding is that there are certain parts of HIS that we have not purchased, which means we cannot introduce timetabling from the allied health point of view.

- Doing most of the things in HIS seems to be cost-prohibitive. We have rolled out Tap on and Tap off to clinical areas but have not rolled it out to other areas like allied health. The cost of doing this properly seems to be a significant barrier. Not being able to invest enough is a barrier. There appears to be an underlying barrier around cost.
- We don't think we document the investment correctly. We are not sure, and if we don't record the benefits, it comes down really to no money to invest.
- With new investments, we may save money or we may not, but it is going to be terrible if we don't invest, and it is going to fall over. We are starting from a weak base, so the realization of benefits may not be significant, because we must fix the basics first and then worry about benefits realization.
- We didn't know where we were going, what we did was took some funding which was available and did what we could do with it. Funding is sometimes opportunistic, rather than being planned. We are now almost half stuck and are currently seeking more funding to complete the whole picture.
- We haven't the vision, the map, and we have not understood the resources required, the financial resources needed. We don't have a strategy of continuing to invest in improving.
- Technology is a dynamic field and capability of the product changes over time, and we are stuck, once we have invested millions of dollars, we are reluctant to sort of change. We are set and forget mentality.
- Investment is sometimes not clearly articulated, or they are opportunistic. Our investment is built on being opportunistic, and the government does not have a clear strategy either.
- We are not sure if the electronic medical record is about saving time, it is about having transparency of information, the accuracy of the information so that it can be read. In the long term, it is going to be transformational, as we build data on these records and do analysis. There is a benefit for the community in the long term, and for the short term, it is the transparency of information, accuracy, and accessibility.
- It is not about saving time, and it is about documenting differently. People take a short time view of ICT that it is going to reduce waiting time, reduce errors immediately. I think there has been a lot of short-termism in the expectation of the benefits of IT.
- We need to influence the people who give us the resources and make them aware of the vital need for ICT. We need to influence the people who hold the purse string for public

health. In the past, we have been burnt with ICT projects with transport, health, but they need to get past. It is a bit of a perception thing. We need to improve the politician's confidence that IT is well managed, and it is time for them to invest, invest significantly.

- There has been a lack of strategic investment over time. There haven't been finances available because of the ongoing budget cuts by the government, and the changes in the government.
- Our investment in innovation and technology upgrades have been on customer complaints because we don't always have the money.
- The funding model is problematic. The funding model, as it exists, does not cover all our costs. With an activity-based funding model, the revenue we get covers 70% of our cost, so any funding surplus is directed towards the basics, like replacing new beds and clinical equipment. It leaves us very little to invest strategically unless you have a long-term view. The current funding model keeps the patient's kind of looked after. The revenue we make as an organisation is very limited in areas such as car parks, or in some commercial ventures, we are not set up as an organisation to focus in these areas.
- We don't have a very good grants process here, so we are not aware of anyone who is actively scouring organisations that are offering grants.
- Fundraising is very tricky as it needs to appeal to the donor. The donor has different views on what they want out of donating money.
- Research funds are getting very harder to acquire because it is getting very competitive. International sites can do better at a competitive rate because they can pay their staff a cheaper rate.
- When we get close to the election cycles, where there was no money, suddenly the money becomes available for good media exposure. Your business cases can get rejected because it wasn't the flavour of the month with the government, even though it is the right thing to do. Sometimes suddenly we get money, which we weren't planning, because of things like a complaint in the society around mental health issues. Where we need investment in technology or data, we struggle with.
- We see the benefits of being able to deliver care from home, which is cheaper, but again, we are stuck because there is a considerable upfront capital investment. It's frustrating when we can see the benefits of doing that. We pay a lot of tax in this country. We think it should be a priority for the government to do this.

- Organisation in the past has taken the approach that we have got the money, let's go and get it done. I think we are now suffering from that approach of work duplication and risks to patients.
- Full implementation is better than a half-baked hybrid approach, but we need millions to do that.
- Money is the gap, and we haven't seen the building blocks and the period. The size of the investment is going to be significant to get to the future. In the long term, we should be able to take that cost out of business, so it is building that business case. Making our clinicians mobile and automating workflows will save us money in the long term. We need to articulate well and what it looks like, as to why we are going to put a million dollars into this new IT system.
- At the hospital, there is a natural tendency to put money into patient care. We need to be working with the politicians and the ministers on this. We don't have direct access to cash, everything that we need must go through a business case to the department. So, it is going to take time, and it is tough to get the upfront money flowing we are going to struggle to get all the funding locked in upfront, and we need to be creative on that front.
- It is not a natural response to benefits realization, and we do not track benefits.
- We have got capability barriers in writing a business case and what it is going to take to put them together.
- There is an insufficient investment to support business goals.
- There is no funding for innovation. We fund capital projects, but not an innovative approach to anything.
- There is a total disconnect between departmental direction and the funding that goes with it.
- We don't get Operational Expenditure (OPEX) funding for technology, and it continues to erode the system. The project was Capital Expenditure (CAPEX) funded, but now there is no OPEX to support it.
- Capital is allocated to infrastructure, and technology uplift is part of it.
- Banks have a good understanding of the importance of technology to the business and hence had proper funding. The health sector needs the right directional objectives, and right funding inputs to deliver the correct outputs. May be in Health service they don't understand the benefits, maybe they are not interested in it, or perhaps they don't

understand it, there are a lot of factors to the gap in technology investment. From the investment perspective, it gets pigeonholed into a silo, and it works best for that department.

- The decision around HIS was around political and financial reasons.
- There is a lack of investment in health infrastructure across Australia. We are told that there is no money to buy superior products, and we are still using unsupported products. It is better to go for the systems that work for the clinicians than to go with cheaper products. Manual workarounds do not make things safer for patients. Management has shown an emphasis on the budget and clinicians care about the patients.
- We have problems because we did not buy all the bits.
- We need to invest more in capabilities like business analysis. There is too much layer of middle management. Some of the middle management can be replaced with investment in ICT.
- If we poured money into the ICT systems, we are not sure if it is going to be significantly faster. We can throw a significant amount of money at IT, but if there are no systems to buy, then the investment is not going to be worthwhile.
- Every dollar we spend is scrutinized in the public health environment. We think where the money comes from gets a more prominent focus, rather than the poor clinician at the bedside trying to use the system. We believe we went with the cheapest option, hoping things will eventually fix together.
- Investment is small in the public environment that there will be gaps. Purchasing the whole suite of products is expensive.
- There is a blow out of costs along the way, and they do not achieve what they intended initially.
- Digital will not be embraced if it is seen as a cost-saving initiative and not improving clinicians and the patient's user experience. We sure technology can improve quality, but not so sure if it can reduce the cost. There will be saving in areas such as length of stay, avoidance of complications, and it gets back to how we are funded for the activities that we perform.
- There is limited money in public and private healthcare services to improve the IT systems. There is a tension between what is desirable and what is achievable. Hospital management would be reluctant to implement, expensive, unproven technology. We need to understand the cost of making a 10-15% improvement to the existing systems

because it may be costly, and the value may not be there. We have about 130 - 200 systems. We have seen an environment where they have 1000 and significant IT spend.

- There needs to budget allocated for the renewal of hardware and software. There is no money to adapt to any of the good solutions that are available. We have some fantastic opportunities, particularly with the number of mobile devices in Australia, but we need money to do that. Public health cannot afford Business to Business (B2B) solutions. Organisations sell fantastic solutions with a hefty price tag, which is not affordable and sustainable.
- There is a cyclical nature of the stakeholders who are in control of funding, so sometimes it goes up, and sometimes it goes down.
- We don't think for some of the systems, we have invested in the right systems.
- Solutions will take a long time to implement because of drip feed funding and stakeholder landscape. By the time the solution is implemented fully, it will be the end of life.
- There is a continuously growing population in this country, and money is tight. The health environment is ten years behind other businesses. We are always lagging, it costs us, and we are bleeding money.
- There is no end to end strategy as to why we are duplicating resources in these five areas.
- We must spend money on providing free Wi-Fi to patients, and no one wants to spend money if there is no charge.
- Investment is spread out too thin because of their own mistakes. ICT funding has become very expensive. Getting a return on investment and return on ownership is a challenge so that we don't throw money away.
- The ICT infrastructure is an afterthought in the healthcare industry.
- There will challenge of Full-Time Equivalent (FTE) to get us to the fully digital platform. The challenge is having the resources and skills available.
- The investment needs to improve patient outcomes, patient experience, patient safety, and process efficiency. If we need a senior person to administer the software or a doctor, the hospital management will currently go with the doctor.
- Nobody is willing to pay for bridging into more generic holistic solutions when they have invested in local solutions. Investment is an issue in healthcare for clinical IT solutions when the money has been spent on bureaucratic auditing.

- We spend a reasonable amount of money on widgets. It is about how much of chips we have in the box to deal with the systems. There are several small systems because of the cost factors to move to Enterprise-wide systems, as well as the political considerations. Different competing people have different visions for investment.
- Investment in prevention activities like drugs and alcohol is lacking.
- There is a bit of funding to do this and a bit of funding to do that, so they end up doing similar things. Funding comes in bits and pieces, and there is a gap, systems are built to address the gap.
- There is a lack of transparency on how the money is being spent.
- Investment needs to be addressed on a more regular basis. There is a lack of investment in IT staff.
- Australia, as a country, compared to New Zealand, is lacking investment in information technology in healthcare space.
- Fiscal challenges could be a barrier to digital transformation. New systems cost a lot of money. Money always goes first to clinical. It always comes back to the power of the dollar and how much the management wants to invest in technology. IT is very low on the pecking order for funding.
- The first people to get impacted with funding cuts are non-clinical, i.e., admin, IT, and it affects areas such as innovation. There was a lack of commitment to invest in technology.
- Staff is limited with what they can purchase due to budget restrictions. Technology implementations are hindered due to budget restrictions.
- Investment in technology is currently like a plug, just fixing things that are broken. Funding is not a long-term strategy, and it is in short sprints.
- The funding in government is more reactive than proactive. Funding in government is more to treat an immediate problem then invest in something to prevent in 10, 20 years.
- The activity-based model of care is a problem in healthcare. The activity-based model attracts funding to treat patients but does not account for preventing people from falling sick by keeping the population healthy.

5.2.3.6.2 Facilitators for investment

Some of the key findings identified by the participants, which will facilitate investment in the healthcare sector are:

- ICT is an integral part of the healthcare infrastructure. Investment in technology should be considered fundamental to healthcare infrastructure.
- Helping the government understand the business case around why we would invest in technology space and what are the benefits it would bring to the business, to patients, all those things are essential. It's about helping management see, how it is going to help them in what matters most to them.
- Some of the organisations like CSIRO put forward funding rounds for innovative ideas. Hospitals need to capitalize a bit more on these types of opportunities.
- As we don't always have the money, we have strategically partnered with CSIRO, Telstra, and other partners. We have partnered with organisations, who have got funding specifically for innovation. We need to be smart about how we do certain things because we don't have a lot of money to invest. When we got less money, we need to be more innovative. Often great ideas come out when we don't have a lot of money to spend on something. Partnership opportunities with other organisations should be considered.
- IT systems will have to be funded to be continuously refreshed and updated to mitigate any system downtime. Outdated systems and infrastructure have a significant impact on clinical staff and their clinical workflows. OPEX must be allocated to upkeep the systems. Ongoing investment in technology must be sustained.
- HHS needs to understand what the things are that they are going to stop investing in so that there is no duplication of systems and services.
- Funding does compromise a well-planned cohesive IT strategy. Investment strategy needs to be developed to support the organisational strategic intent.
- The hospital is risk-averse, and Health services need to make educated risk to invest more in ICT with longer-term benefits realization.
- Health services should look for opportunities outside the funding model because the current funding model keeps the lights on.
- Technology can empower people in leading a healthy life as much as they can, and there is a vast potential in that area to enhance the patient experience by investing in technology. Patient experience and quality of care should be an essential part of the investment strategy.
- Health services need to be smart about their digital strategy and at least partially fund these developments and strategy implementation on their own. The health services

should actively pursue any funding opportunities that the department has. Fundraising and research are another avenue for money and must be actively pursued.

- ICT is a significant part of healthcare infrastructure and requires ongoing investment. Like we replace everything in healthcare, we will have to replace IT modules as well.
- There are benefits to investing in technology. Technology will make clinicians' jobs easier. It will help connect across different systems, which will reduce clinical risks, increase efficiency, it will enable clinicians to make more informed and better decisions. If it was going to improve patient care, if it is going to minimize risk, if it is going to drive better research outcomes, then clinicians will listen, which will encourage technology investments. ICT system can stop the errors of providing the wrong medication or ordering the wrong test to the patients.
- Cost of doing nothing, cost of maintenance, cost of risk, cost of missed opportunities, cost of national productivity increase, all of it should be included in the business case for technology investment. Health services need to have an overriding business case, and then they need to break it down into chunks and go to the government department.
- There needs to be a balancing act for investment in technology space from clinical groups. ICT needs to be treated as the clinical space of the future with joint ownership from the clinicians. The use of technology has become a fundamental necessity in healthcare.
- Collaboration and key partnerships are essential when the HHS cannot afford to invest in technologies or develop their expertise individually.
- The government needs to start investing in state-wide standard systems and infrastructure. There needs to be financial support to roll out the national digital platforms by the government.
- HHS needs to articulate where they are trying to get to and paint a picture so that they can ask for resources.
- There is more focus on clinical because that is the business that healthcare services are in. It is vital to leverage strategic intent to get investment.
- Funding should be focused on the desired outcomes for the community. It should be about being realistic with the health budget and making efficient use of it for the long term.
- The funding model in healthcare needs to be reviewed. The current funding model is an activity-based, more outcome-based funding approach that will be required, which

will make the requirement to invest in technology, public health, and well-being more visible.

5.2.3.7 *Measurements*

Measurement was one of the critical categories that were identified from the data, which was impacting strategic alignment. This subcategory had 67 references from the regional hospital and 21 references in the metropolitan hospital. These references have been summarised through memoing as internal challenges and facilitators to illustrate the theme. Inaccurate and not well designed performance measurements for job roles based on structure, activity-based measurement instead of using outcome base measure, and not having proper objective measures were some of the key themes highlighted from a measurement perspective that was impacting strategic alignment.

Table 5-25 Measurements construct coding

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Measurements	67	Measurements	21	88

5.2.3.7.1 Internal challenges for measurements

Participants highlighted the following internal challenges concerning measurement:

- Health services don't know where we are going so, and we don't know what to measure.
- Standardization of metrics is challenging because everyone will look at it from a different perspective. Disparate groups have different needs.
- Doctors are becoming super-specialized, and it is a real challenge around how we meet everyone's needs. Even in general physicians, most of them have subspecialty like a respiratory physician, which will pose challenges in terms of standardization of metrics. Any metrics that go beyond the basic metrics will get complicated.
- People don't have time, and they make up the data required for the Key Performance Indicators (KPI's). Some clinicians don't want to do complete certain activities because it is not part of their job.
- Inputting timings is a type of measure and a lot of times we adjust them because we need to rush to address patient issues and we are inputting it half an hour or hour later. If the hospital is relying on timings for some measurements, then the timings are not correct.

- There is a lot of government reporting requirements, like VAUD, VMED, and VINA. The government dictates what data they need to be extracted because they want to measure specific performances.
- IT measurements have a lot of financial bias and do not measure on a clinician or a patient care basis.
- Essential information like name, address, patient needs, and discussions that are held are not appropriately captured. This impacts any reporting and analysis that is done from the data.
- We are not sure if the field services group has a KPI around the jobs that are assigned to them by the Service desk.
- There is a KPI around, how quickly the scanned information is available, as supposed to be acceptable. There may be 24-36 hours gap in scanning information and having it online.
- The government says you need to see the patients within this timeframe under these certain conditions and the hospital provides the necessary tools to do that.
- Some measurement metrics are inaccurate or have the wrong focus. The measurements are not objective at times.
- Some of the structures for reporting are incorrect, and this leads to incorrect KPI's for staff.
- Incorrect things are getting measured, so we are currently managing the activity rather than an outcome.
- The measure required in the reports are not very well defined, and there is a disconnect between what is clinically recorded and what is being reported.
- Measuring outcomes benefits for services like mental health will be a challenge.
- The funding model has been created to incentivize activity and not the outcome.

5.2.3.7.2 Facilitators for measurements

Some of the key findings identified by the participants, which will facilitate improving measurements in healthcare are:

- The existing metrics will have to be reviewed and validated. Metrics that are validated and are evidence-based will go a long way in ensuring standardization. Health service might be able to get agreement on standardization of metrics for a cohort of specialized doctors like Oncologists.

- Measures will be required around patient experience and the health benefits that they are getting from the service. The patient experience might be something that health services could use to measure as a standard.
- Health services need to be collecting information that adds to patient care and not just for reporting. Patient-reported outcomes could be a new quality measure.
- Employee profiles may change in the future with the implementation of digital technologies, and measurement metrics will have to be reviewed to stay in line with digital change.
- Incorrect reporting structures leads to incorrect metrics being assigned to the clinical staff. The KPIs should be reviewed and realigned based on staff role type and organisation structure. Measures must align with organisational structure, and KPI's will have to be fed into the role descriptions.
- IT will have to build the measurements in conjunction with the business. Technology can be used to develop measures for example how many people are arriving too early for their appointment, how many patients are going to the wrong location and how long does it take for the doctor to see the patient once they have arrived. The other metrics might be, how long does it take to treat after the patients have been referred. IT needs to align these metrics with the strategic plan. The ultimate measure would be the achievement of the broader strategic plan.
- Weighted activity units (WAU) is a form of the current measure, which needs to be reviewed for improvement. The measures should align with outcomes rather than activities.
- Learning and development measures should be built into the staff job descriptions. Building learning measurements into the staff job descriptions will help the part-time staff and shift workers with their training needs.
- Clinicians should be provided time to be able to be involved in technology-related work. Measures will have to be developed around clinician's participation and contribution to technology.
- The current indicators for measurement of the clinician's work will require improvement. Metrics and measurements will be required for measuring the efficiency of doctors and for avoiding duplicate efforts.
- KPI's will have to be developed around engagement, collaboration, and behaviour. KPI's should also be about teamwork and technology use.

- Community buy-in will be required around measurements such as, how would we get the patients engaged in managing their healthcare.
- Improved measures will be required in the prevention services, for example, reduced access to chronic service and emergency services. The measurements will have to be based on outcomes and should enable people to live healthy lives. The outcomes should be around preventing people from having an illness such as diabetes and obesity, rather than providing treatment for diabetes.
- Measures around the outcome-based approach will have to be properly thought through and designed. Measuring outcomes, such as fixing a broken leg, can still drive the patient to the hospital.
- Measures will be required around clinics and education sessions delivered at aged care, kindergartens, schools, universities, and community groups by the HHS. Measuring the health of the community is essential. Measurements around (Primary Health Network) PHN needs assessment and improvement.
- National productivity increases if people are not sick with an illness such as diabetes and obesity. National productivity increases need to be measured for measuring prevention benefits.

5.3 Results

Eighty concepts, twenty subcategories and three core categories emerged during the data analysis in the open coding phase of the open-ended survey question and semi-structured interviews as illustrated in Table 5-23, Table 5-24 and Table 5-25. The open-ended question, which was of free text format yielded a wealth of information from the participants in terms of their additional feedback. Through axial coding procedures, open codes have grouped the concepts into 20 subcategories, which fell into the three overarching core categories. Tables 5-23, 5-24 and 5-25 below also summarizes the frequency of the subcategories and the themes expressed by the participants under each subcategory. The subcategories are grouped under core categories. Selective coding procedures elucidated the interrelationships and relationships between the subcategories and the core categories. The thematic elements of the core categories and the subcategories are illustrated in Tables 5-23, 5-24 and 5-25. Three core categories were identified from the GT-lite qualitative analysis. The three core categories were:

- Strategic intent
- Strategic alignment

- Technology use

The conceptual model (see Figure 5-1) outlines the process of impact of ICT use on strategic intent and strategic alignment. The conceptual model is created from the three core categories based on how the core categories are interrelated with each other concerning strategic intent. Strategic intent was a higher-order construct which was impacted by strategic alignment and technology use constructs. The predictability of technology use and strategic alignment on strategic intent was theorised from the information derived through GTM-lite analysis. Improvement opportunities were identified from the themes arising under each of the subcategories. The themes also identified some of the internal challenges and facilitators concerning the subcategories.

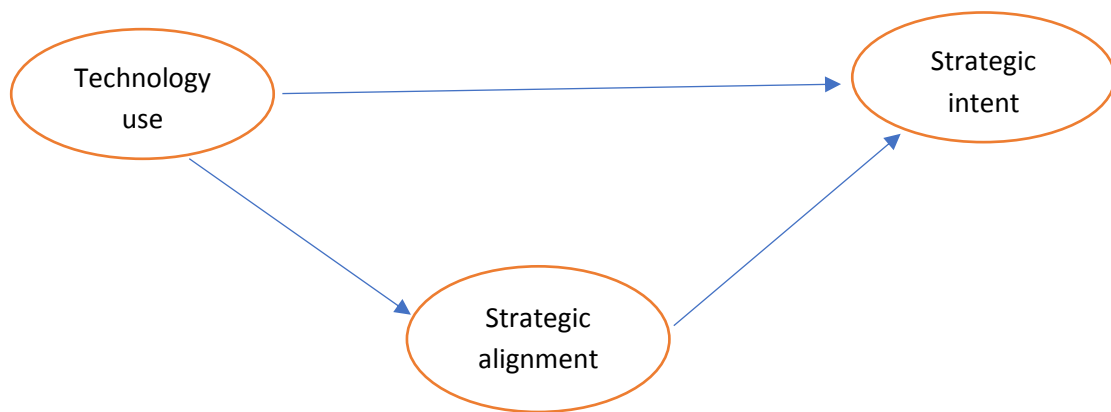


Figure 5-1 Conceptual model

Table 5-26 Strategic intent sub-categories

<i>Categories</i>	<i>Sub-categories</i>	<i>n</i>	<i>Themes</i>
Strategic intent	Strategic direction	1366	
		496	
		214	Issues around strategic planning
		187	Issues around ICT strategy
		122	Technology planning issues
		29	Understanding organisation strategy
		19	State of the organisation
		23	Strategy implementation
		29	Understanding IT strategy
		22	Defining strategic priorities
		22	Identifying strategic priorities
	Enablement	295	
		135	Lack of skills
		124	Lack of resources
		70	Time constraints
		9	Lack of time due to system issues
	Engagement	292	
		109	Communication issues
		60	Issues with stakeholder engagement
		60	Lack of proper stakeholder engagement
		58	Lack of clarity in stakeholder requirements
	Culture	251	
		99	Not enough collaboration
		53	Support change
		17	Bureaucracy
		7	Power
	Leadership	108	
		11	Lack of trust
		9	Transparency
		6	Leadership style
	Information continuum	112	Requirement of information flow
	Ecosystem	49	Partnership

Table 5-27 Strategic alignment sub-categories

Categories	Sub-categories	N	Themes
Strategic Alignment	Governance	1332	
		470	
		204	Structure
		16	Accountability
		115	Risk Management
		62	Policies and Procedure
	Organisational learning	48	Ethics
		281	
		262	Training
		110	Training strategy
		51	Knowledge management
		28	Lessons learnt
		11	Knowledge gap
		3	Document management systems
	Technology transformation	238	
		121	Technology implementation
		59	Technology upgrades
		49	ICT Change management
		7	Technology Impact
		33	Project Management
	Sustainability	126	Prevention, Health literacy
		353	
	Investment	136	Benefits
		51	Efficiency
		8	Quality
		47	Financial model
		26	Cost
		26	Budget
		42	Investment planning
	Measurements	88	Inaccurate measurements
	Procurement	66	Economies of scale

Table 5-28 ICT use sub-categories

Categories	Sub-categories	n	Themes
ICT use		1391	
	System Design	479	
		115	Systems integration
		163	System Useability
		58	System Requirements
		70	Patent centric design
		64	Design issues
		27	Legacy systems
		9	Time constraints- system issues
	ICT Operations	465	
		176	ICT Support
		33	ICT Application Support
		197	ICT Process
		118	ICT Infrastructure and devices
		32	Availability and Capacity issues
		14	Shadow IT
	Information Management	331	
		54	Access Information
		70	Data Integrity
		53	Privacy and confidentiality
		61	Interoperability
		47	Security
		50	Information standards
		27	Data analytics and reporting
		20	Information Currency
	Leveraging ICT	319	
		128	Use of technology
		77	Enabling Technology
		75	Innovation
		11	Knowledge Gap
		14	Shadow IT
	Agility	14	Mobile devices
	Platform	19	Standard infrastructure platforms

Table 5-29 Common themes for metro and regional hospital

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Access information	36	Access information	18	54
Accountability	8	Accountability	8	16
Availability, performance and capacity issues	11	Availability, performance and capacity issues	21	32
Benefits	118	Benefits	18	136
Budget	17	Budget	9	26
Bureaucracy	13	Bureaucracy	4	17
Collaboration	45	Collaboration	54	99
Communication	55	Communication	54	109
Cost	18	Cost	8	26
Culture	138	Culture	109	247
Data analytics and reporting	13	Data analysis and reporting	14	27
Data integrity	35	Data integrity	35	70
Design issues	28	Design issues	36	64
Document management systems	2	Document management systems	1	3
Ecosystem	32	Ecosystem	17	49
Efficiency	21	Efficiency	30	51
Enablement	184	Enablement	111	295
Enabling technology	52	Enabling technology	25	77
Engagement	149	Engagement	143	292
Ethics	35	Ethics	13	48
Financial models	40	Financial models	7	47
Governance	266	Governance	204	470
ICT application support	22	ICT application support	11	33
ICT change management	35	ICT change management	14	49
ICT infrastructure and devices	49	ICT infrastructure and devices	69	118
ICT operations	200	ICT operations	265	465
ICT process	75	ICT process	122	197
ICT support	116	ICT support	60	176
ICT use	719	ICT use	672	1391
Inaccurate measurements	5	Inaccurate measurements	1	6
Information continuum	56	Information continuum	56	112
Information currency	6	Information currency	14	20
Information flow	7	Information flow	1	8
Information management	189	Information management	142	331

Information standards	24	Information standards	26	50
Innovation	40	Innovation	35	75
Interoperability	29	Interoperability	32	61
Investment	68	Investment	122	190
Investment planning	15	Investment planning	27	42
IT Strategy	109	IT Strategy	78	187
Knowledge gap	6	Knowledge gap	5	11
Knowledge management	32	Knowledge management	19	51
Leadership	67	Leadership	40	107
Leadership style	4	Leadership style	2	6
Legacy systems	19	Legacy systems	8	27
Lessons learnt	15	Lessons learnt	13	28
Leveraging ICT	191	Leveraging ICT	128	319
Measurements	67	Measurements	21	88
Organisation state	16	Organisation state	3	19
Organisational learning	167	Organisational learning	114	281
Patent centric design	31	Patent centric design	39	70
Platforms	9	Platforms	10	19
Policies and procedures	39	Policies and procedures	23	62
Power	6	Power	1	7
Privacy and confidentiality	35	Privacy and confidentiality	18	53
Procurement	44	Procurement	22	66
Project Management	21	Project Management	12	33
Proper engagement	36	Proper engagement	24	60
Quality	5	Quality	3	8
Resources	71	Resources	53	124
Risk management	62	Risk management	53	115
Security	25	Security	22	47
Shadow IT	2	Shadow IT	12	14
Skills	89	Skills	46	135
Stakeholder engagement	36	Stakeholder engagement	24	60
Stakeholder requirements	25	Stakeholder requirements	33	58
Strategic alignment	784	Strategic alignment	548	1332
Strategic direction	270	Strategic direction	226	496
Strategic intent	780	Strategic intent	586	1366
Strategic planning	113	Strategic planning	101	214
Strategic priority	3	Strategic priority	19	22
Strategy implementation	14	Strategy implementation	9	23
Structure	109	Structure	95	204
Support change	37	Support Change	16	53
Sustainability	106	Sustainability	20	126
System Design	222	System Design	257	479

System requirements	43	System requirements	46	89
System useability	45	System useability	118	163
Systems integration	79	Systems integration	36	115
Technology impact	6	Technology impact	1	7
Technology implementation	75	Technology implementation	46	121
Technology planning	63	Technology planning	59	122
Technology transformation	153	Technology transformation	85	238
Technology upgrades	40	Technology upgrades	19	59
Time constraints	34	Time constraints	36	70
Time constraints- system issues	8	Time constraints- system issues	1	9
Training	154	Training	108	262
Training strategy	69	Training strategy	41	110
Transparency	6	Transparency	3	9
Trust	8	Trust	3	11
Understanding IT strategy	13	Understanding IT strategy	16	29
Understanding organisation strategy	18	Understanding organisation strategy	11	29
Use of technology	94	Use of technology	34	128

The themes that were different in the regional hospital and metropolitan hospital are illustrated in Table 5-27. Geographic spread, lack of agility, manual workaround duplicate application and processes were some of the themes that were specific to the regional hospital. This can be attributed to the widespread and remoteness of regional health services. The requirement for health literacy and focus on prevention was also highlighted in regional health services. The need for patient and staff empowerment, design constraints of the existing systems, development of strategic capabilities and not understanding the complete capability of the existing systems were some of the themes that were specific to the metro hospital.

Table 5-30 Different themes for metro and regional hospital

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>
Agility	14	Behaviour	8
Duplicate applications and process	3	Delivery	2
Duplicate work	9	Design constraints	4
Facilities	1	Empowerment of staff and patients	4
Geographic spread	5	Information access	9
Health literacy	24	Politics	5
Manual workarounds	13	Strategic capabilities	9
Prevention	29	Technology construct	5
Safety	8	Technology state	7
		Understanding the capability of existing systems.	2

5.4 Preliminary findings

The qualitative analysis of the themes yielded the following preliminary findings:

In order to improve strategic intent, the below dimensions had to be improved:

- The culture in healthcare organisations required to be changed. Everyone was under pressure, looking after their little area and protecting their own areas, and there was not a lot of impetus to change the system. There was a lack of collaboration between different units within healthcare, and the mindset was “we have always done a thing like this” (Clinical staff). Cultural change was required to challenge the status quo.
- Building ecosystems between other healthcare providers, suppliers, and partners were required to deliver the strategic intent. The strategic intent could not be accomplished by a single health service alone, without building appropriate partnerships and ecosystems between different participating healthcare service providers.
- The smooth and continuous flow of data within the ecosystem was required to achieve the organisational strategic intent. Without the constant flow of information, the ecosystem built for healthcare would be ineffective. The flow of patient information will be impacted if the data does not flow seamlessly between healthcare service providers within the ecosystem.
- Authentic and robust leadership was required for delivering long-term strategic goals, and the leadership had to be stable.
- Having clear organisational direction with strategic priorities identified was important for delivering the strategic intent. The strategic intent could not be accomplished

without having a clear plan and by not having the strategic priorities identified. Strategic capabilities would have to be built to achieve strategic priorities.

- Having the staff enabled to deliver the strategic priorities in terms of resources, time, and skills were essential to address the organisational strategic intent.
- Staff will have to be engaged in terms of listening to their needs and participating in the strategic direction of the organisation. Staff engagement was necessary for achieving organisational strategic intent.

In order to improve strategic alignment, the below dimensions had to be improved:

- Good vendor management, contract management, and strategic procurement to achieve economies of scale were required for improving procurement.
- Ethics, structure, accountability, policies and procedure review, and improving risk management were required from a governance perspective to improve strategic alignment.
- Development of prevention programs and patient literacy to control the demand side of healthcare, investment in technology to generate better clinical outcomes which can reduce healthcare costs by the reduction in duplicate tests, faster processing of patients, and providing care closer to home were some of the key themes highlighted from a sustainability perspective that could improve strategic alignment
- Organisation change management, organisation size, trialability of the systems, project management, and technology upgrades were some of the key digital transformation themes to improve strategic alignment.
- Lack of enough training, lack of training strategy, lack of knowledge management and document management systems, and lack of lessons learned approach were some of the key themes identified from an organisational learning perspective. Improvement in organisational learning was required for good strategic alignment.
- Incorrect measurements for job roles based on organisation structure, activity-based measurement instead of using outcome-based measures, and not having proper objective measures were some of the key themes highlighted from a measurement perspective that were impacting strategic alignment. Improvement in key performance measurements was required for improving the strategic alignment.

To improve technology use, the following dimensions had to be improved:

- Systems integration issues, legacy systems, system performance, and systems usability were identified as the key issues related to system design. There was a need to make the system design more patient-centric to improve the patient experience.
- Having standard digital platforms for infrastructure delivery, which was quickly configurable and interoperable, was required to improve technology use.
- Fostering innovation within the organisation, keeping technology updated with how it is used outside of the workforce, and using technology to enable clinicians to improve clinical outcomes were identified as necessary for leveraging emerging technology and innovation into clinical practice. Shadow IT had to be reduced by making the technology more aligned with the clinician's needs.
- ICT infrastructure issues, ICT process, lack of facilities for computers, and service desk issues were impacting technology operations in healthcare. Clinical workflows were not aligned with ICT system workflows, so much so that they had to be improved for better alignment of technology use and for enhancing ICT operations within healthcare.
- Privacy, security, confidentiality, access, and data integrity issues were some of the critical themes identified that should be addressed to improve information management in healthcare. The national framework for information management was lacking with every state having its policies for information management. The national information management framework had to be put in place to improve technology use.
- Mobility of the clinician's care closer to home, and the ability of the patients to access data from mobile devices was the key theme highlighted which would improve the agility of the clinicians and the patients and hence improving technology use.

6 Study 1 Quantitative analysis

6.1 Introduction

The online survey was conducted at the metropolitan hospital and the regional hospital with clinical and non-clinical staff to understand their views regarding the organisation's strategic objectives, strategic alignment, and technology use. The survey link was sent to approximately 3000 staff at both sites. The participants were informed about the study goal and ethics protocol. The survey was designed to understand if there were any dependencies of TOE factors with the organisational strategic intent. The total number of participants that participated in the survey was $n = 434$; $n = 292$ complete responses were received for all the questions. The survey had a total of 60 questions and took approximately 20 minutes to complete. Some of the responses were not completed as participants tended to drop out in the middle of their survey, which can be attributed to the time constraints of the clinical staff. Incomplete or unfinished responses were not used for statistical analysis in this study. The demography of the participants who participated in the survey is shown in Table 6-1:

Table 6-1 Participant demographics

<i>Role</i>	<i>n</i>	<i>% Total</i>	<i>Complete responses</i>	<i>% Complete responses</i>
Nurse	146	33.64%	103	35.27%
Doctor	58	13.36%	48	16.44%
Pharmacist	11	2.53%	8	2.74%
Manager	61	14.06%	48	16.44%
Allied health	36	8.29%	13	4.45%
Administration	122	28.11%	72	24.66%
Total	434		292	

Table 6-2 Complete responses in the metropolitan hospital

<i>Role</i>	<i>n</i>
Nurse	81
Doctor	37
Pharmacist	6
Manager	33
Allied Health	9
Admin	28
	194

Table 6-3 Complete responses in the regional hospital

<i>Role</i>	<i>n</i>
Nurse	22
Doctor	11
Pharmacist	2
Manager	15
Allied Health	4
Admin	44
	98

The key 11 first-order constructs were initially identified and designed based on published literature, practical experience, careful observation, and reviews with industry experts as per the survey design. The constructs were categorised initially at a high level, based on the TOE framework and strategic intent context as per the survey design. The 11 dimensions identified in the survey were culture, engagement, enablement, governance, information management, investment, leveraging emerging technologies, organisational learning, ICT operations and strategic direction. The detailed questions for the online survey are available in Appendix G. The quantitative phase and the qualitative phase were run in parallel with each other, according to the mixed-method paradigm.

6.2 Results

The survey questions were analyzed for simple descriptive statistics. The following indicator variables had a mean value of ≤ 3 , which is indicated that these indicators required to review and further improvement from a participant's perspective (see Table 6-4).

Table 6-4 Survey results

<i>Indicator</i>	<i>Mean</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>	<i>Standard Deviation</i>	<i>Excess Kurtosis</i>	<i>Skewness</i>
OPS03	1.887	2	1	5	0.78	1.987	0.998
INM08	1.94	2	1	5	0.639	1.591	0.535
LVG02	1.979	2	1	5	0.963	1.329	1.109
INM02	2.337	2	1	5	0.903	-0.552	0.286
INV01	2.594	3	1	5	0.932	-0.352	0.091
ENA05	2.618	3	1	5	0.935	-0.402	0.281
INV02	2.845	3	1	5	0.769	0.875	-0.677
SDD02	2.901	3	1	5	0.968	-0.635	-0.02
SDD04	2.904	3	1	5	0.896	-0.337	0.164
ENA03	2.91	3	1	5	1.003	-0.515	-0.193
OPS02	2.928	3	1	5	1.028	-0.742	-0.17
CUL03	2.946	3	1	5	0.903	-0.581	0.057
INM01	2.949	3	1	5	0.99	-0.369	-0.158
LVG01	2.952	3	1	5	0.964	-0.407	-0.306
OGL06	2.973	3	1	5	0.957	-0.616	-0.336
CUL01	2.976	3	1	5	1.022	-0.999	-0.087
INM05	2.976	3	1	5	0.857	0.126	-0.441
OPS04	2.988	3	1	5	0.814	0.631	-0.445
GOV01	2.997	3	1	5	0.816	0.71	-0.226
ENG04	3.018	3	1	5	0.962	-0.355	-0.056

6.3 Discussions

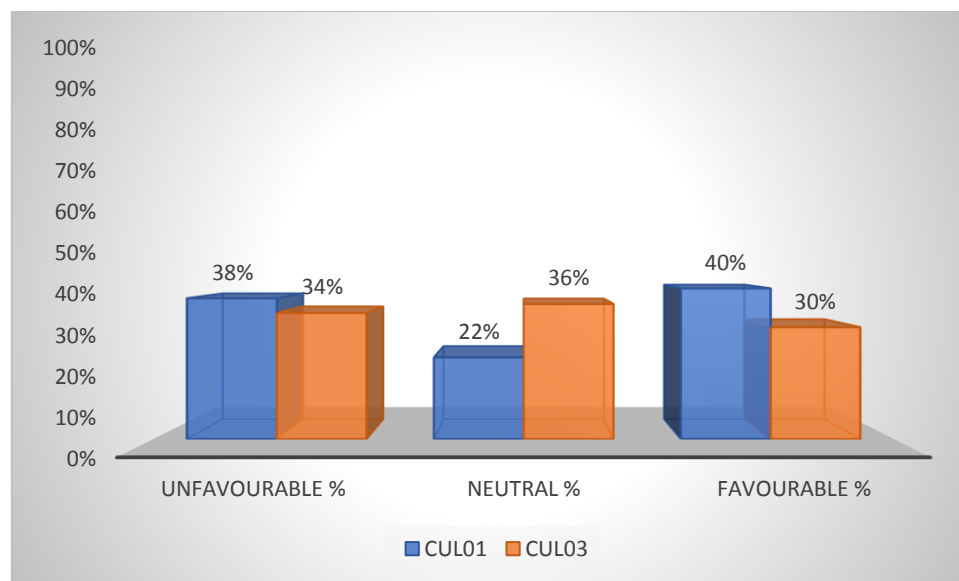
The mean values from the survey response for each of the indicator variables were calculated from the survey responses using the Likert scale. The mean values of 3 or below 3 indicated that the participants did not fully agree as a response to the questions asked in the survey or were seeking improvement in an area. This further suggested that the theme and the indicator variable required further action to improve technology use and strategic intent in the organisation.

6.3.1 Culture

The participants provided a response to the culture dimension, as shown in Table 6-5 and Figure 6-1.

Table 6-5 Culture dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
CUL01- Staff feel that they can easily learn new technologies.	342	38%	22%	40%
CUL03-Staff always supports new ICT projects.	340	34%	36%	30%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
CUL01	2.976	1.022
CUL03	2.946	0.903

Figure 6-1 Culture dimension

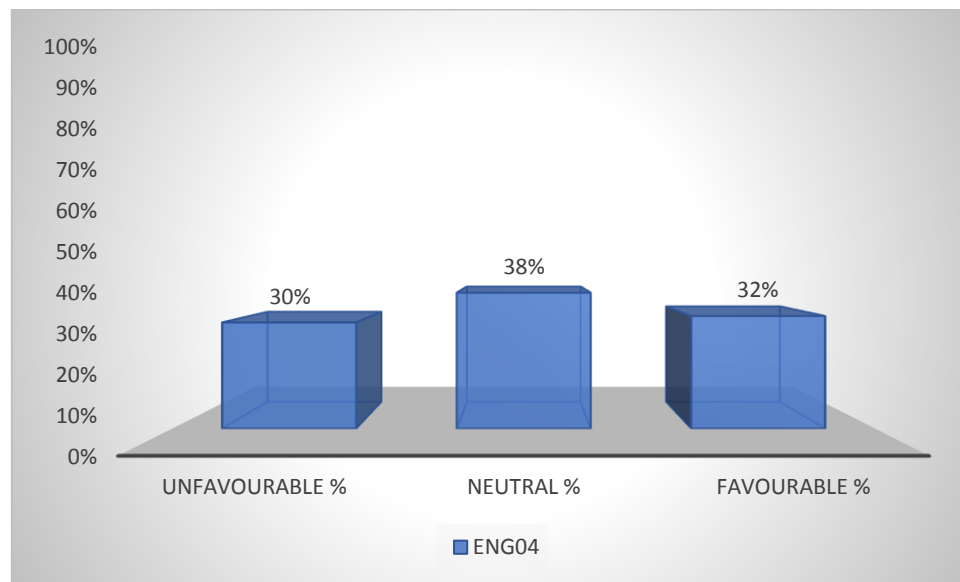
The mean values for the indicator variables were: CUL01 was 2.976, and CUL03 was 2.946. The standard deviation for the variables were 1.022 and 0.903. Of the participants surveyed, only 40% agreed that they could easily learn new technologies, and only 30% of the participants agreed that staff always support new technologies. This indicates that the organisation's culture needs to be conducive for learning new technologies so that the healthcare staff can keep with the technological change and provide a better quality of care to patients at a reduced cost. The culture should also change to support digital transformation by breaking down silos and hierarchies so that the staff can collaborate to support new digital change initiatives.

6.3.2 Engagement

The participants provided a response to the engagement dimension, as shown in Table 6-6 and Figure 6-2.

Table 6-6 Engagement dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
ENG04- My direct manager communicates how new ICT technologies can improve healthcare by reducing the cost of patient care.	337	30%	38%	32%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
ENG04	3.018	0.962

Figure 6-2 Engagement dimension

The mean value for the indicator variable ENG04 was 3.018. The standard deviation for the variable was 0.962. Of the participants surveyed, only 32% agreed that there is clear communication from their manager regarding improvements to clinical practice through the use of technology. This indicates that there is a lack of engagement with staff from hospital management from a technology perspective. In the era of digital change, it is essential for managers to engage staff and communicate the benefits of technology and how it can improve clinical practice and clinical outcomes to patients. It is also equally important for staff to bring

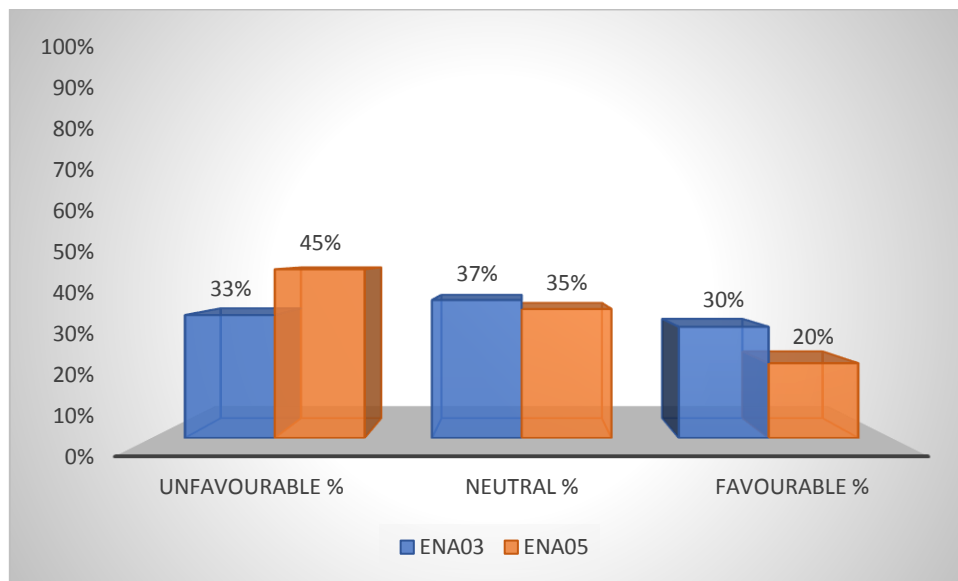
in innovative ideas for improving the quality of care through technology innovation. Engaged staff will drive better clinical outcomes for health services.

6.3.3 Enablement

The participants provided a response to the enablement dimension, as shown in Table 6-7 and Figure 6-3.

Table 6-7 Enablement dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
ENA03- Hospital Management will provide the right advancements in technology as technological changes happen.	351	33%	37%	30%
ENA05- We have resources that are needed to deliver the business goals.	303	45%	35%	20%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
ENA03	2.91	1.003
ENA05	2.618	0.935

Figure 6-3 Enablement dimension

The mean values for the indicator variables were: ENA03 was 2.910, and ENA05 was 2.618. The standard deviation for the variables were 1.003 and 0.935. Of the participants surveyed, only 30% agreed that hospital management would provide the right advancements in

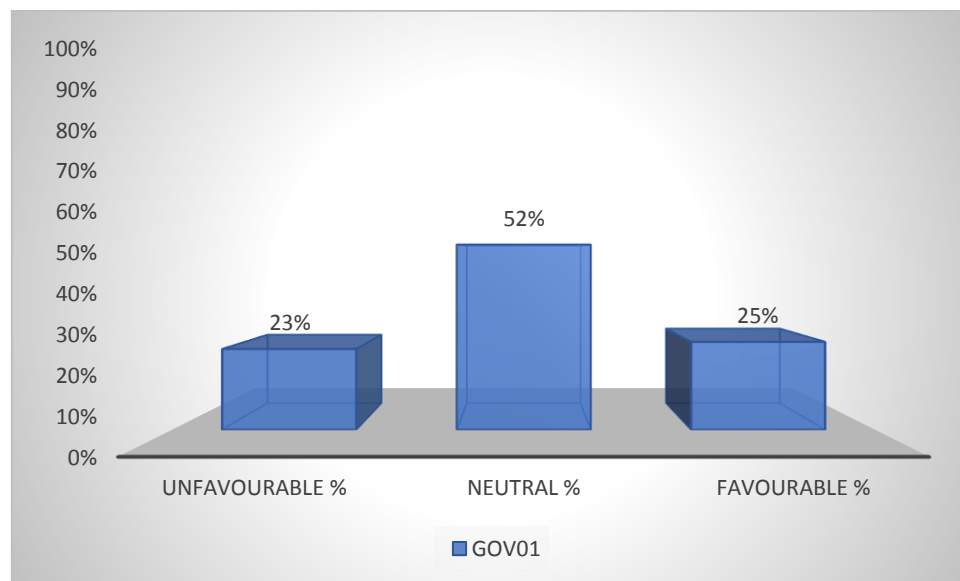
technologies as the technological changes happen, and only 20% of the participants agreed that they have the resources that they need to deliver the business goals. This indicates that it is essential that hospital management ensure that the staff are enabled with the right resources, tools, and new technologies as technological changes happen to support digital change. Enablement of staff will assist in delivering the strategic intent of the organisation.

6.3.4 Governance

The participants provided a response to the governance dimension, as shown in Table 6-8 and Figure 6-4.

Table 6-8 Governance dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
GOV01- I always get Hospital management support to implement ICT changes correctly.	297	23%	52%	25%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
GOV01	2.997	0.816

Figure 6-4 Governance dimension

The mean value for the indicator variable GOV01 was 2.997. The standard deviation for the variable was 0.816. Of the participants surveyed, only 25% agreed that they always get hospital management support to implement technology changes correctly. This indicates that there is a lack of governance for technology change management. Technology governance is an essential

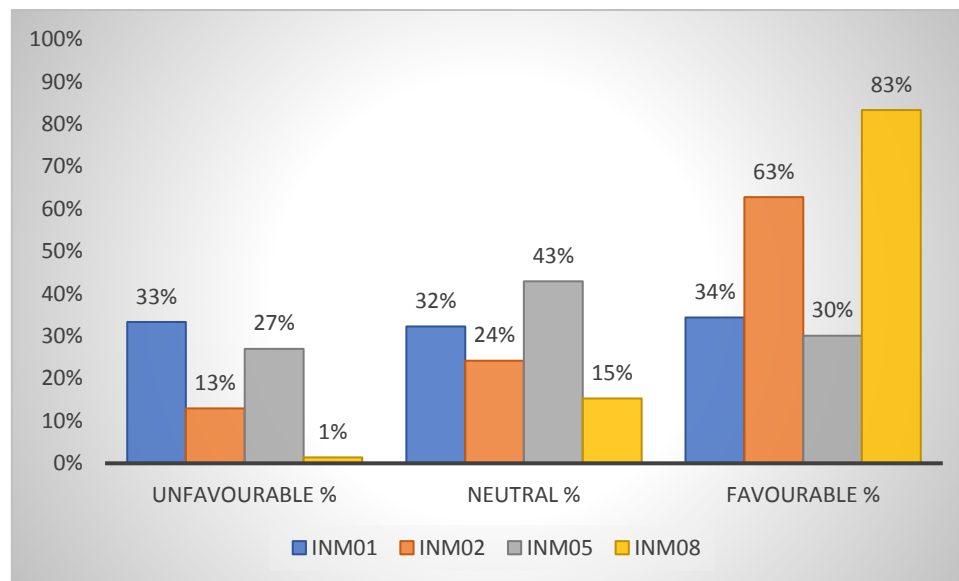
element of digital change. Digital changes need to be supported and governed by hospital management through effective technology risk management for the successful delivery of digital evolution.

6.3.5 Information management

The participants provided a response to the information management dimension, as shown in Table 6-9 and Figure 6-5.

Table 6-9 Information management dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
INM01- Important patient care information is often lost.	291	33%	32%	34%
INM02- Problems often occur in the exchange of information across hospital units.	293	13%	24%	63%
INM05- Patient history can be accessed from other hospitals.	289	27%	43%	30%
INM08- Quality of information management can be improved.	288	1%	15%	83%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
INM01	2.949	0.99
INM02	2.337	0.903
INM05	2.976	0.857
INM08	1.94	0.639

Figure 6-5 Information management dimension

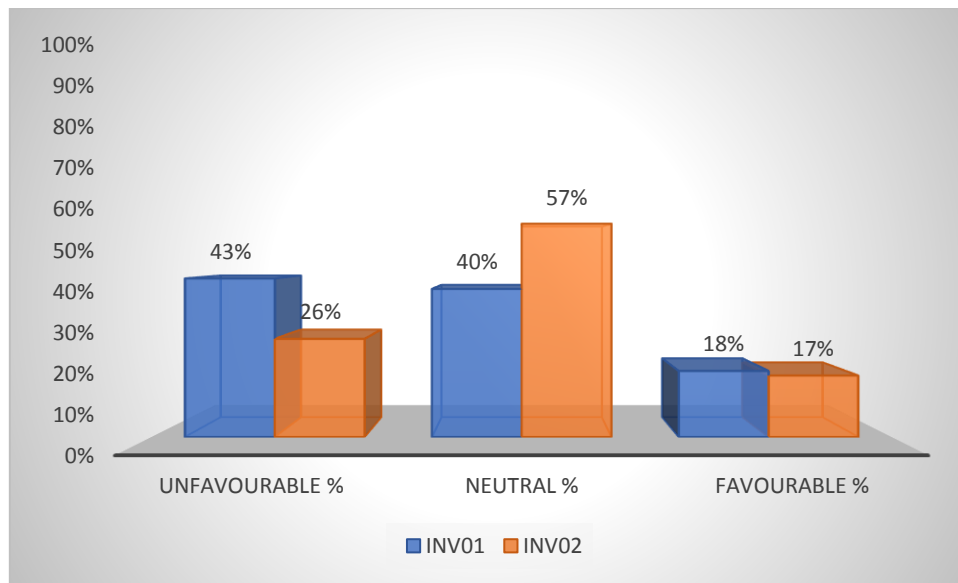
The mean values for the indicator variables were: INM01 was 2.949, INM02 was 2.337, INM05 was 2.976, and INM08 was 1.940. The standard deviation for the variables were 0.99, 0.903, 0.857 and 0.639. Of the participants surveyed, 34% agreed that important patient care information is often lost. Sixty-three percent of the participants responded that problems occur during the exchange of information across hospital units. Only 30% of the participants responded that patient history could be accessed from other hospitals, and 83% of the participants agreed that the quality of information management could be improved. This indicates that the management of patient information needs to be enhanced by hospital management and the government. Information management is a crucial element of digital change. Management of patient information around security, confidentiality, and privacy becomes critical for the digital transformation of health. National standards and frameworks around information management need to be implemented for better management of privacy, security, and confidentiality of patient information.

6.3.6 *Investment*

The participants provided a response to the investment dimension, as shown in Table 6-10 and Figure 6-6.

Table 6-10 Investment dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
INV01- There is enough investment in ICT projects from Hospital Management.	287	43%	40%	18%
INV02- Investments made by Hospital Management are in the right areas.	284	26%	57%	17%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
INV01	2.594	0.932
INV02	2.845	0.769

Figure 6-6 Investment dimension

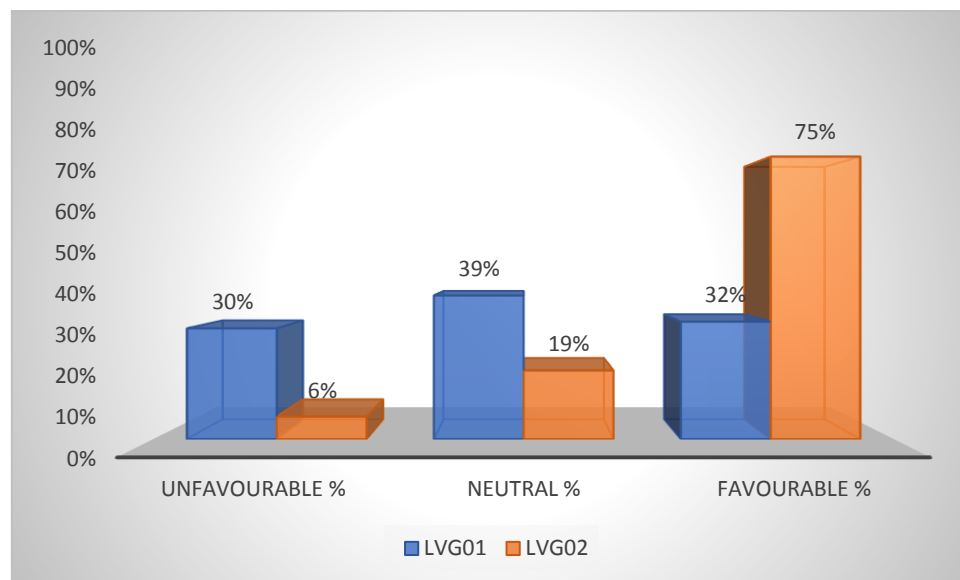
The mean values for the indicator variables were: INV01 was 2.594, and INV02 was 2.845. The standard deviation for the variables was 0.932 and 0.769. Of the participants surveyed, only 18% agreed that there is enough investment in ICT projects, and only 17% of the participants agreed that the investments made by the hospital are in the right areas. This indicates that there is a lack of investment in the technology domain by hospital management. It is essential that investments are made in technology-related projects, which will improve the quality of patient care by hospital management, State and Federal government. Without investment in technology, the evolution of health into the digital space will not be conceivable.

6.3.7 Leveraging emerging technology

The participants provided a response to the leveraging new technologies dimension, as shown in Table 6-11 and Figure 6-7.

Table 6-11 Leveraging technology dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
LVG01- Staff leverage new ICT technologies such as social media (e.g. Facebook, Yammer, Twitter, etc.) to collaborate.	332	30%	39%	32%
LVG02- I would like to see big data technologies and analytics implemented to improve the quality of patient care by the ICT department.	362	6%	19%	75%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
LVG01	2.952	0.964
LVG02	1.979	0.963

Figure 6-7 Leveraging emerging technologies dimension

The mean values for the indicator variables were: LVG01 was 2.952, and LVG02 was 1.979. The standard deviation for the variables was 0.964 and 0.963. Of the participants surveyed, only 32% agreed that they use new technologies such as social media and mobile to collaborate and 75% of the participants agreed that they would like to see new emerging technologies such as artificial intelligence and data analytics implemented to improve the quality of patient care.

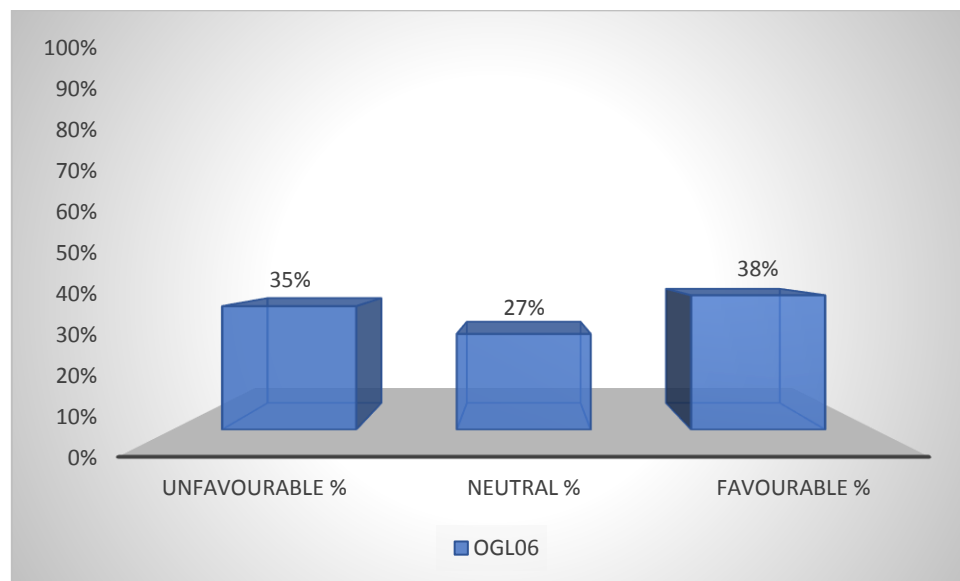
It was assumed that the participants would have knowledge of what artificial intelligence meant as it is commonly used in chatbots at banks, Apple Siri in iPhone and with Google assistant. The above indicates that there is a lack of technological innovation and collaboration in healthcare. Leveraging emerging technological innovations are essential for enhancing the quality of patient care and for improving staff collaboration.

6.3.8 *Organisational learning*

The participants provided a response to the organisational learning dimension, as shown in Table 6-12 and Figure 6-8.

Table 6-12 Organisational learning dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
OGL06- I am happy with the level of training provided to me with new ICT technologies during technology transformation projects.	295	35%	27%	38%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
OGL06	2.973	0.957

Figure 6-8 Organisational learning dimension

The mean value for the indicator variable OGL06 was 2.973. The standard deviation for the variable was 0.957. Of the participants surveyed, only 38% agreed that they were happy with

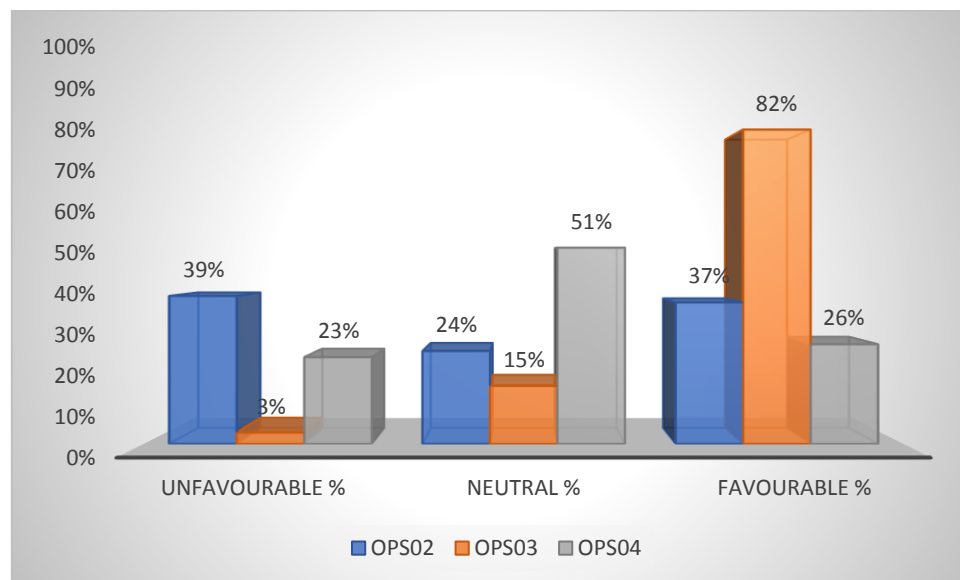
the level of technology-related training that was provided to them. This indicates that enough training is not offered to all staff when new technology is implemented. Training is an essential aspect of digital change. Staff should be provided with enough training so that they are proficient and confident in the use of new ICT systems and devices.

6.3.9 ICT operations

The participants provided a response to the ICT operations dimension, as shown in Table 6-13 and Figure 6-9.

Table 6-13 ICT Operations dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
OPS02- ICT procedures and IT systems are well-organized for service delivery.	300	39%	24%	37%
OPS03- I would like to see improvements to the Hospital's existing ICT practices.	302	3%	15%	82%
OPS04- The ICT department is well structured for service delivery.	295	23%	51%	26%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
OPS02	2.928	1.028
OPS03	1.887	0.78
OPS04	2.988	0.814

Figure 6-9 ICT Operations dimension

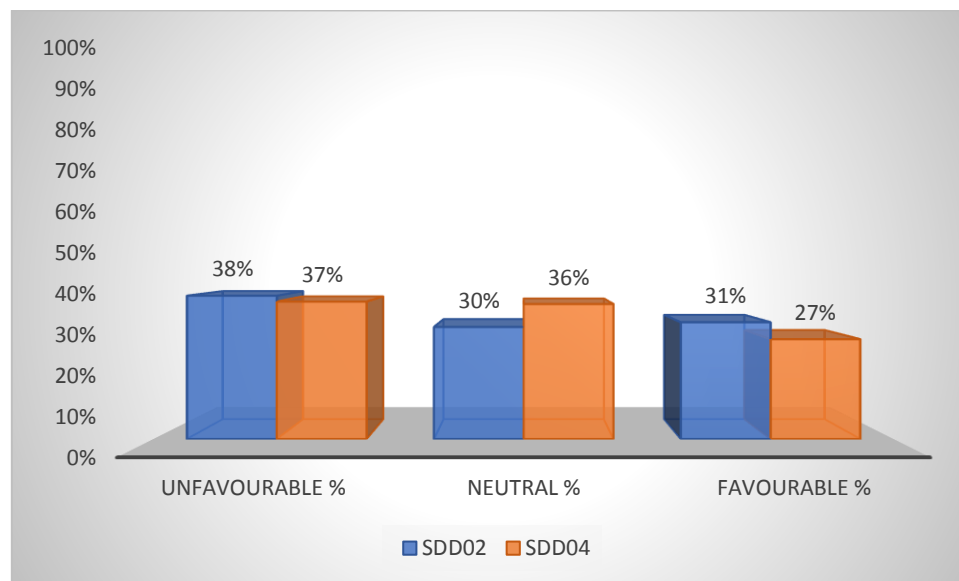
The mean values for the indicator variables were: OPS02 was 2.928, OPS03 was 1.887, and OPS04 was 2.988. The standard deviation for the variables was 1.028, 0.78, and 0.814. Of the participants surveyed, only 37% agreed that the ICT systems and procedures are well organized for clinical service delivery. Eighty-two percent of the staff agreed that they would like to see improvements in current ICT practices. This indicates that ICT service delivery and workflow must be improved in hospitals. ICT systems should align with the clinical workflows and should be made easy for clinicians to use the ICT systems. ICT systems should not add a layer of complexity to the existing clinical workflows. If ICT systems tend to add more work to the clinician's daily work, then they will not use the technology and work around it. Only 26% of the staff agreed that the ICT department is well structured for service delivery in hospitals. Majority of the respondents were neutral, as they may not have understood the IT organisation structure. ICT department structure should be aligned to work closely with the clinicians and for improving clinical service delivery.

6.3.10 *Strategic direction*

The participants provided a response to the strategic direction dimension, as shown in Table 6-14 and Figure 6-10.

Table 6-14 Strategic direction dimension

<i>Indicator</i>	<i>n</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
SDD02- I have a good understanding of the strategy and goals of DHS (Department of Human Services Department) and eHealth implementation goals.	312	38%	30%	31%
SDD04- I have a good understanding of the ICT strategy and goals.	309	37%	36%	27%



<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
SDD02	2.901	0.968
SDD04	2.904	0.896

Figure 6-10 Strategic direction dimension

The mean values for the indicator variables were: SDD02 was 2.901, and SDD04 was 2.904. The standard deviation for the variables was 0.968 and 0.896. Of the participants surveyed, only 31% agreed that they have a good understanding of the eHealth implementation goals and objective and only 27% agreed that they have a good understanding of their hospital's ICT strategy and goals. This indicates that the staff were not clear on the strategic direction of the organisation from a technology perspective. The leadership team should communicate goals and objectives so that they are clear on the strategic intent that the organisation wants to achieve and can then collectively participate in achieving it. If staff are not knowledgeable of the

strategic intent and the operational goals, then they will not actively participate in achieving those goals.

6.4 Preliminary findings

The survey yielded the following preliminary results which were communicated to the participating organisations for implementing improvement action plans. The survey responses from each organisation were analysed individually, and recommendations were sent to the respective organisations for review. Based on the finding, the action plans were implemented in the metropolitan hospital and the regional hospital. The preliminary consolidated survey findings are as per below:

Culture:

- Organisation culture needs to be improved through better collaboration between different services within public health. The culture must be conducive to technological change.

Engagement:

- Improvement in staff engagement is required to communicate the benefits of technological change and to understand key stakeholders' technological requirements.

Enablement:

- Enablement of staff from skills, resourcing, and contemporary technologies, such as mobile access is required;
- Patient empowerment using technology is needed.

Governance:

- Improvement in unified corporate governance structure, ICT structure, ethics, and improved risk management is necessary to support digital change.

Information management:

- Interoperability standards and integration between applications will have to be improved to enhance patient information flow;
- Data integrity issues due to lack of training and lack of integration will have to be addressed;

- System access and usability issues will have to be addressed to improve the quality of care.

Investment

- Investment in ICT is lacking, and further investment in ICT projects with benefits analysis is needed.

Leveraging emerging technology

- Emerging technologies must be implemented to improve the quality of patient care.

Organisation learning

- Formalized staff training strategies with train the trainer approach for ongoing support is necessary.

ICT Operations:

- ICT systems, i.e. infrastructure (for example- Wi-Fi, printers, network, desktops) and legacy applications will need to be reviewed for an upgrade;
- ICT service delivery will require improvement;
- ICT department should be aligned to work more closely with the clinicians
- ICT processes and procedures will require review and alignment with the business and clinical workflows.

Strategic direction:

- ICT strategy and operational plans must be communicated to the staff to get their buy-in and participation;
 - An integrated approach to planning between different healthcare services and state with a long-term focus is required;
- Stable executive leadership who can provide the right strategic direction is required.

7 Convergence and exploratory testing

7.1 Introduction

The convergence of the results from the survey and the qualitative analysis led to a conceptual research model that could be measured and tested for its statistical significance. This chapter addresses the following research questions

1. Is there a disconnection between organisational strategic intent and ICT use in healthcare?
2. What factors are important for the alignment of ICT use with strategic intent?

The three core categories and their respective subcategories were identified for the research model. The causal relationship between the core categories and their subcategories was tested using PLS- Structural Equation Modelling (PLS-SEM). The data for the constructs from the online survey was used to form the conceptual model. The key constructs that were used for the measurement model were Culture, Enablement, Engagement, Strategic Direction, Governance, Investment, Organisational Learning, Digital transformation, ICT Operations, Leveraging ICT, and Information Management. The key second-order constructs were converged from the qualitative analysis. Measures were designed to be reflective for the 11 first-order constructs, that is, the direction of causality is from the latent construct to the measured items and formative for the second-order constructs.

The participant responses from the online survey questions which used a Likert scale were used as variables for testing the research model. Survey questions were selected to be reflective variables for the key 11 first-order constructs. Second-order constructs, identified as the three core categories from the Grounded Theory Method (GTM)-lite analysis, were: ICT Use, Strategic Alignment, and Strategic Intent. These second-order constructs were designed to be formative and were formed from the first-order constructs, that is, subcategories of the core categories from the GTM-lite analysis. If the indicators cause the construct and are not interchangeable among themselves, they are formative. Formative indicators can have positive, negative, or no correlations between each other (Haenlein & Kaplan, 2004; Petter, Straub & Rai, 2007). The second-order constructs ICT use, strategic alignment, and strategic intent were chosen to be formative based on the qualitative analysis. The first order constructs Strategic Direction, Culture, Engagement, and Enablement were the subcategories for the core category strategic intent, and hence were chosen as formative for the research model. The first order constructs Investment, Organisation Learning, Governance, and Digital transformation were

the subcategories for the core category Strategic Alignment and hence were chosen to be formative for the research model. The first order constructs ICT Operations, Leveraging ICT, and Information Management were the subcategories for the core category ICT use and hence were chosen to be formative for the research model. Strategic Intent, which is a second-order construct, was formed from first-order constructs Strategic Direction, Culture, Engagement, and Enablement. Strategic alignment contextual factors influence the business effect of technology (Kearns & Sabherwal, 2006). Strategic Alignment second-order construct was formed from the first-order constructs Investment, Organisation Learning, Governance, and Digital transformation. ICT Use second-order construct was formed from the first-order constructs ICT Operations, Leveraging ICT, and Information Management. The choice of methodology and research technique was made, taking into consideration the objectives of the research. The aim of the study lends itself to an exploratory causal model that guides the direction of this study (Argyrous, 2011).

Partial Least Squares-Structural Equation Modelling technique (PLS-SEM) is a so-called soft-modelling approach and an emerging multivariate data analysis method that has gained popularity in the mid-2000s with advanced path modelling software like SmartPLS (Wold, 1980; Wong, 2013). A PLS-SEM modelling approach was used to test the significance of the path coefficients of the relational model (Hair et al., 2006; Hair et al., 2013; Tabachnick & Fidell, 2007) and deduce inferences that could be generalized. Several features of PLS-SEM have led to its increasing use in management, strategy, and marketing research (Bontis, Booker & Serenko, 2007; Drengner et al., 2008; Gruber et al., 2010; Hennig-Thurau et al., 2007; Robins et al., 2002; Sattler et al., 2010). PLS-SEM is less suited to testing well-established complex theories due to a lack of a global optimization criterion to assess the overall model fit (Hair et al., 2012). PLS-SEM is, however, advantageous compared to covariance-based structural equation modelling when analysing exploratory predictive research models that are in the early stages of theory development (Fornell & Bookstein, 1982). The latter exemplifies the research described in this study, which used PLS-SEM to test the conceptual model. PLS-SEM handles complex models for formative measured constructs of the structural model. It explains the variance in the endogenous latent variables and is hence oriented to explain the variance in the research model. This study used both reflective and formative measurements for first and second-order constructs. The decision regarding the mode of measurement for the newly created second-order formative constructs Strategic Intent, ICT Use, and Strategic

Alignment was also based on an intensive review of the literature and the supporting results of Confirmatory Tetrad Analysis (CTA) in PLS-SEM (CTA-PLS).

Five-point reflective Likert scale was used to measure each variable of the first order reflective constructs, 1 for strongly disagree to 5 for strongly agree. The survey questions were tested by industry experts to address any weakness and potential bias. Some of the indicators that were not significantly loading on the 11 reflective constructs were eliminated during the refinement of the Structural Equation Model. Research bias such as flawed study design was minimized by clearly defining outcomes with objectives, and selection bias was overcome by sending the well-designed survey to all clinical and non-clinical staff and thus minimizing confounding results (Pannucci & Wilkins, 2010). The criteria for construct validity and the model fit were also examined from the data.

Since PLS-SEM can deal with both reflective and formative measurement, it was important to determine the appropriate mode (Bollen & Lennox, 1991; Coltman et al., 2008). This decision guides the selection of appropriate data-analysis methods and the relevant criteria for reliability and validity assessment (Diamantopoulos & Winklhofer, 2001). Construct reliability, convergent validity, and discriminant validity were examined for the first-order constructs before testing the structural model. The p-value associated with the test results from the sample were considered significant using a type 2 error rate of 0.05. The minimum sample size for the model was calculated using the G Power calculator. The number of tested predictor variables for first-order constructs equals 11, alpha of 0.05, and the power of 0.95 was used for the sample size calculation. The minimum sample size, which needed to achieve the power of 0.95 from the calculation was $n = 91$ using the G Power calculator (Faul, Erdfelder, Buchner & Lang, 2009). The effect size was taken at a moderate value of 0.2 (Hair et al., 2013). The data were analyzed by applying SmartPLS software (Ringle, Wende & Will, 2005). The conceptual research model is depicted in Figure 7-1. The three core categories ICT Use, Strategic Intent, and Strategic Alignment are formed using the 11 first-order reflective constructs.

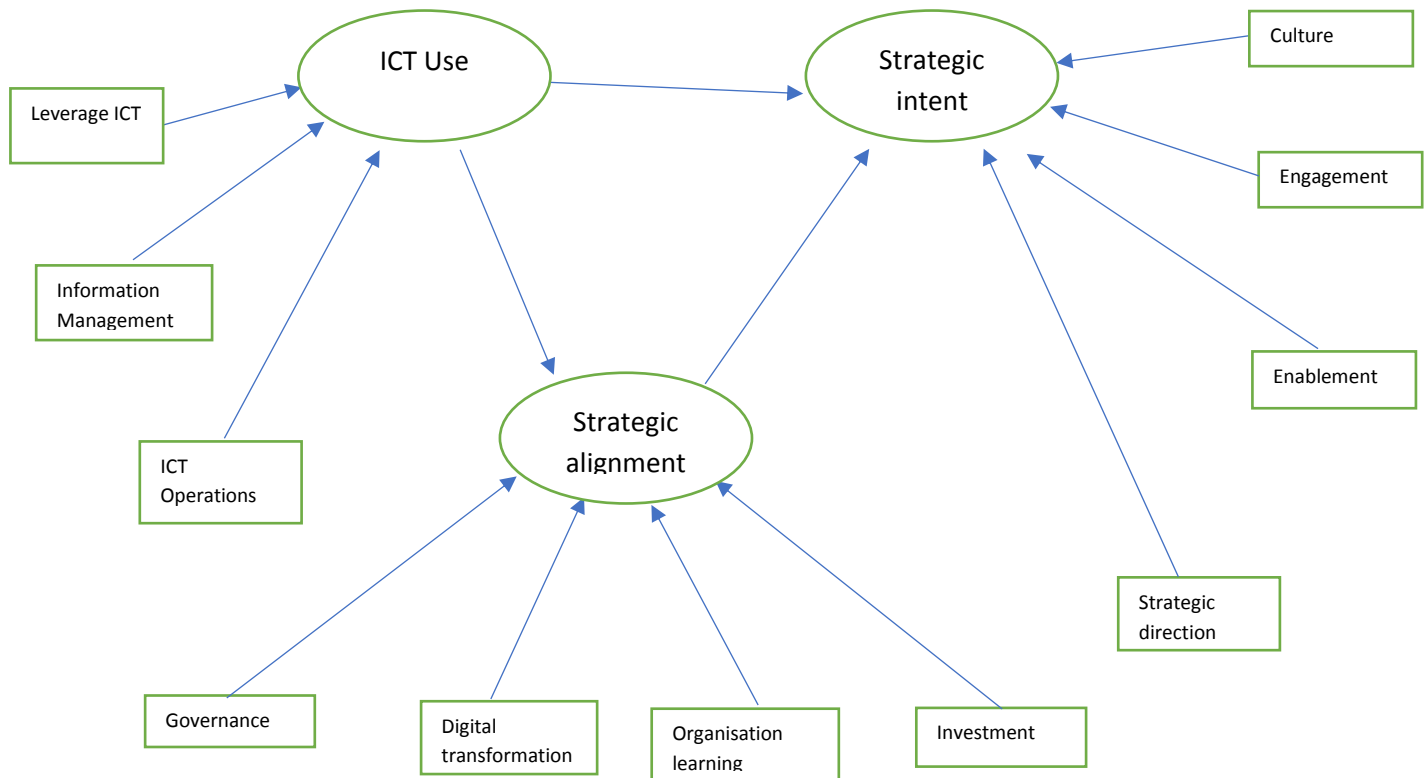


Figure 7-1 Conceptual model

7.2 Results

PLS algorithm was used to calculate the path coefficients for the structural model. For the structural model, path significance levels were estimated using the bootstrap technique for 5000 sampling iterations to ensure maximum consistency in the results. R² (R squared) was used to assess the structural model. The model explained variance in ICT use and strategic intent. Table 7-7 explains the results of the structural model for R², path coefficients, and significance of the path coefficients. The acceptable values of R squared depend on the context of the research (Hair et al. 2012). According to Cohen (1992), values between 0.12 and 0.25 indicate a moderate effect size. The acceptable values for R² for Strategic Alignment and Strategic Intent could be classified as moderate (Chin, 1998) for this study due to its exploratory nature. Path coefficients that were above the value of 0.1 and that were significant at a level of $p < 0.05$ or lower were considered as significant predictors for the model. The predictive validity of the structural model was evaluated using Stone-Geisser-Criterion (Q²) which was derived through blindfolding procedure with an omission distance of 7 (Geisser, 1975; Stone, 1974; Tennenhaus et al., 2005; Wold, 1980). The values of Q² were above the critical threshold values of zero. Variance Inflation Factor (VIF) at the structural level was also calculated. The VIF values were below 5 (Getotz et al., 2010). Hence the predictive validity and no multicollinearity issues with the structural model were confirmed. The magnitude of the path

coefficients and their t-values were also assessed by applying non-parametric bootstrapping (Chin, 1998). Path coefficients were considered significant at a value of $t > 1.96$ or higher.

Table 7-1 Construct validity and reliability

<i>Construct</i>	<i>Composite Reliability</i>	<i>Average Variance Extracted (AVE)</i>
ICT Operations	0.889	0.617
Information Management	0.73	0.475
Leverage ICT	0.791	0.568
Governance	0.892	0.734
Investment	0.826	0.544
Organisation Learning	0.836	0.562
Digital transformation	0.825	0.542
Culture	0.858	0.602
Enablement	0.846	0.533
Engagement	0.829	0.619
Strategic Direction	0.91	0.503

The reliability and validity of the model were evaluated first before assessing the quality criteria of the structural model (Hulland, 1999) as per Table 7-1. All reflective indicators were significantly associated with their constructs ($p < 0.05$), and all reflective loadings were above the critical threshold of 0.7, which indicated high reliability (Bagozzi et al., 1991). A high level of convergent reliability was asserted by the model with composite reliability exceeding the threshold of 0.7 (Bagozzi & Yi, 1988; Nunnally & Bernstein, 1994). The constructs also had an AVE above the critical value 0.5 and indicated enough convergent validity (Fornell & Larcker 1981; Getotz et al., 2010). Assessing indicator weights and their significance using nonparametric bootstrapping revealed that most indicators significantly influenced their corresponding constructs (Chin 1998; Tennenhaus et al., 2005). The bootstrapping results showed that there was a difference in their relative importance (Getotz et al., 2010). The indicators that had measurement issues were removed from the model to improve the reliability and convergent validity of the constructs. The indicators that were removed had indicator reliability of less than 0.5. The following indicators were removed from the measurement model.

- ICT use: LVG02, OPS03, INM06, INM07, INM02, INM08, INM05
- Strategic alignment: OGL02, OGL05
- Strategic intent: ENA06, ENG04, CUL04

The discriminant validity of the constructs was established using an HTMT criterion, as shown in Table 7-2. HTMT value of below 0.9 confirmed enough discriminant validity had been

established between constructs (Henseler, Ringle & Sarstedt, 2015). In order to test whether constructs were sufficiently different from each other, discriminant validity was also inspected using the Fornell and Larcker (1981) criterion, which calls for a construct's AVE to be larger than the square of its largest correlation with any construct (see Table 7-3). All constructs used in this study fulfil this requirement.

Table 7-2 Discriminant validity - HTMT ratio

	ICT Operations	Information Management	
ICT Operations			
Information Management	0.654		
Leverage ICT	0.522	0.7	
Governance		Investment	Organisational Learning
Investment	0.824		
Organisation Learning	0.821	0.745	
Digital transformation	0.684	0.776	0.687
Culture		Enablement	Engagement
Enablement	0.585		
Engagement	0.78	0.841	
Strategic Direction	0.492	0.655	0.751

Table 7-3 Fornel Larkin Criterion

	<i>Governance</i>	<i>Investment</i>	<i>Organisational Learning</i>	<i>Digital transformation</i>
Governance	0.857			
Investment	0.633	0.738		
Organisation Learning	0.647	0.564	0.75	
Digital transformation	0.536	0.573	0.528	0.736
	Culture	Enablement	Engagement	Strategic Direction
Culture	0.776			
Enablement	0.469	0.73		
Engagement	0.582	0.616	0.787	
Strategic Direction	0.43	0.558	0.6	0.709
	ICT Operations	Information Management	Leverage ICT	
ICT Operations	0.786			
Information Management	0.406	0.689		
Leverage ICT	0.389	0.376	0.754	
	ICT Use	Strategic Alignment	Strategic Intent	
ICT Use	1			
Strategic Alignment	0.768	1		
Strategic Intent	0.7	0.777	1	

The magnitude of the path coefficients and their t-values were assessed by applying non-parametric bootstrapping (Chin, 1998; Zucker, 1987). All path coefficients were significant at a t-value of 1.96 or higher and p-value < 0.05. ICT use, Strategic intent, and Strategic alignment were taken as formative constructs. Strategic intent, Strategic alignment, and ICT Use were used as a second-order index composite model (Becker et al., 2012) (Type II: reflective-formative type). The hierarchical latent variables, Strategic intent, ICT use and Strategic alignment in PLS-SEM were specified through the hierarchical components model, through the repeated use of manifest variables (such as indicators) of the underlying 11 first-order constructs (Tenenhaus et al., 2005; Wold, 1985). The decision regarding the mode of measurement for formative indicators ICT use, strategic intent, and strategic alignment was based on the supporting results of Confirmatory Tetrad Analysis (CTA) in PLS-SEM. CTA-PLS provides insights as to if the reflective indicator specification or formative indicator specification is more appropriate for the construct. As suggested by Gudergan et al. (2008), the formed constructs were computed for all vanishing tetrads of the measurement model for each latent variable. The model implied vanishing tetrads were identified, which was then followed by eliminating redundant model-implied vanishing tetrads and examining the statistical significance for each vanishing tetrad. The statistical results were evaluated for all model-implied non-redundant vanishing tetrads. For all model implied non-redundant vanishing

tetrads, the p-value of some of the tetrads was below 0.05 and supported the formative measurement of the model specification. All formative indicators were also exceeding loadings of 0.1 for ICT use, Strategic alignment, and Strategic intent formative constructs. The quality criteria for the formative indicators were also examined using the variance inflation factor (VIF). As seen in Tables 7-4, 7-5, and 7-6, all the VIF values were below 5 for all formative indicators suggesting that multi-collinearity was not an issue. Indicator weights were all statistically significant at $t > 1.96$, and if they were not statistically significant, then the outer loadings should be higher than 0.5. No issues with the quality criteria of the formative indicators were found. All formative indicators were exceeding loadings of 0.1 and were significant at t-value of 1.96 or higher, suggesting the importance of all formative indicators.

Table 7-4 ICT use formative indicator quality criteria

<i>Indicator</i>	<i>VIF</i>	<i>T value-weights</i>	<i>Outer Loadings</i>
INM01 -> ICT Use	1.174	7.715	0.453
INM03 -> ICT Use	1.216	10.043	0.502
INM04 -> ICT Use	1.168	7.651	0.482
LVG01 -> ICT Use	1.135	5.194	0.364
LVG03 -> ICT Use	1.47	13.049	0.534
LVG04 -> ICT Use	1.646	15.251	0.65
OPS01 -> ICT Use	2.445	18.464	0.693
OPS02 -> ICT Use	2.11	17.061	0.743
OPS04 -> ICT Use	1.916	18.028	0.687
OPS05 -> ICT Use	1.537	13.355	0.667
OPS06 -> ICT Use	2.19	18.45	0.632

Table 7-5 Strategic intent formative indicator quality criteria

<i>Indicator</i>	<i>VIF</i>	<i>T Statistics (weights)</i>	<i>Outer Loadings</i>
CUL01 -> Strategic Intent	1.814	11.659	0.51
CUL02 -> Strategic Intent	2.33	13.943	0.475
CUL03 -> Strategic Intent	2.288	13.67	0.528
CUL05 -> Strategic Intent	1.613	12.447	0.612
ENA01 -> Strategic Intent	1.308	9.106	0.421
ENA02 -> Strategic Intent	1.862	14.839	0.587
ENA03 -> Strategic Intent	2.358	14.631	0.621
ENA04 -> Strategic Intent	2.895	18.753	0.696
ENA05 -> Strategic Intent	1.409	9.885	0.487
ENG01 -> Strategic Intent	1.791	17.682	0.63
ENG02 -> Strategic Intent	1.729	16.333	0.592
ENG03 -> Strategic Intent	1.952	19.607	0.666
SDD01 -> Strategic Intent	1.849	11.925	0.575
SDD02 -> Strategic Intent	2.004	13.231	0.576
SDD03 -> Strategic Intent	2.063	13.853	0.674
SDD04 -> Strategic Intent	2.271	13.743	0.692
SDD05 -> Strategic Intent	2.547	13.899	0.726
SDD06 -> Strategic Intent	2.003	12.429	0.63
SDD07 -> Strategic Intent	2.157	12.609	0.567
SDD08 -> Strategic Intent	2.883	16.237	0.698
SDD09 -> Strategic Intent	2.321	16.966	0.651
SDD10 -> Strategic Intent	1.68	11.829	0.516

Table 7-6 Strategic alignment formative indicator quality criteria

<i>Indicators</i>	<i>VIF</i>	<i>T Statistics (weights)</i>	<i>Outer loadings</i>
GOV01 -> Strategic Alignment	1.812	18.949	0.681
GOV02 -> Strategic Alignment	2.59	21.933	0.76
GOV03 -> Strategic Alignment	2.291	19.576	0.715
INV01 -> Strategic Alignment	1.532	10.98	0.541
INV02 -> Strategic Alignment	1.899	17.158	0.659
INV03 -> Strategic Alignment	1.658	14.113	0.636
INV04 -> Strategic Alignment	1.555	10.647	0.62
OGL01 -> Strategic Alignment	1.868	14.271	0.688
OGL03 -> Strategic Alignment	1.933	15.818	0.68
OGL04 -> Strategic Alignment	1.427	6.281	0.454
OGL06 -> Strategic Alignment	1.763	14.304	0.638
TTT01 -> Strategic Alignment	1.455	8.966	0.462
TTT02 -> Strategic Alignment	1.673	13.488	0.619
TTT03 -> Strategic Alignment	1.714	13.93	0.656
TTT04 -> Strategic Alignment	1.693	14.832	0.593

The acceptable values of R² depend on the context of the research (Hair et al., 2011). As the formative indicators for ICT use, Strategic intent, and Strategic alignment were analyzed, low-level values for R² were realistic. According to Cohen (1992), r-square value 0.12 or below indicates low, between 0.13 to 0.25 values indicate medium, and 0.26 or above values indicate high effect size. Path coefficients above the value of 0.1 were considered significant at a level of $p < 0.05$ or lower. Table 7-7 explains the results of the structural model for R², path coefficients, and significance of the path coefficients. The acceptable values for R squared for Strategic Alignment and Strategic Intent could be classified as medium (Chin, 1998). Path coefficients that were above the value of 0.1 and were significant at a level of $p < 0.05$ or lower were considered as significant predictors for the model. The predictive validity of the structural model was evaluated using Stone-Geisser-Criterion (Q²) which was derived through blindfolding procedure with an omission distance of 7 (Geisser, 1975; Stone, 1974; Tennenhaus et al., 2005; Wold, 1982). The values of Q² were above a critical threshold of zero. Variance Inflation Factor (VIF) at the structural level was also calculated and was below the value of 5 (Getotz et al., 2010). Hence the predictive relevance and no problematic levels of multicollinearity for the structural model were confirmed. The magnitude of the path coefficients and their t-values were assessed by applying non-parametric bootstrapping (Chin, 1998; Zucker, 1987). All path coefficients were considered significant at t-value of 1.96 or higher.

Table 7-7 Results

<i>Path</i>	<i>Beta</i>	<i>Standard Deviation (STDEV)</i>	<i>T Statistics (O/STDEV)</i>	<i>P Values</i>	<i>R squared</i>
ICT Operations -> ICT Use	0.611	0.015	40.3	0	
Information Management -> ICT Use	0.317	0.011	28.644	0	
Leverage ICT -> ICT Use	0.347	0.012	30.108	0	
ICT Use -> Strategic Intent	0.251	0.051	4.938	0	0.59
Strategic Alignment -> ICT Use	0.768	0.028	27.618	0	
Strategic Alignment -> Strategic Intent	0.584	0.05	11.643	0	0.63
Governance -> Strategic Alignment	0.273	0.008	33.982	0	
Investment -> Strategic Alignment	0.305	0.008	37.1	0	
Organisation Learning -> Strategic Alignment	0.322	0.01	31.729	0	
Digital transformation -> Strategic Alignment	0.309	0.009	33.577	0	
Culture -> Strategic Intent	0.243	0.008	29.776	0	
Enablement -> Strategic Intent	0.259	0.006	40.102	0	0.398
Engagement -> Strategic Intent	0.174	0.006	29.425	0	0.339
Strategic Direction -> Strategic Intent	0.544	0.012	44.38	0	

The results show the following significant direct effects:

- Statistically significant predictors for strategic intent are ICT use ($\beta = 0.251$, $p < .05$) and strategic alignment ($\beta = .584$, $p < .05$). The model explained 59% variance in ICT use and 63% variance in strategic intent.
- Statistically significant predictors for ICT use are ICT operations ($\beta = 0.611$, $p < .05$), Information management ($\beta = 0.317$, $p < .05$) and Leveraging ICT ($\beta = 0.347$, $p < .05$).
- Statistically significant predictors for Strategic alignment are Digital transformation ($\beta = 0.309$, $p < .05$), Organisation learning ($\beta = 0.322$, $p < .05$), Investment ($\beta = 0.305$, $p < .05$) and Governance ($\beta = 0.273$, $p < .05$).
- Statistically significant predictors for Strategic intent are Culture ($\beta = 0.243$, $p < .05$), Engagement ($\beta = 0.174$, $p < .05$), Enablement ($\beta = 0.259$, $p < .05$) and Strategic direction

($\beta = 0.544$, $p < .05$). The model explained 33.9% variance in Engagement and 39.8% variance in Enablement.

- ICT use and strategic alignment were significant predictors of strategic intent. Strategic alignment ($\beta = 0.768$, $p < .05$) mediated ICT use and Strategic intent ($\beta = 0.584$, $p < .05$).

Endogeneity of the selected variables was not an issue with this measurement model, as the model did not test a hypothesis, and the model was predictive. Addressing endogeneity of the variables has become an integral part of the regression-based analysis (Sinkovics et al., 2016) and users of PLS-SEM may have overlooked this issue. PLS-SEM is predictive, and which if taken into complete consideration in the method will render the question of endogeneity irrelevant (Ebbes et al., 2011). Test of a hypothesis corresponds to the explanation perspective while deriving managerial implications follow a prediction perspective. Therefore endogeneity of variables does not become a concern when the researcher emphasises predictive perspective in their analysis (Hult et al., 2018). The measurement model above did not test a hypothesis, and hence the endogeneity issue is not relevant to the stated measurement results.

7.3 Discussion

According to Cenfetelli and Basselier (2009), the magnitude of the significant weights can be used to determine the relative importance of indicators in forming a latent construct. These weights can be interpreted similarly to the estimated beta coefficients from multiple regression analyses (Chwelos, Benbasat & Dexter, 2001). In the measurement model, the path loadings of the 11 key constructs reveal their relative importance in determining the three latent constructs (see Figure 7-2). Engagement (0.174), Enablement (0.259) and Culture (0.243) had similar beta values, suggesting that they contributed equally to the organisation's strategic intent. Strategic direction (0.544) had higher beta value, and strategic intent is heavily affected by the strategic direction of the organisation. Leveraging new technology (0.347) and information management (0.317) had similar values and contributed equally to ICT use. ICT operations (0.611) had a higher beta value and heavily affected the ICT use of the organisation. Governance (0.273), organisational learning (0.322), technology transformation (0.309) and investment (0.305) had similar values and contributed equally to the strategic alignment of the organisation. Strategic alignment mediated ICT use and strategic intent. Strategic alignment (0.584) had higher beta values, and strategic intent was impacted by strategic alignment. ICT use (0.768) had higher beta values and significantly impacted strategic alignment.

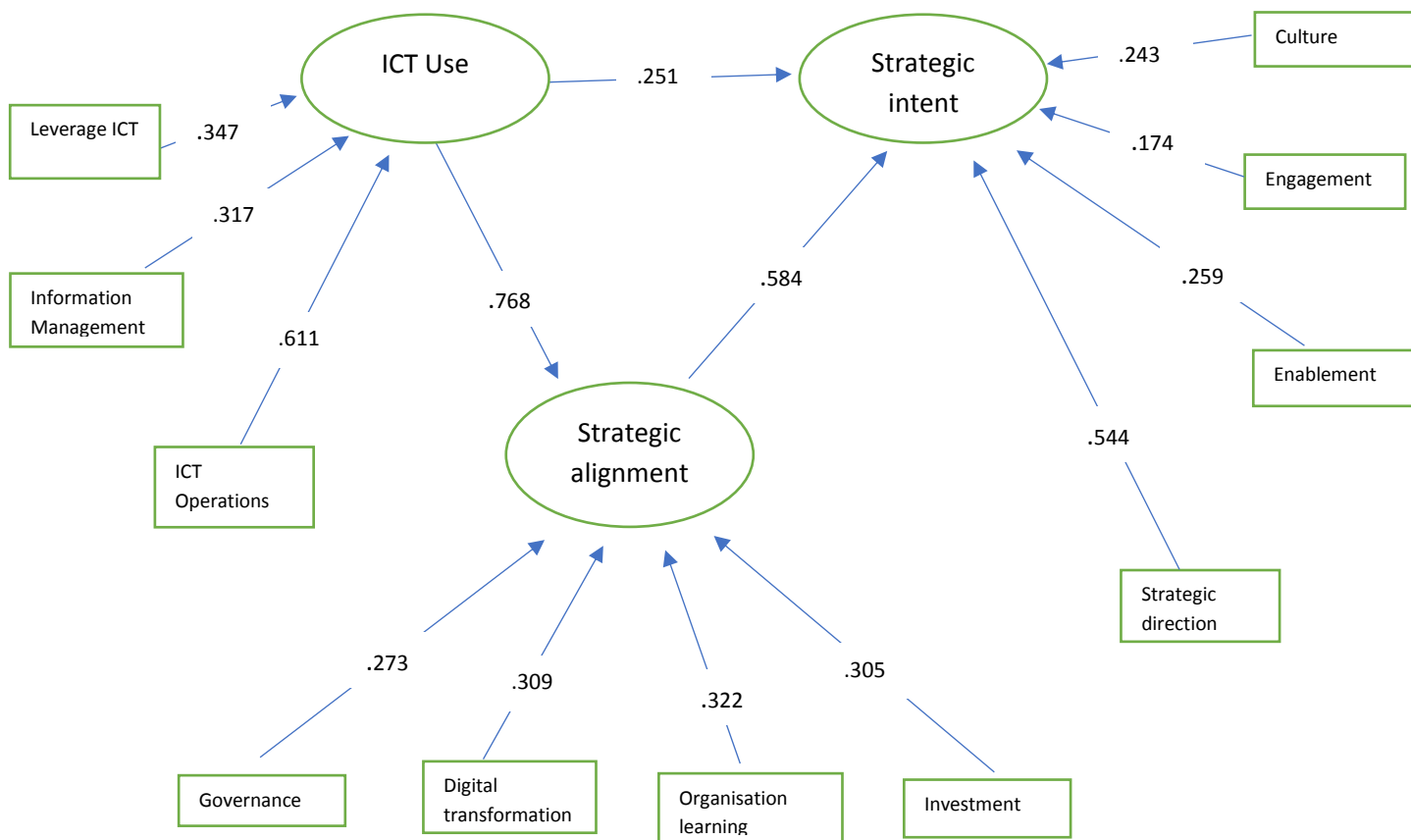


Figure 7-2 Research model results

7.3.1 Technology use

The participants provided responses to information management and ICT operations, as shown in Table 7-8.

Table 7-8 ICT use quantitative and qualitative participant responses

<i>Question</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
Important patient care information is often lost.	33.33%	32.30%	34.36%
ICT procedures and IT systems are well-organized for service delivery	38.67%	24.33%	37%

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
ICT use	719	ICT use	672	1391

Information management is a significant predictor for ICT use ($\beta = 0.317$, $p < .05$). As seen in Table 7-8, 34.36% of the participants responded that important patient care information is often lost. Participants in their interviews quoted that the use of hybrid processes such as some manual and some through the use of IT systems were the main reasons for the loss of some of the important patient information. Participants also quoted that there were a lot of disparate IT systems that were non-integrated for patient data flow, causing issues with patient data. ICT operations is a significant predictor for ICT use ($\beta = 0.611$, $p < .05$). 37% of the participants responded that IT systems and procedures are well organized for service delivery. Participants in their interviews quoted that there were issues with the non-alignment of the IT process flows with clinical workflows. The system performance was impacting the usability of the IT system. Clinicians had to perform time-critical events such as charting, labs, discharge summaries, and prescriptions which were impacted by slow IT system performance and login issues. Significant improvement in information management and ICT operations was required to improve ICT adoption and use in healthcare organisations.

7.3.2 *Strategic intent*

The participants provided responses for engagement, enablement, culture, and strategic direction, as shown in Table 7-9.

Table 7-9 Strategic intent quantitative and qualitative participant responses

<i>Question</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
We have the resources that are needed to deliver business goals.	45.21%	34.65%	20.13%
Staff understand what is required of them during the technology transformation projects	28.31%	30.12%	41.57%
Staff always supports new ICT projects.	34%	36%	30%
I have a good understanding of the ICT strategy and goals.	37%	36%	27%

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Strategic intent	780	Strategic intent	586	1366

Enablement ($\beta = 0.259$, $p < .05$) and engagement ($\beta = 0.174$, $p < .05$) are significant predictors for strategic intent. As seen in Table 7-9, 20.13% of the participants agreed that they have the resources that they need to deliver on business goals and 41.57% of the participants understood what is required of them during technology transformation projects. From the semi-structured interviews, participants quoted that there was a lack of proper engagement from the project implementation teams and hospital management, which impacted the delivery of technology-related projects. Participants quoted that the current technology was old, requiring an upgrade and was slow. There were also not enough devices to look at patient data. This, in turn, hampered the clinician's ability to deliver timely care. Enablement and engagement of staff were required to deliver the strategic intent of the organisation.

Culture ($\beta = 0.243$, $p < .05$) and strategic direction ($\beta = 0.544$, $p < .05$) are significant predictors of strategic intent. As seen in Table 7-9, 30% of the staff agreed that they always support new projects and 27% of the staff agreed that they have a good understanding of the ICT goals and objectives of the organisation. Participants further in their interview quoted that working in silos and lack of collaboration between different units with the health services did not allow them to understand what was going on in different departments. The reservations of staff to use new technology hampered the support of new technology implementations and did not make the culture conducive to new technology implementations. Staff stated that they did not understand the strategic direction of IT and what the long-term goals and objectives were. The lack of strategic direction can be attributed to a lack of stable leadership, and leadership issues (Spencer et al., 2012) Organisation culture and strategic direction had a significant impact on the strategic intent. Organisation culture needed to be improved through further collaboration between the business units, and clarity in strategic direction had to be provided with good leadership so that the staff could participate in delivering the strategic intent of the organisation.

7.3.3 *Strategic alignment*

Organisational learning ($\beta = 0.322$, $p < .05$), investment ($\beta = 0.305$, $p < .05$) and governance ($\beta = 0.273$, $p < .05$) are significant predictors of strategic alignment, as shown in Table 7-10.

Table 7-10 Strategic alignment participant responses

<i>Question</i>	<i>Disagree %</i>	<i>Neutral %</i>	<i>Agree %</i>
I am happy with the level of training provided to me with new ICT technologies during technology transformation projects.	35%	27%	38%
There is sufficient investment in ICT projects from Hospital Management.	43%	40%	18%
I always get Hospital management support to implement ICT changes correctly.	23%	52%	25%

<i>Regional hospital</i>	<i>n</i>	<i>Metropolitan hospital</i>	<i>n</i>	<i>Total -n</i>
Strategic alignment	784	Strategic alignment	548	1332

As seen in Table 7-10, 38% of the staff were happy with the level of training provided to them during new technology implementation projects. Participants in their interviews quoted that lack of training strategy to cater for different staff skill levels and the training needs of the individual staff were lacking. Sometimes the training provided was too early or too late during technology implementation projects. The training requirements for part-time staff and shift workers were not adequately addressed. Lack of training hampered the adoption and use of new systems that were implemented. 18% of the staff agreed that there was enough investment in ICT. Participants in their interviews quoted that there was a lack of devices, devices were old, were not upgraded to the latest version and the overall IT infrastructure was old and was not able to cope with the technology changes. Participants quoted that investment in technology was required to strategically align technology use with the strategic intent of the organisation. 25% of the staff agreed that they get hospital management support to implement ICT changes correctly. Staff in their interviews stated that there was a lack of ownership and accountability of the IT systems, there were structural issues in how the business units aligned with each other, and there was no proper risk management of IT systems, which hindered the successful implementation of technology and system changes. Participants stated that governance with

health services, including technology governance, had to be improved to align with the strategic intent.

7.4 Managerial implications

This study evaluates topics such as technology use, strategic alignment, and strategic intent and provides managerial insights that can be useful in the design and implementation of digital transformation initiatives in healthcare organisations. The study indicated that there is a significant impact of ICT use on the strategic intent of the organisation. There is also a significant impact of strategic alignment on the strategic intent of the organisation. ICT use ($\beta = 0.251$, $p < .05$) and strategic alignment ($\beta = .584$, $p < .05$) are statistically significant predictors of strategic intent. The model explains a 59% variance in ICT use and a 63% variance in strategic intent. So, ICT use must be improved to achieve the long-term strategic intent of the organisation for the digital revolution 4.0. Statistically significant predictors for ICT use are ICT operations ($\beta = 0.611$, $p < .05$), Information management ($\beta = 0.317$, $p < .05$) and Leveraging ICT ($\beta = 0.347$, $p < .05$). The study identified that information management had to be managed with better policies, procedures, and controls. It was important to leverage emerging technologies and innovation. ICT operations had to be enhanced to improve technology adoption and use in healthcare.

Strategic alignment played an important role in aligning technology use with strategic intent. Strategic alignment had to be improved to align technology use with strategic intent more closely. Statistically significant predictors for Strategic alignment were Digital transformation ($\beta = 0.309$, $p < .05$), Organisation learning ($\beta = 0.322$, $p < .05$), Investment ($\beta = 0.305$, $p < .05$) and Governance ($\beta = 0.273$, $p < .05$). The study indicated that the investment in technology initiatives and technology governance was lacking and required further improvement, for better strategic alignment with organisational objectives. Digital transformation initiatives had to be managed well with good technology change management, trialability, and meeting stakeholder expectations. Organisational learning had to be improved with a good training strategy, document management, and good knowledge management systems.

Engagement, enablement, strategic direction, and culture played a significant role in achieving the desired strategic intent. Statistically significant predictors for Strategic intent were Culture ($\beta = 0.243$, $p < .05$), Engagement ($\beta = 0.174$, $p < .05$), Enablement ($\beta = 0.259$, $p < .05$) and Strategic direction ($\beta = 0.544$, $p < .05$). The engagement had to be improved by improving communications from management and by understanding stakeholder needs. Enablement had

to be improved by providing the necessary technical resources such as faster systems and by providing the necessary skills, time, and human resources to accomplish their job. The strategic direction had to be improved by good leadership, defining a clear IT strategic plan, defining the strategic priorities, and developing strategic capabilities to support the strategic plans. The culture had to be improved by promoting collaboration between different business units and HHS, by challenging the status quo and by developing a culture around patient empowerment.

Hospital management and senior policymakers can use the insight and findings from this study to put appropriate policies and frameworks in place for improving technology adoption and use in healthcare. The study explores through the TOE framework lens to generate a new conceptual model which was converged from the quantitative and the qualitative strands. The study here investigated technology adoption and use from a strategic intent perspective. This study was conducted in the healthcare industry, but the findings from this study could be generalised to a population using statistical significance tests. TOE framework is also flexible and can be adapted to any industry context. A multi-disciplinary approach can be used to synthesise and apply the findings to other industries. There may be industry-specific legislation and market competitive factors which may significantly impact the technology adoption in other industries, but those specific environmental factors were not considered in this study. The environmental factors that were used were consistent with Baker's review (2012), i.e. role of IT, adaptable innovations and risk management. In the age of digital revolution, every organisation and its management will have to be thinking about digitizing their business models and digitizing the service delivery. The findings from this study will help them by providing insights for achieving the long-term strategic intent by identifying some of the critical constructs around digital evolution.

8 Strategic intent-Alignment-Technology use framework for healthcare sustainability

8.1 Introduction

The convergence of the results from the qualitative strand and the quantitative strand leads to the synthesis of information from the findings in the form of a conceptual framework for healthcare sustainability with three main dimensions, that is, strategic intent, strategic alignment, and technology use. This chapter addresses the following research question

3. Can we create a framework to improve the alignment of technology with strategic intent?

The Strategic Intent-Alignment-Technology use (IAT) framework identifies the key focus areas of the individual dimensions, their subcategories, and the critical success factors around them (see Figure 8-1). The critical success factors were derived from the analysis of quantitative and qualitative data. The success factors were also synthesised from the researcher's memos and professional experience. By addressing some of the critical success factors for each of these dimensions and subdimensions, and by successfully resolving the challenges holistically, sustainability in healthcare can be achieved through technology adoption and use (see Figure 8-2).

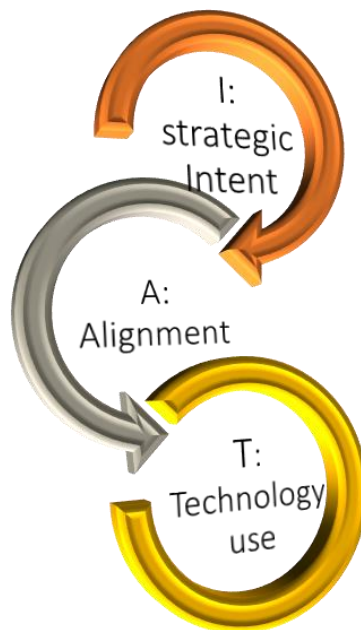


Figure 8-1 IAT Framework

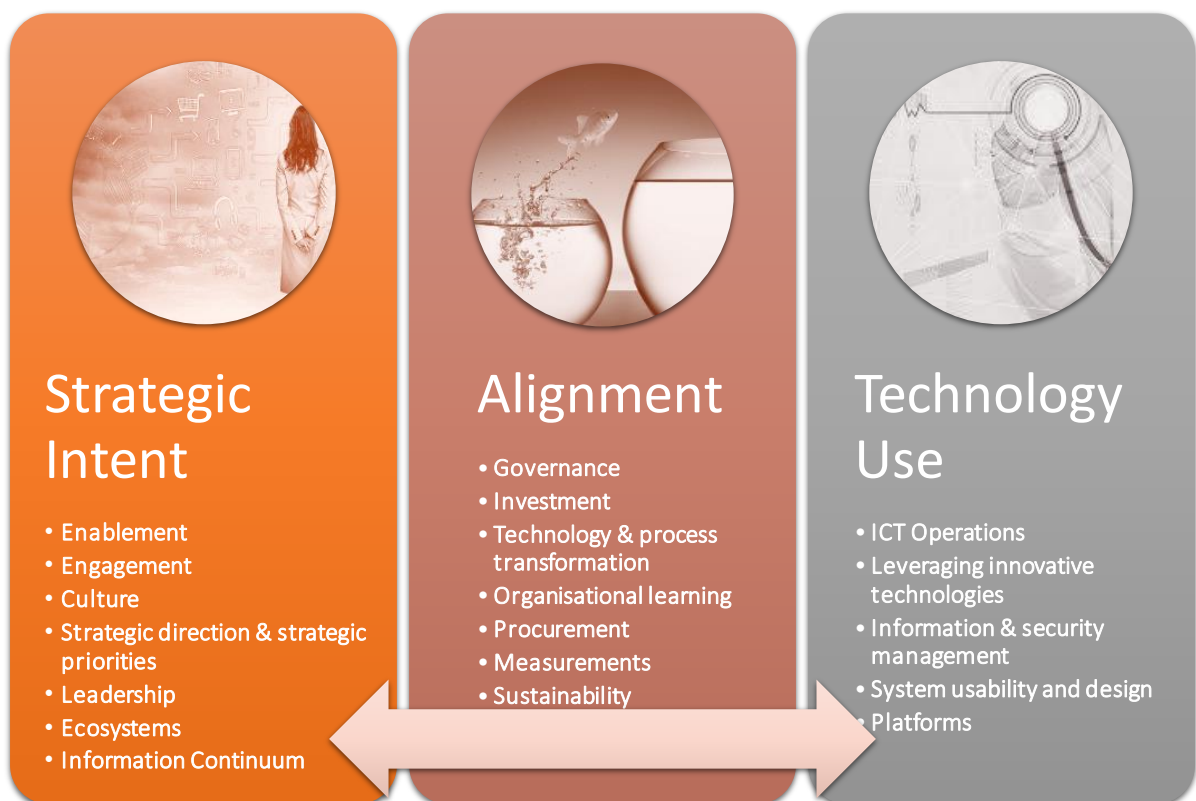


Figure 8-2 IAT Framework

8.2 Framework

The framework consists of 3 dimensions that are Strategic intent, Strategic alignment, and Technology use.

8.2.1 Strategic intent

Strategic intent dimension consists of the following extents:

- Strategic direction
- Engagement
- Enablement
- Culture
- Ecosystem
- Information continuum
- Leadership

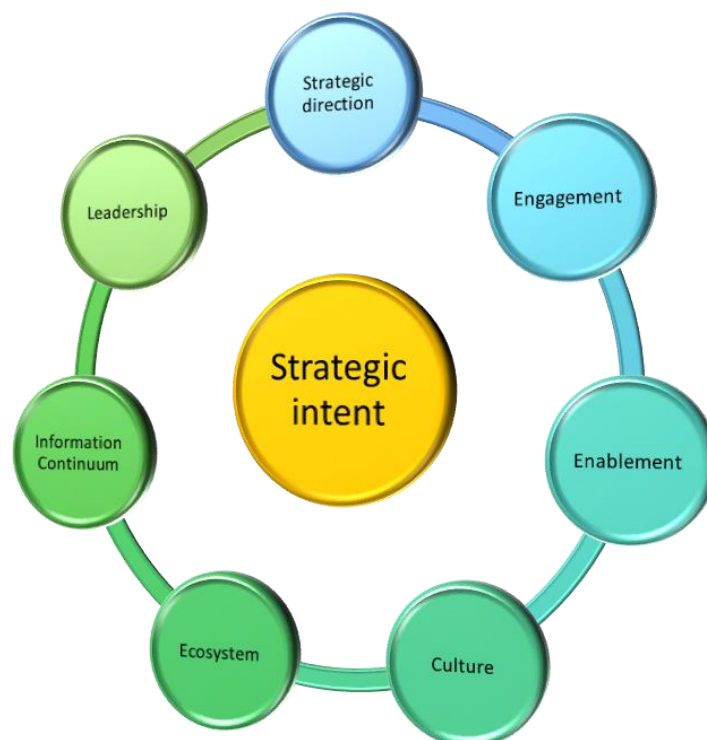


Figure 8-3 Strategic intent

8.2.1.1 *Strategic direction*

Key focus areas and critical success factors for strategic direction are identified as per below. Addressing the key focus areas and their CSF's (Critical Success Factors) are essential for achieving organisational strategic intent.

8.2.1.1.1 Key focus areas of strategic direction

Goals and objectives-CSF: Define clear goals and objectives for the technology in the operational plans.

Long term plan- (CSF): Develop a cohesive long-term strategic intent plan between the state government and health services related to continuity of patient care, sustainably, prevention, and care closer to home to support clinicians and patients.

Leadership-CSF: Provide stable and good leadership.

Operational strategy-CSF: Develop operational plans and their goals and objectives based on strategic intent.

Strategic capability planning-CSF: Plan for people, technical, legislative, infrastructure, partnership, information, innovation, financial, and process capabilities.

Strategic implementation-CSF: Implement the strategic intent with strategic capabilities and operational plans.

Strategic risk-taking-CSF: Encourage strategic risk-taking to develop new innovative solutions.

Strategic change management-CSF: Develop strategic change management programs to align strategic priorities and operational plans with strategic intent annually.

Strategic priority-CSF: Identify strategic priorities, strategic pillars, and the collective desired outcomes based on the strategic intent from the ground up. Understand the cause and effect relationships for strategic priorities.

Technology strategy-CSF: Develop the technology plan based on long-term strategic intent, strategic priorities, and strategic pillars.

8.2.1.2 *Engagement*

Key focus areas and critical success factors for Engagement is identified as per below. Addressing the key focus areas and their critical success factors are essential for engagement and for achieving organisational strategic intent.

8.2.1.2.1 Key focus areas of engagement

Awareness-CSF: Create awareness among staff on the programs that are being developed which are linked to the strategic priorities.

Communication-CSF: Increase executive communication to staff on the key strategic priorities to people at the ground level. Understand the communication needs of staff at various organisation levels.

Direction-CSF: Clarify the management direction and objectives to staff and their role individually vs. collectively in achieving the desired objectives.

Empowerment-CSF: Empower staff to speak up regarding the issues that they are experiencing.

Focus-CSF: Drive staff to keep focused on key strategic priorities and strategic pillars and the desired outcomes.

Feedback-CSF: Incorporate feedback from staff while defining the strategic priorities and the strategic pillars.

Influence-CSF: Influence staff and key stakeholders to be excited about the strategic collective outcomes and involve them in the journey.

Involvement-CSF: Involve staff in design thinking and co-creation activities.

Participation-CSF: Encourage clinical staff to participate early in any new implementations and involve all stakeholders to understand their requirements.

Stakeholder consultation-CSF: Understand the requirements of staff at the ground level from an end to end process perspective, understand their challenges, and involve them in the decision-making process.

Transparency-CSF: Convey the key information and messages transparently.

8.2.1.3 *Enablement*

Key focus areas and critical success factors for Enablement are identified as per below. Addressing the key focus areas and their critical success factors are essential for enablement and for achieving organisational strategic intent.

8.2.1.3.1 Key focus areas of enablement

Compensation-CSF: Compensate all staff in par with industry standards.

Funding-CSF: Make adequate funding available for staff enablement.

Knowledge-CSF: Enhance the technical skill of staff through re-education, professional development, cross-skilling, supporting, and coaching.

Management-CSF: Develop good leadership and management skills for staff.

People strategy-CSF: Develop long term people strategy focused on strategic objectives, outcomes, and strategic priorities.

Resources-CSF: Provide human resources with skills, experience, knowledge, and tools to staff, to accomplish their job. Develop people management strategies.

Retain-CSF: Retain staff with good capabilities.

Regions-CSF: Develop plans for addressing issues in regional areas.

Time-CSF: Make the time available for staff for value-add activities. Develop IT systems that are less time-consuming. Compensate clinical staff for the additional time spent on technology improvements.

Technology-CSF: Implement technology that enables better clinical outcomes to reduce administration time.

8.2.1.4 Culture

Key focus areas and critical success factors for culture are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving culture and for achieving organisational strategic intent.

8.2.1.4.1 Key focus areas of culture

Brave- CSF: Encourage people to speak up and reward staff for following the core values and apply consequences for unacceptable behaviour.

Challenging the status quo-CSF: Encourage a culture of calculated risk-taking and challenging the status quo to drive improved patient care and research outcomes.

Diversity-CSF: Encourage diversity among staff at the management layer.

Empowerment-CSF: Create a culture of employee and patient empowerment so that innovations can flow from outside-in.

Flexibility-CSF: Promote flexibility in the working environment.

Politics-CSF: Understand the political environment and influence positive change.

Respect-CSF: Respect individuals and understand their emotional needs.

Silo mentality-CSF: Encourage teams to collaborate and break down silos.

Trust-CSF: Establish trust between leaders and staff.

8.2.1.5 *Ecosystem*

Key focus areas and critical success factors for the ecosystem are identified as per below. Addressing the key focus areas and their critical success factors are essential for ecosystem development and for achieving organisational strategic intent.

8.2.1.5.1 Key focus areas of ecosystem

Connected systems-CSF: Build connected systems for data exchange between partners, collaborators, and research organisations.

Diffusion of innovation-CSF: Maximize innovation, knowledge sharing, and economies of scale. Share knowledge across the ecosystem. Lift and shift successful innovation across the industrial sector.

Explore opportunities-CSF: Explore opportunities for innovation, economies of scale, and technological solutions with partner organisations.

Ecosystem-CSF: Map the ecosystem with suppliers, partners, collaborators, and research organisations. Involve all stakeholders and patients while building ecosystems.

Maximize resource-CSF: Maximize the consumption of scarce resources through partnerships.

Patient centric-CSF: Build ecosystems with connected entities to follow the patient.

Partnership framework- CSF: Establish a framework for building and maintaining the partnership model.

Strategic partnership-CSF: Establish strategic partnerships based on strategic priorities, desired outcomes, and strategic capabilities.

8.2.1.6 *Information continuum*

Key focus areas and critical success factors for the information continuum are identified as per below. Addressing the key focus areas and their critical success factors are essential for developing the information continuum and for achieving organisational strategic intent.

8.2.1.6.1 Key focus areas of information continuum

Data custodian-CSF: Make the patient data custodian for his personal information and establish security and privacy controls.

Data sharing framework-CSF: Establish a data-sharing framework with legal requirements and standards defined — review regulations on data sharing from a strategic perspective.

Follow the patient-CSF: Make the patient the centre of information flow. Map the information flow to follow the patient journey to provide the right information at the right time to the clinicians.

Integration-CSF: Identify and establish strategic integration requirements for the information continuum with entities such as private providers, primary care, allied health, and community health.

Information flow-CSF: Establish information exchange requirements within the ecosystem and map the information flow.

Pathways-CSF: Identify and map multiple data pathways, which are both incoming and outgoing from the organisation.

Strategic lever-CSF: Establish the strategic priority of information and desired outcomes in the information flow and establish controls.

Unique identifier-CSF: Establish unique identifier requirements for patients and mandate information required.

8.2.1.7 Leadership

Key focus areas and critical success factors for leadership are identified as per below. Addressing the key focus areas and their critical success factors are essential for developing leadership capability and for achieving the organisational strategic intent.

8.2.1.7.1 Key focus areas of leadership

Accountable-CSF: Be accountable for decisions and actions that are undertaken.

Clarity-CSF: Provide clarity in direction and priority around key focus areas.

Capability-CSF: Develop leadership capability around governance, engagement, technology, culture, and strategic risk-taking.

Decisions-CSF: Make bold visionary decisions and be ethical in the decision-making process.

Environment-CSF: Create an environment for transformational change.

Lead-CSF: Lead the journey around people, technology change, and cultural transformation.

Relationship-CSF: Build relationships with both internal and external stakeholders and influence them.

Support-CSF: Support and sponsor key change initiatives.

Stability-CSF: Provide stable leadership and stick to the decisions.

Trust-CSF: Develop trust with employees and partners. Maintain transparency in information where feasible.

8.2.2 *Strategic alignment*

Strategic alignment dimension consists of the following extents:

- Sustainability
- Investment
- Measurements
- Organisational learning
- Digital transformation
- Governance
- Procurement

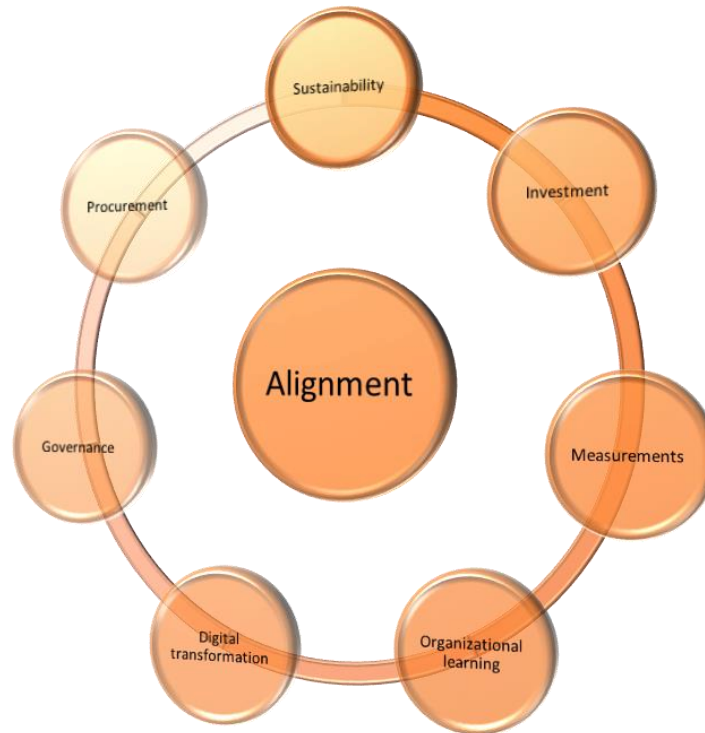


Figure 8-4 Strategic alignment

8.2.2.1 Sustainability

Key focus areas and critical success factors for sustainability are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving sustainability and for achieving the strategic alignment.

8.2.2.1.1 Key focus areas of sustainability

Affordability-CSF: Make healthcare affordable and accessible to patients. Make the healthcare model sustainable for the organisation in the long term.

Contemporize healthcare-CSF: Implement technology as a vital tool in sustaining contemporary healthcare. Enable technology to work in harmony with clinical outcomes. Improve patient experience.

Environment-CSF: Reduce environment impact by reducing paper-based records, reducing patient travel time, and by lowering wastage by better health planning.

Long term benefits-CSF: Identify long term sustainability benefits that will reduce patient risks, increase efficiency, will enable clinicians to make better-informed decisions, and will

minimize duplicate effort. Commit to long-term investments with long term sustainable benefits.

Long term costs-CSF: Identify methods to reduce costs in the long-term using technology for appropriate patient care and care closer to home. Identify options where patients can participate in their care.

Monetary sustainability-CSF: Focus on providing the right service at the correct cost by having the right skills, right technology, and the right framework for the future for productivity improvements. Focus on the outcome-based model rather than the activity-based model.

Prevention-CSF: Focus on healthy living by employing prevention strategies such as public health, drug, and alcohol prevention, community health, health literacy, exercise, diet, hygiene, and injury prevention, to have less demand on the hospital service.

8.2.2.2 *Investment*

Key focus areas and critical success factors for investment are identified as per below. Addressing the key focus areas and their critical success factors are essential for the improvement in investment and for achieving the strategic alignment.

8.2.2.2.1 Key focus areas of investment

Benefits-CSF: Focus on long term benefits rather than short term paybacks. Focus on improving patient experience, minimizing risks, improving research outcomes, improving quality of care, and long-term benefits for the community.

Benefits realization-CSF: Develop a benefits realization plan to track long term benefits. Ensure the benefits are sustained over the longer horizon.

Budget-CSF: Create a long-term budget for the actual financial resources required to deliver the strategic intent. Update annual budgets based on strategic priority and long-term budgets. Track cost blowouts on annual budget vs. long term budgets. Review strategic priorities annually to ensure the implemented solutions are not outdated.

Cost-CSF: Identify total costs, including total cost of patient risk, cost of ongoing maintenance, lost national productivity, and lost opportunity costs to improve patient care outcomes.

Economies of scale-CSF: Identify opportunities for economies of scale to reduce the solution costs.

Funding-CSF: Identify and pursue different sources of funding opportunity. Identify funding opportunities for research and innovation. Partner with other organisations for research and innovation.

Financial model-CSF: Implement an outcome-based funding model rather than an activity-based funding model. Develop an economic model to keep the population healthy.

Investment planning-CSF: Develop long term investment plans and influence the key stakeholders for funding. Minimize the impact of political cycles on the funding disbursement. Lock funds for long term investments. Do not compartmentalize technology investments into individual business units. Focus on long term return on investment and return on ownership and plan for investments in prevention-related activities.

Strategic investments-CSF: Make longer-term strategic investments based on strategic intent with more extended payback periods. Periodically review and sustain investments.

Technology refresh-CSF: Plan for technology refresh in the long-term budgets.

8.2.2.3 *Measurements*

Key focus areas and critical success factors for measurements are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving measurements and for achieving the strategic alignment.

8.2.2.3.1 Key focus areas of measurements

Job descriptions-CSF: Input key measurements into job descriptions.

Learning -CSF: Develop learning measurements for skills update.

Objectives-CSF: Keep measurement objectives in alignment with strategic priority and strategic intent.

Patient experience-CSF: Develop a standard set of metrics to measure patient experience.

Patient outcome-CSF: Develop a standard set of metrics to measure patient-reported clinical outcomes.

Patient flow-CSF: Develop a standard set of metrics to track patient flow, such as treatment times once the patient is referred, a patient arriving at appointments, incorrect locations, patient wait times, disease condition, treatment outcomes and repeat conditions. Develop measures around the efficiency of doctors to reduce duplicate tests and treatments.

Prevention-CSF: Improve metrics to measure prevention, for example, reduced access to emergency service, increased productivity, preventing diabetes and obesity, and delivering education sessions.

Strategic priorities and strategic pillars-CSF: Develop a standard set of metrics to track and monitor strategic priorities. Cascade the measurements into the operational plans.

Technology measure-CSF: Develop technology measures based on clinical outcomes.

Teamwork-CSF: Develop measurements around teamwork and collaboration.

8.2.2.4 Organisational learning

Key focus areas and critical success factors for organisational learning are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving organisational learning and for achieving the strategic alignment.

8.2.2.4.1 Key focus areas of organisational learning

Cross skill-CSF: Cross skill staff in other areas of their interest to broaden their skills and employment opportunities.

Document management systems-CSF: Implement document management systems for better management of documents and version control.

Intuitive-CSF: Ensure that the systems are intuitive so that the learning becomes more natural.

Knowledge management-CSF: Implement knowledge management systems for clinicians and administrative staff to increase efficiency. Develop a standard knowledge network for clinicians, administration staff, and the patients. Develop systems to retain knowledge and information considering staff turnover.

Lessons learnt-CSF: Implement portal to capture lessons learned information both within the organisation and externally from other organisations. Implement continuous improvement initiatives from the lessons learned portal. Develop the organisation to be a learning organisation.

Skills-CSF: Recruit staff with the right skills and knowledge required to perform the role.

Training-CSF: Develop a training plan and professional development for employees as part of the employment and employee engagement process.

Training strategy-CSF: Develop training strategy for the individual and the team, based on their skill level, age, maturity in the subject, availability, such as part-time, shift works, and

technology use requirements. Find the appropriate training delivery method suitable to the individuals and the teams. Reduce red tape for training access. Identify requirements for refresher training.

Training support-CSF: Implement train the trainer approach to have super users in the team. Ensure there is ongoing training available with staff turnover, such as, for new starters in the team such as technology, leadership, personal and professional development. Ensure super users are available to support any new users when required.

Training needs-CSF: Understand the training needs of the individual such as age, skills, access to computers, access to mobile devices, availability, and access to the internet.

Training time-CSF: Ensure staff gets adequate time to complete their training.

Training packages-CSF: Develop training packages where clinicians can help complete the induction themselves and access these learning packages online.

8.2.2.5 *Digital transformation*

Key focus areas and critical success factors for digital transformation are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving digital transformation and for achieving the strategic alignment.

8.2.2.5.1 Key focus areas of digital transformation

Change management-CSF: Establish a process and structure for organisational change management.

Communication plan-CSF: Create a communication plan to deliver the key messages and the benefits to the key stakeholders at the right time via the correct method.

Champions-CSF: Enable business units to nominate champions for organisational change management. Garner clinical leadership.

Demonstrate-CSF: Demonstrate the benefits of IT applications and how it impacts the clinicians in their daily jobs. Convey how technology can help the clinicians to improve patient care. Demonstrate how technology can reduce some of their clinical workloads and manage their resistance around additional documentation and impact on their roles.

Organisation size-CSF: Consider the size and the magnitude of the change in the organisation change management process.

Project management-CSF: Establish a process and structure for the project management office. Monitor project progress and terminate projects that are no longer providing benefits.

Process management-CSF: Establish a structure to review clinical workflows and redesign IT workflows to align with clinical workflows. Involve clinicians to understand the clinical workflows.

Technology upgrade-CSF: Plan projects for technology upgrades and for replacing legacy and unsupported technologies. Upgrade substandard hardware and devices.

Trialability-CSF: Create testbeds and proof of concept environment where users can test run the systems and provide constructive feedback.

Technology implementation-CSF: Plan for technology implementation so that it does not impact the clinician's ability to care for patients. Implement technology in stages rather than the big bang. Get stakeholder buy-in for technology implementation. Roll out systems as promised, as per clinician's expectations.

Time-CSF: Allocate time for clinicians to work on technology implementations.

Technology impact-CSF: Work with the clinicians on finding solutions that can improve patient care using technology. Recognize the impact on patient care through the use of technology. Make the systems intuitive for the clinicians to use and to care for patients.

Technology transition-CSF: Transition the technology into business as usual mode, so that the ongoing support efforts for the systems are sustained in operational mode.

8.2.2.6 Governance

Key focus areas and critical success factors for governance are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving governance and for achieving the strategic alignment.

8.2.2.6.1 Key focus areas of governance

Capability-CSF: Establish people, process, and technology capability framework based on strategic intent.

Ethics-CSF: Establish an ethics framework and train staff in organisational ethics requirements.

Good governance-CSF: Establish good sustained governance through various management frameworks. Make the decision-making process transparent. Consider the requirements of small departments and patients in the strategic priority and operational planning process.

Information governance-CSF: Establish an information management governance framework for information sharing, information management standards, information protection, privacy, and confidentiality.

Investment governance-CSF: Establish a framework for sustained long-term investments to align with strategic intent. Provide transparency on how the funds are spent and how financial decisions are made around contract procurement.

Ownership-CSF: Identify and establish business ownership of technology solutions. Establish solution ownership, support, and development requirements between the state government and health services to deliver the strategic intent.

Project governance-CSF: Establish a project management framework for project governance.

Policies and procedures-CSF: Periodically review policies and procedures to align with strategic priority and strategic intent. Reduce bureaucratic and red tape procedures.

Risk management-CSF: Establish a framework for risk management and manage technology risks along with clinical, patient, and other operational risks.

Structure-CSF: Align organisational structure with strategic priority, strategic pillars, and strategic intent. Establish cross-functional structures with clear accountabilities. Establish structures to be timely and flexible such as steering committees that can provide governance oversight. Remove bureaucratic structures.

Technology governance-CSF: Establish a technology governance framework with clearly defined technology solutions and solution owners. Define clear technology pathways.

8.2.2.7 Procurement

Key focus areas and critical success factors for procurement are identified as per below. Addressing the key focus areas and their critical success factors are important for improving procurement and for achieving the strategic alignment.

8.2.2.7.1 Key focus areas of procurement

Collective bargaining-CSF: Establish buyer cohorts for collective bargaining power with the suppliers. Leverage economies of scale to influence better outcomes.

Contract management-CSF: Review contract terms to ensure that there are ongoing version upgrades available. Ensure all the modules that are demonstrated in the sales demonstration are delivered. Impose penalties for non-delivery of any functions or product features. Ensure the vendor is flexible in providing the outcome the health services are seeking.

Ethics-CSF: Ensure that the procurement decisions are made by the panel are transparent, and the right vendors are chosen ethically.

Even playing field-CSF: Remove bureaucracy to ensure the procurement process is at an even playing field for big and small innovative players alike.

Legal review-CSF: Ensure the solution is reviewed to meet all the legal requirements.

Panel-CSF: Extend the vendor panel to a broad cross-section of suppliers.

Strategic procurement-CSF: Establish a strategic procurement framework with long-term procurement focus.

Subject matter expert-CSF: Involve subject matter experts and end-users in providing input before making any final procurement decisions.

Standardize -CSF: Standardize procurement process for technology, so that the process is transparent and the right advisors become available when required, about any product. Remove bureaucracy in approvals and reviews. Ensure the process is quick enough to avoid unnecessary delays.

Trialability-CSF: Ask the vendor to set up an environment where end-users can use the trial version of the product and provide feedback.

Vendor lock in-CSF: Procure products that have open interfaces, easy to migrate data, and that is easy to integrate with third-party products to avoid vendor lock-ins

8.2.3 *Technology use*

Technology use dimension consists of the following extents:

- Systems design
- Platforms
- Leveraging emerging technologies
- ICT Operations
- Information management
- Agility

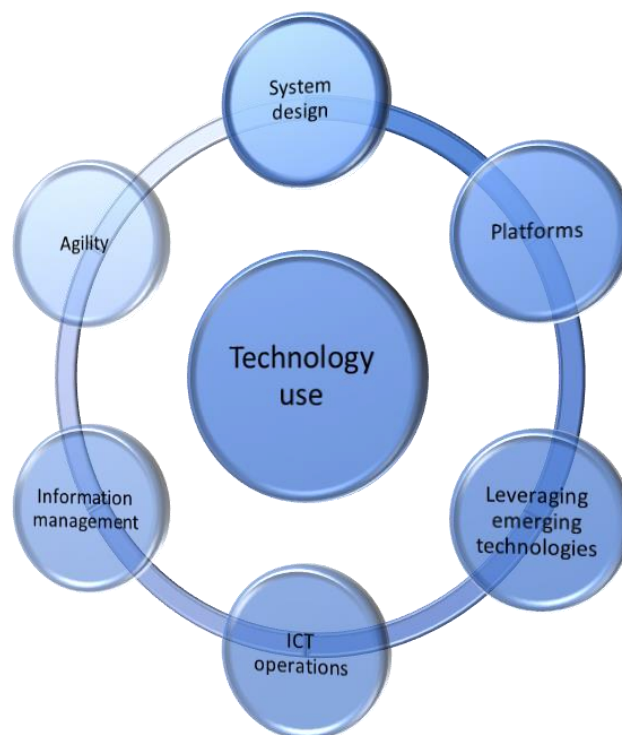


Figure 8-5 Technology use

8.2.3.1 *System design*

Key focus areas and critical success factors for system design are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving system design and for improving technology use.

8.2.3.1.1 Key focus areas of system design

Architecture standards-CSF: Define architecture, data, and integration standards for open systems integration. Define the business process architecture.

Business intelligence-CSF: Design business intelligence systems that integrate data from different data sources and meet the business reporting needs in near real-time.

Data migration-CSF: Design systems that allow for smooth data migration from legacy systems.

Flexibility-CSF: Design the systems to be flexible and adapt to the model of care.

Mobile care-CSF: Design systems that make use of mobile and smartphone technology which enables the clinicians to be mobile and use their mobile devices more efficiently.

Performance, reliability, and availability-CSF: Design systems to be highly available, with reliable information and meets the performance expectations of the clinicians.

Patient-centric design-CSF: Design patient-centric systems so that patients can participate in their care, manage their records, and connect their own devices using patient portals.

Patient care-CSF: Design the systems so that they do not interrupt the clinicians providing care.

Revenue streams-CSF: Design systems to integrate across different revenue streams within the ecosystem.

System integration-CSF: Define enterprise architecture for systems integration for continuous information flow, to address risks with patient safety, and to improve clinical outcomes.

System requirements-CSF: Gather end to end process and system requirements from the end-users of the system.

System usability-CSF: Design user interfaces that are easy to use, intuitive, and cater to different levels of technology literacy and do not burden clinical staff with administration and data entry work. Design the user interfaces to be customizable to the individual department's needs.

System update-CSF: Update the systems when new versions become available so that the drugs and tests entered into the system are current and reflect the latest models of care.

Span-CSF: Design systems to connect across primary, secondary, and tertiary care.

8.2.3.2 *Platforms*

Key focus areas and critical success factors for platforms are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving platform development and for improving technology use.

8.2.3.2.1 Key focus areas of platforms

Digital-CSF: Design the platform based on the business process, application, and information needs.

Geographical reach-CSF: Design platforms that have an excellent geographic reach in the regional areas.

Legislative principles-CSF: Define legal principles around managing standard platforms.

Mobile-CSF: Design platform to support mobile devices such as smartphones and tablets.

National-CSF: Design a standard platform at the national level for healthcare service.

Open -CSF: Design platforms to support the open exchange of data between different healthcare providers.

Patient access-CSF: Design platforms that make the data accessible easily to clinicians and patients at the point of care.

Secure-CSF: Design platforms to be reliable and secure.

Standard-CSF: Design standard platforms that are easy to maintain, such as cloud where various health services will not have to not worry about the infrastructure barriers.

8.2.3.3 *Leveraging emerging technologies*

Key focus areas and critical success factors for leveraging emerging technologies and innovation are identified as per below. Addressing the key focus areas and their critical success factors are essential for leveraging emerging technologies and for improving technology use.

8.2.3.3.1 Key focus areas of leveraging emerging technologies

AI and Analytics-CSF: Define use cases and concepts around clinical and patient care for leveraging emerging technologies such as artificial intelligence (AI) and analytics to increase efficiency in patient care. Leverage emerging technology to reduce duplication in tests and reduce patient wait time, for example, use of AI-assisted decision support systems.

Enabler-CSF: Review and understand how technology is expended as an enabler by different healthcare providers such as private providers. Review if there are better technologies for data capture, for example, video or voice.

Improve clinical outcomes-CSF: Introduce technology such as patient data control, health apps, education apps, the patient being able to book their appointment and a single portal for all information to improve clinical outcomes.

Improved care-CSF: Improve healthcare service by exploiting innovative opportunities around health literacy, online consultation, and providing outcome-based care by technology augmentation with nurses and doctors. Contemporize models of care and job roles using innovative technologies.

Innovation-CSF: Generate key principles for leveraging innovation around legal, data, research, and technology features. Apply technology innovations through research and development for improving clinical solutions.

Proof of concepts-CSF: Provide an environment for building proof of concept and test environment.

Shadow IT-CSF: Reduce shadow IT by meeting clinicians' needs in an innovative and cost-effective way.

Technology congruence-CSF: Understand how technology is used in everyday life and align technology change to be congruent with society's expectations.

Technology best practice-CSF: Introduce technology best practice from other health service providers and industry to improve patient care outcomes.

Technology consumption-CSF: Understand how the technology is consumed from the clinician's perspective and use scarce resources innovatively.

8.2.3.4 *ICT operations*

Key focus areas and critical success factors for ICT operations are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving ICT operations and for improving technology use.

8.2.3.4.1 Key focus areas of ICT operations

Application modernization-CSF: Develop strategies for application modernization of legacy applications.

Business continuity-CSF: Document business continuity plans to deal with patients during system outages.

Capacity, Performance, and Availability-CSF: Address capacity, performance, and availability issues with infrastructure and clinical applications.

Devices-CSF: Provide enough contemporary devices such as updated computers and tablets to clinicians to complete their clinical work.

Infrastructure-CSF: Provide fundamental technology infrastructure in places such as Wi-Fi, network bandwidth, computers, mobile devices, printers, and video conferencing tools for clinical staff. Ensure the infrastructure requirements cover the regional areas.

Process-CSF: Identify and document clinical processes and the underlying systems that support these clinical processes. Understand the end to end patient care workflows.

Reporting-CSF: Enable near real-time reporting across multiple data sources.

Service Desk-CSF: Recruit skilled staff at the IT Service desk and reduce wait times, so that patient care is not affected due to technical issues. The support will have to be available 24 hours daily, seven days a week to clinical staff.

Service delivery-CSF: Improve IT service delivery by taking feedback from clinical staff, resolving technical issues, and continuously improving the systems.

Space-CSF: Assign space to blend technology with patient care.

Standard operating environment-CSF: Provide a standard operating environment that is using the latest version of MS office, internet explorer, and other everyday use desktop applications.

Service catalogue-CSF: List all available solutions, their functions, and their interconnectivity. List the applications and their support structure for the applications provided by the state and the applications that are supported internally by the health services.

8.2.3.5 Information management

Key focus areas and critical success factors for information management are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving information management and for improving technology use.

8.2.3.5.1 Key focus areas of information management

Access-CSF: Process quick access to information with a single sign-on to critical clinical applications. Ensure there are enough devices available for information access. Ensure there are clear pathways available to the clinicians to access the required clinical information.

Data integrity-CSF: Implement controls such as forcing functions and audit trails to reduce data integrity errors. Ensure the information displayed is reliable.

Information governance-CSF: Develop information management policies around data retention, access, security, privacy, and confidentiality. Develop controls around the use of third party mobile applications such as WhatsApp.

Interoperability-CSF: Develop open standards for data interoperability between software providers and make open standards mandatory for systems integration. Information models need to be flexible to change with the models of care.

Information management framework-CSF: Develop a national level legislative framework for data retention and management.

Information currency-CSF: Ensure information is available in near real-time.

Information alerts-CSF: Ensure important patient alerts and patient information is more visible to the clinician.

Privacy and confidentiality-CSF: Provide patient control of their data and enable them to provide informed consent. The data should be uploaded and maintained by healthcare service providers. Make only relevant information available to the appropriate clinician, except that information which is concerned with patient safety. Develop privacy protocols to communicate between clinicians.

Records management-CSF: Develop policies and systems around records management to prevent loss of a critical patient, staff, and organisational information.

Reports-CSF: Standardize reporting requirements required by the government at the national level. Deliver reports in near real-time if feasible.

Security management-CSF: Provide security around data leaks from healthcare service providers and patients. Develop security controls for patient data protection when in transit and at rest. Define security, privacy, confidentiality policies, and controls around data exchange between private providers and other partners.

Unique identifier-CSF: Develop unique patient identifier at a national level, and link disparate patient records with this unique identifier.

8.2.3.6 *Agility*

Key focus areas and critical success factors for agility design are identified as per below. Addressing the key focus areas and their critical success factors are essential for improving clinician's agility and for improving technology adoption and use.

8.2.3.6.1 Key focus areas of agility

Follow the patients-CSF: Ensure there is a single digital record that is available, which follows the patients.

Information update-CSF: Ensure clinicians can update information at the point of care using mobile devices.

Mobile access-CSF: Ensure suitable mobile, and wireless infrastructure is available for mobile information access by the clinicians in the metropolitan as well as regional areas.

Mobile applications-CSF: Develop mobile technologies for health apps for remote patient monitoring, providing patient information to clinicians remotely and for providing education and care closer to home.

Point of care-CSF: Ensure information is available to the clinicians at the point of care.

Technology adoption-CSF: Ensure technology adoption flows from the outside-in rather than pushing top-down.

8.3 *Framework applicability*

The IAT conceptual framework identifies the three core areas for managing the digital evolution of healthcare, that is, strategic intent, strategic alignment, and technology use. The framework can be used as an overarching guideline for identifying the key focus areas within the three core areas for improving technology adoption and use in healthcare. The critical success factors determine the factors that are important for the successful implementation of the key focus areas for the core dimensions. This framework can be applied to improving sustainability in healthcare through technology adoption and use. The framework can be used to analyse the current state of the organisation, to understand the gaps and develop an action plan for addressing the gaps.

The framework identifies the dimensions of each of the three core areas. The strategic intent dimension consists of strategic direction, engagement, enablement, culture, ecosystem, information continuum and leadership. The key focus areas from each of these dimensions can be used to improve the strategic intent context within healthcare. For example, strategic direction dimension states identifying strategic priority is a key focus area, and the success depends on identifying the strategic pillars, the cause and effect of various strategic priorities and the desired collective outcomes for the organisation. A gap analysis will have to be performed to understand if the collective desired outcomes of the organisation are identified in the strategic pillars and strategic priorities. If gaps are identified, then an action plan will have to be developed for gap resolution. Technology use dimension consists of systems design, platforms, leveraging emerging technologies, ICT operations, information management and agility. For example, technology use dimension identifies unique patient identifier as one of the key focus areas, and the success depends on developing a unique patient identifier at the national level to link multiple records of a patient.

Technology is an essential factor in contemporizing healthcare. Healthcare costs can be significantly reduced, and clinical outcomes improved through technology adoption and use. Enhancing sustainability in healthcare through technology adoption and use cannot be done in one year. It requires long multi-year planning with the strategic intent clearly defined and guiding the organisations. All healthcare service providers and all staff should participate in achieving the strategic intent. The problem must not be looked at in isolation by each business unit or single health service provider. Therefore, this framework provides a holistic guideline merging multi-organisational factors such as ecosystem formations and information exchange between entities in the ecosystem for fostering innovation and partnership, which will be required for long term healthcare sustainability from a cost, environment, and patient perspective. By addressing some of the critical success factors identified in this framework, it is envisaged that long term sustainability of healthcare will be made possible through the successful adoption of technology and its use from a strategic intent perspective.

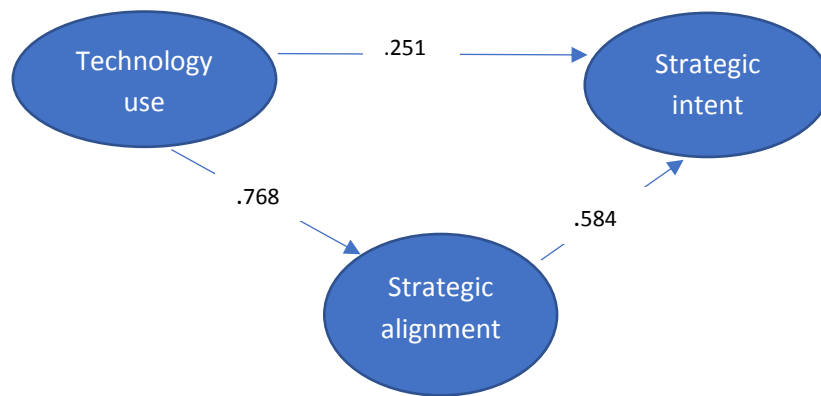
9 Conclusion

It is evident from the study findings that technology use, strategic alignment, and strategic intent are essential for organisations' survival and success in the digital economy. Researchers also stress the importance of technology for organisational learning (Duffield & Whitty, 2015) and to act strategically for innovation (Skinner & Staiger, 2015; Groves et al., 2016). The research aimed to find out if there is a disconnect between ICT use and the strategic intent of the organisation. This study statistically confirms that ICT use significantly affects the strategic intent of the organisation, and ICT use is mediated by strategic alignment construct. Therefore, technology must be included in the organisational strategic intent. Technology use factors and strategic alignment factors must be considered to achieve the strategic intent of the organisation in the digital age. The strategic intent must be articulated for the long term rather than using short-term plans. Leadership becomes essential so that the strategic direction of the organisation and the long-term goals are set, and the capabilities are developed around achieving those goals. Improvements in culture, engagement, enablement, ecosystem development, and ease of information flow between the providers will have to be performed. Alignment factors such as investment, organisational learning, measurements, technology change management, and governance factors should be considered as critical. Technology use factors such as systems design, platform support, emerging technologies, technical operations, and information management will have to be given enough attention from executive management and improved. Information management will play a key role in improving healthcare outcomes as it provides a foundation for emerging technologies such as big data and predictive analytics. A universal standard patient identifier, such as a Medicare number with patient information, will be required for data integration. There are governance challenges in healthcare data, such as the lack of data standards and data privacy issues (Belle et al., 2015). Information management framework addressing the privacy, security and confidentiality of healthcare data should be developed at the national level. This framework will allow addressing the data-sharing concerns quickly during situations such as a bushfires, pandemic and other natural disasters. Therefore, technology should play a vital role in an organisation's strategic intent. Strategic intent and strategic alignment perspective to technology adoption and use has not been researched before and is a new contribution to knowledge. Further taking a practitioner's approach, this study also allows the industry professionals and academic community to take a step back and review and reflect on the rapid technology revolution and

how technology use is impacting the traditional care models in healthcare. By adopting digital innovation, healthcare sustainability using technology can be achieved.

9.1 Contribution to knowledge

This study makes a two-fold contribution by a) existing research has paid insufficient attention to strategic intent and strategic alignment for technology adoption and use. This study investigates technology adoption and use in this specific context, offering strategic and technology-specific insights. It contributes to healthcare management by identifying some of the factors affecting the adoption of technology and use from a strategic intent and strategic alignment perspective; and b) this study builds upon the TOE framework to integrate strategic intent and strategic alignment perspectives into the proposed technology adoption model. It begins by investigating the TOE model and integrating strategic intent perspectives that may influence technology adoption and use, and then building on the various aspects of strategic alignment (see Figure 9-1). This type of model that integrates multiple perspectives is new in terms of combination and integration of the theoretically grounded variables for technology adoption and use. This model considers strategic and human factors for technology adoption and use. The study also evaluates strategic intent and strategic alignment perspectives and should provide managerial insights that can be useful in the design and implementation of digital transformation initiatives in the healthcare industry. The findings from this study also provide important practical implications for the healthcare industry to improve technology adoption and use.



<i>Path</i>	<i>Beta</i>
Technology Use -> Strategic Intent	0.251
Strategic Alignment -> ICT Use	0.768
Strategic Alignment -> Strategic Intent	0.584

Figure 9-1 Conceptual model

This study proposes and empirically validates that strategic intent, strategic alignment, and technology use, conceptualised as a construct, captures the crucial strategic intent, strategic alignment, and technology use practices. This study then empirically tests if the strategic alignment is fully mediating the positive impact of technology use on strategic intent. The findings show that

- Enablement, engagement, strategic direction, and culture are essential antecedents of strategic intent. Engagement (0.174), Enablement (0.259) and Culture (0.243) have similar beta values, and this study concludes that they contribute equally to the organisation's strategic intent. Strategic direction (0.544) has a higher beta value, and strategic intent is profoundly affected by the strategic direction of the organisation.
- Investment, governance, organisational learning, and digital transformation are essential antecedents of strategic alignment. Governance (0.273), organisational learning (0.322), digital transformation (0.309) and investment (0.305) had similar values and contributed equally to the strategic alignment of the organisation.
- Information management, ICT operations, and leveraging new technologies or emerging technologies are essential antecedents for technology use. Leveraging new

technology (0.347) and information management (0.317) had similar values and contributed equally to ICT use. ICT operations (0.611) had a higher beta value and profoundly affected the ICT use of the organisation.

- Strategic alignment positively mediated ICT use and strategic intent. Strategic alignment (0.584) had higher beta values, and strategic intent was profoundly affected by strategic alignment. ICT use (0.768) had higher beta values and significantly affected strategic alignment. The model explained 59% variance in ICT use and 63% variance in strategic intent.

The study answers the following research questions:

1. Is there a disconnection between organisational strategic intent and ICT use in healthcare?

There is no disconnect between technology use and strategic intent. Therefore, technology use should be included in the strategic intent for achieving long term business and patient outcomes.

2. What factors are important for the alignment of ICT use with strategic intent?

Investment, governance, organisational learning, and digital transformation are essential factors for strategic alignment.

3. Can we create a framework to improve the alignment of technology with strategic intent?

Yes, IAT framework has been created to align intent with technology use.

9.1.1 *Theoretical implications*

The structural model provides evidence that technology use has an impact on the strategic intent of the organisation. Strategic alignment mediates the impact of technology use on strategic intent. Technology use and strategic alignment have a positive impact on strategic intent. As the factors for technology use and strategic alignment are improved, strategic intent improves. This theory provides insight that technology is an important factor for organisations' future, and it needs to align with the organisations' strategic intent. Strategic direction, culture, engagement, and enablement were the essential subcategories of strategic intent. Governance, organisational learning, investment, and digital transformation were essential subcategories of strategic alignment. The subcategories have a significant impact on their main categories. This study can, therefore, conclude that strategic direction, culture, engagement, and enablement are the critical elements of strategic intent, and governance, organisational learning, digital

transformation, and investment are the essential elements of strategic alignment. Leveraging emerging technologies, ICT operations, and information management are important elements of ICT use. The theory also identifies several practical implications.

9.1.2 *Practical implications*

The findings from this study also provide important practical implications for the healthcare industry from a technology adoption perspective. This research indicates that there is a significant association of technology use with the strategic intent of the organisation. Technology use is mediated positively through strategic alignment factors of the organisation. This study addresses some of the socio-technical factor gaps in healthcare (Silva and Lapão, 2014). The findings from this study from a strategic technology adoption perspective will enhance successful healthcare digital transformations. During new technology adoption, strategic intent and strategic alignment factors should be considered. Considering the socio-technical factors and focusing on three key areas for ICT, that is, ICT operations, Information management, and Emerging technologies will enable organisations to deliver on their digital agenda.

Strategic intent notion and its relationship with ICT use has not been very well explored in many industries and organisations. Traditional theories are limited in explaining the engagement motivations and practices of technology (Sigala, 2018). This study indicates that there is a significant association between technology use with the organisation's strategic intent and strategic alignment. During new technology deployments and technology adoption, strategic intent and strategic alignment factors should be considered. Usually, new technologies are introduced without long-term strategic intent and alignment focus, but with a very narrow operational focus, for solving a functional problem. However, this study's research findings indicate that, if organisations are to undergo a successful digital change, then considering the strategic intent and alignment factors are essential. With the emergence of the digital revolution, technology is becoming an integral part of new business and patient care models. New models with the long-term strategic focus can enhance the competitiveness of the organisations and help them engage with more customers. Therefore, new technologies must be introduced with a very long-term focus. Operational plans will be required to run services, and these plans will have to be created and reviewed at least annually with the strategic intent focus. The operational plans will have to be monitored so that they stay aligned to the strategic intent. This will ensure that the organisation is making successful increments towards the strategic intent. The difference between traditional strategic planning and this study's research

findings is that technology is considered as part of the strategic intent rather than a vision statement from senior leadership.

This study's research findings show that technology should be considered as part of the strategic intent. Strategic intent acts as a guiding principle rather than a vision statement from senior leadership. It is not a detailed strategy by senior management but identifies the strategic pillars, priorities, and collective desired outcomes. It guides the organisation strategically like a North star. The specific goals and objectives are translated into the operational plans, and the measurements are captured in the operational plans based on the guiding principle and with staff input. It is not a strategic plan that is being pushed top-down. The traditional approaches inhibit engagement, enablement, innovation, and creativity within the workforce and are inefficient for the new digital world. Top-down bureaucratic structures will no longer enable the organisations in the digital age. The organisations will have to modernize their strategic approach. Thinking from a strategic intent perspective will be a paradigm shift to the strategic planning process. The engagement, creativity, and technology adoption and use will flow from the outside in, rather than being pushed top down. The younger generation of staff would like to participate in the technology adoption and strategic intent of the organisation rather than being told what to do from top-down.

The technology adoption and use should also be strategically aligned to the strategic intent. If they are not aligned, then the organisation may end up with far too many duplicate IT systems. The elements of strategic intent are engagement, culture, strategic direction, and enablement. Engagement with staff and patients will become necessary during the digital journey. Management will have to engage and enable both staff and patients to achieve long-term strategic intent through the use of technology. Digital transformation will change the culture of the organisation as it introduces new ways of working and engaging with staff and patients. There will be a shift in traditional methods to modern methods. The dynamics in which people will engage with each other will change with digital disruption, and there will be a culture shift. Therefore, the existing organisational culture will have to change to support digital transformation. Leadership is an essential factor in technology adoption (Spencer et al., 2012). A strategic direction has a significant impact on strategic intent. The organisation will need a transformative leadership style (Kuhnert & Lewis, 1987) with leaders who have the digital skills to lead the organisation in a new direction. This will mean changes to existing leadership. The existing leaders will have to be trained, or new leaders will have to be hired to support the digital evolution. The new leadership should have the capability to provide proper long-term

strategic direction in digital development and lead the digital change. The leadership must also be stable because the continuous change in leadership will continuously change the strategic direction of the organisation and thus impacting the delivery of the strategic intent. Staff and patients will also have to be enabled with new technologies and resources. Strategic alignment factors also play a significant role in the digital journey.

Governance, digital transformation, investment, and organisational learning are essential elements of strategic alignment. Strategic alignment factors such as governance, technology change management, and training will have to be considered during the digital transformation journey. Training staff in new technologies will allow staff to adapt to new technologies relatively quickly and address the skills gap, while technology change management will ensure that the technology adoption process is smooth. Governance will allow for managing any forthcoming technology-related risks to the business. Investment should also be made in emerging technologies that align with strategic intent. Investment planning must be performed, and investments should be made, which will drive new business models. Strategic alignment factors allow for the alignment of technology adoption and use with strategic intent. The strategic alignment factors such as governance, technology change management, and training can help with the transformation, while investment planning can direct the investments in the areas which can drive business change. Long term sustainability factors of the organisation and the digital ecosystem should also be considered during the strategic alignment process. To achieve a new digital business model and improve healthcare sustainability, it also requires a good understanding of technology use context.

Technology use factors must be improved with proper ICT system design to improve clinical usability and by integrating new emerging technologies. ICT operations must be improved, and infrastructure platforms must be standardized using technologies such as cloud computing or standard platforms. Information management will play an important role in the digital era, and common national information management frameworks will have to be crafted for ease of information flow between different service providers. Privacy, security, and confidentiality factors should be enhanced for patient information and information interoperability with open standards defined. Without the successful adoption of new technologies from a strategic perspective, achieving long-term strategic intent for the organisations will not be possible. The findings from this study also provide the executives with a deeper understanding of the strategic intent and strategic alignment paradigm with technology adoption and use. This knowledge is required to provide better quality service to patients and for the long-term sustainability of the

healthcare industry in the digital age. The study also contributes to methodological epistemology.

The mixed methodology using GTM-lite and statistical analysis methods also provides a methodological epistemology to new knowledge. GTM-lite deals with independent and important dependent variables and provides answers to the variations by conceptualizing the emerging theory. The GTM-lite methodology used in this research situation would have contributed to new knowledge by the end of its process of data collection, validation, sorting, memoing, and theorizing. The methodological epistemology is achieved at the end of the process by integrating the qualitative findings into a structural model for statistical verification.

The theory in this study is emergent and has emerged from the process of mixed method design using GTM-lite and quantitative analysis. GTM-lite also provided perceptual empowerment in this study. This means that the comparative process constantly raised the conceptual level of the study, which gave the researcher a continually transcending perspective, a constantly larger and less bounded picture (Glaser, 2010). Most of the research builds on what has gone before, on the other hand, this study has been responsive to the research situation as it is and has found out what is happening in the given situation. There may be a possibility that for the theory discovered, someone has already come up with similar outcomes using more traditional methods, but there is still a valuable contribution to knowledge because as a study from an epistemology perspective this research has cross-validated the theory using a mixed methodology using GTM-lite. To the theory previously offered, this research study would have validated the theory with a more recent study in a new situation, using different methodologies and in a healthcare industry setting. This study also epistemologically contributes to ICT practice in health services organisations by studying the various technology issues and its linkage to the strategic intent and strategic alignment factors. The findings are useful for achieving the long-term digital transformation objectives of the organisation in the contemporary digital age and for future healthcare policy creations.

9.2 Limitations of the study

9.2.1 Limitations of the research methodology

Limitations exist for all research approaches, (Kumar & Phrommathed, 2005) and the methodology for this research has been developed to mitigate several limitations. The methodology uses systematic inquiry procedures of GTM; however, it does not follow the full GTM procedures of developing a full theoretical sampling technique over several phases. Full

GTM can only be achieved in large projects and mixing for GTM with mixed-method design has not been clearly defined. There were also resource constraints for performing full GTM method. Therefore, using full GTM and iterator analysis was a limitation of this research design. This was overcome by using GTM-lite for qualitative data analysis. Any weakness of the GTM-lite procedure was mitigated by the integration of this procedure with quantitative analysis and statistical testing. The conceptual model was developed from the quantitative as well as the qualitative inquiry and was tested using the structural measurement model. Another issue was the duration of the interview, which was restricted to one hour with the participants. This time restriction by the participants had also been an overriding limitation in shaping the full GTM. This limitation was overcome by conducting a simultaneous quantitative strand which consisted of an online survey with participants at both sites, that is, the regional hospital and the metropolitan hospital. Data collection for the qualitative phase and quantitative phase was commenced simultaneously. The quantitative strand allowed for a simple descriptive statistical analysis of the participant responses. An open-ended question was included in the survey. The participant responses from the open-ended survey were used for performing the initial qualitative data analysis. The participant responses from the open-ended questions also helped in generating probe questions for the semi-structured interviews, which had time limitations.

Another weakness of the study was the potential bias due to the self-recruitment of clinical and non-clinical staff for the online survey. This weakness was overcome by using a convergent design methodology. Data from individual sites, that is, the metropolitan hospital and the regional hospital were collected individually and then converged for the data analysis. The merged data was used to calculate the mean, median, and standard deviation of the variables. The convergence design allowed this study to eliminate any bias that was engendered by self-recruitment. Five-point Likert scale from “Strongly Disagree” to “Strongly Agree” was used in the online survey. For some of the questions, the five-point Likert scale from “Never” to “Always” would have been more meaningful, which is a limitation to the survey design. This was overcome by statistically testing the measurement model and deleting the indicators that did not load significantly on the construct. The indicators that had reliability of less than 0.5 were removed from the measurement model. Semi-structured interviews were conducted in the qualitative phase. The participant responses for some of the survey questions were almost evenly split between disagree, neutral and agree. For such responses, the results seem to be

inconclusive. This limitation was overcome by the qualitative analysis of participant responses from the open-ended survey response and semi-structured interviews.

The data collection process for the semi-structured interviews was longitudinal in multiple phases, that is, with staff first and then with senior management. Longitudinal data collection using various phases allowed this study to add to key concepts and themes, as the data collection progressed until data saturation was reached. Semi-structured interviews were conducted with senior management staff. Interviews with senior management who are experts in their field also easily outweigh the time limitation for the interviews since it is a rare opportunity to interview leaders at such high levels of the organisation. Thus, the limitation of one methodology was overcome by the strength of another methodology using a convergent mixed-method design.

9.2.2 *Summary of study limitations*

The study had some limitations. The limitations of this study are stated as below:

- The research could not be conducted to look at ICT use and adoption implications in every health services segment such as General practice, Pharmacies, and health insurance providers.
- The study of technology use, strategic alignment, and strategic intent was limited to one vertical industry segment, that is, public health service providers and did not research private providers.
- The research sample was limited to a sample size from the two participant organisations in the chosen vertical industry segment; however, this was overcome in the research design by achieving the desired power to the sample size.
- Recommendations were aimed at improving strategic intent, strategic alignment, and technology adoption and use factors for the chosen vertical industry segment. However, the conceptual model can be generalized to other sectors due to the broad applicability of the TOE framework and by statistically testing generic factors in the conceptual model.
- The study was limited to participants from 2 major hospitals in two major Australian states, that is, Victoria and Queensland, and did not research other states. However, the combined findings from two hospitals for this research were statistically tested, and the test results can be generalized to the population as the p values were significant.

Some of the study limitations highlighted above also provide a pathway for future research.

9.3 Strengths of the study

The strengths of this study were, it used a mixed-method design using both quantitative and qualitative strands to integrate and converge on the findings. Any weakness in one methodology, that is, quantitative, or qualitative, was overcome by the strength of the other. The study also used the structural measurement model to validate the significance of the findings statistically. It used widely accepted statistical testing methods like PLS-SEM to test the significance of the individual formative and reflective constructs, by which results of the study could be generalized to a population. The research was also performed at two large public service hospitals with clinical and non-clinical staff involvement in the regional area and the metropolitan area in 2 states, that is, Victoria and Queensland. The minimum sample size for each of the quantitative and the qualitative strand was achieved. The design also achieved a power of greater than 0.95, eliminating any type 2 errors.

9.4 Future research

The topic of the study is relatively new, and not a lot of academic research has been conducted to study the digital transformation of healthcare using technology. Technology has revolutionized industries and business practices in the last ten years. The pace of technology transformation has been fast, and technology adoption within the healthcare industry has been relatively slow. Further research will be required to understand the adoption of technology and use by private providers, general practices and pharmacies and to validate if the same theory and the conceptual framework can be applied to those segments of health services as well. The above can be future researched using confirmatory techniques.

The study was limited to participants from 2 major public health service providers in the 2 Australian states, and it did not research other states. There may be state or region-specific legislation and competitive market factors which may significantly impact the technology adoption and use in the healthcare industry for that specific region, but those specific environmental factors were not considered in this study. The environmental factors that were used were consistent with Baker's review (2012), that is, the role of IT and risk management. This study included generic environmental factors such as governance and digital transformation. Although this is a limitation of this study, the findings from the study can be generalized to a population using statistically significant results from the structural model. Future research models can be created using additional formative constructs for ICT use, strategic alignment, and strategic intent and conducted with different environmental factors for

a specific region or a country. The different factors can also be applied using the PLS path modelling approach, which is used mainly for developing new theories in exploratory research. PLS-SEM explains the variance in the dependent variable and is suited when the constructs are formative, which aligns with this study's goals. Covariance based SEM could also be used for the future research models to test the goodness of model fit when more information about the constructs are gathered, or new theories or hypotheses are developed. TOE model is also flexible and can be applied to any industry settings. Similarly, the newly developed conceptual model in this study could be generalized and tested in a different industry such as retail or hospitality. Further research will be required in this direction.

References

- Abraham, S. (2012). Job Satisfaction as an antecedent to employee engagement. *SIES Journal of Management*, 8(2).
- Adrian, A. (2008). Intellectual Capital in the world of information economies. *Journal of International Commercial Law and Technology*, 3(4), 242-246.
- Albelda Pérez, E., Correa Ruiz, C., & Carrasco Fenech, F. (2007). Environmental management systems as an embedding mechanism: A research note. *Accounting, Auditing & Accountability Journal*, 20(3), 403-422.
- Argyrous, G. (2011). *Statistics for research: With a guide to SPSS*. Los Angeles: SAGE.
- Atwood, G. E., & Stolorow, R. D. (2014). *Structures of subjectivity: Explorations in psychoanalytic phenomenology and contextualism*: Routledge.
- Australian Research Council. (2018). *Codes and Guidelines*. Retrieved from <https://www.arc.gov.au/policies-strategies/policy/codes-and-guidelines>
- Bagozzi, R., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16, 74-97.
- Bagozzi, R., Yi, Y., & Phillips, L. (1991). Assessing construct validity in organisational research. *Administrative Science Quarterly*, 36, 421-458.
- Baier, C., Hartmann, E., & Moser, R. (2008). Strategic alignment and purchasing efficacy: An exploratory analysis of their impact on financial performance. *Journal of Supply Chain Management*, 44(4), 36-52.
- Baker, J. (2012). *The technology–organisation–environment framework Information systems theory* (pp. 231-245): Springer, New York, NY.
- Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International*, 13(3), 209-223.
- Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management*, 27(6), 643-650.
- Beasley, M., Bradford, M., & Dehning, B. (2009). The value impact of strategic intent on firms engaged in information systems outsourcing. *International Journal of Accounting Information Systems*, 10(2), 79-96.
- Becker, J.-M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: Guidelines for using reflective-formative type models. *Long Range Planning*, 45(5), 359-394.
- Belle, A., Thiagarajan, R., Soroushmehr, S., Navidi, F., Beard, D. A., & Najarian, K. (2015). Big data analytics in healthcare. *BioMed Research International*, 2015.
- Berg, B. L. (1998). *Qualitative research methods for the social sciences*. New York: Wiley.

- Berg, M., Aarts, J., & van der Lei, J. (2003). ICT in health care: Sociotechnical approaches. *Methods Inf. Med*, 42, 297—301.
- Berghaus, S. (2018). *The Fuzzy Front End of Digital Transformation: Activities and Approaches for Initiating Organisational Change Strategies*. Universität St. Gallen.
- Berman, S. J. (2012). Digital transformation: Opportunities to create new business models. *Strategy & Leadership*, 40(2), 16-24.
- Blaikie, N. (2007). Approaches to social enquiry: *Advancing knowledge*. Polity.
- Bollen, K., & Lennox, R. (1991). Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin*, 110, 305-314.
- Bontis, N., Booker, L. D., & Serenko, A. (2007). The mediating effect of organisational reputation on customer loyalty and service recommendation in the banking industry. *Management Decision*, 45, 1426-1445.
- Boonstra, A., & Broekhuis, M. (2010). Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC Health Services Research*, 10(1), 231.
- Bradley, E. H., Curry, L. A., Spatz, E. S., Herrin, J., Cherlin, E. J., Curtis, J. P., . . . Krumholz, H. M. (2012). Hospital strategies for reducing risk-standardized mortality rates in acute myocardial infarction. *Annals of Internal Medicine*, 156(9), 618-626.
- Bratman, M. E. (1999). *Faces of intention: Selected essays on intention and agency*. Cambridge: Cambridge University Press.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Brinkmann, S., & Kvale, S. (2005). Confronting the ethics of qualitative research. *Journal of Constructivist Psychology*, 18(2), 157-181. doi:10.1080/10720530590914789
- Brown, J. (1997). Seeing differently: Insights on innovation. *Harvard Business Review*.
- Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6(1), 97-113.
- Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services, *Information and communication technologies in tourism*, (pp. 377-389): Springer, Cham.
- Burgelman, R. A. (1994). Fading memories: A process theory of strategic business exit in dynamic environments. *Administrative Science Quarterly*, 24-56.
- Burgelman, R. A., & Grove, A. S. (1996). Strategic dissonance. *California Management Review*, 38(2).
- Callen, J. L., Braithwaite, J., & Westbrook, J. I. (2008). Contextual implementation model: A framework for assisting clinical information system implementations. *Journal of the*

- American Medical Informatics Association*, 15(2), 255–262.
- Carr, W., & Kemmis, S. (1986). *Becoming critical: education, knowledge, and action research*. Geelong, Vic: Deakin University.
- Casselmann, R. M., & Sama, L. M. (2013). Microfinance, mission drift, and the impact on the base of the pyramid: A resource-based approach. *Business and Society Review*, 118(4), 437-461.
- Castells, M. (1996). *The rise of the networked society*. Cambridge Mass: Blackwell Publishers.
- Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *Journal of Mixed Methods Research*, 4(4), 342-360.
- Cenfetelli, R. T., & Bassellier, G. (2009). Interpretation of formative measurement in information systems research. *MIS Quarterly*, 689-707.
- Charmaz, K. (2000). *Handbook of qualitative research* (2nd ed.). CA: Sage Publications.
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*: Sage.
- Charmaz, K., & Belgrave, L. L. (2007). *Grounded theory*. The Blackwell encyclopedia of sociology.
- Chia, R., & Holt, R. (2006). Strategy as practical coping: A Heideggerian perspective. *Organisation Studies*, 27(5), 635-655.
- Chieh - Min, C. (2011). A framework for aligning strategic positioning and knowledge management system. *Information Technology Journal*, 10(8), 1594-1600.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research*, 295(2), 295-336.
- Choronaki, C. E., Andreassen, H. K., & Bujnowska, F. M. (2007). European citizens' use of E-health services: A study of seven countries. *BMC Public Health*, 7.
- Chwelos, P., Benbasat, I., & Dexter, A. S. (2001). Empirical test of an EDI adoption model. *Information Systems Research*, 12(3), 304-321.
- Clarke, V. (2005). We're all very liberal in our views': Students' talk about lesbian and gay parenting. *Lesbian & Gay Psychology Review*, 6(1), 2-15.
- Clemons, E., Dewan, R., & Kauffman, R. (2006). Special section: digital economy and information technology value. *Journal of Management Information Systems*, 23(2), 7-11. doi:10.2753/mis0742-1222230201
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155.
- Coiera, E. (1999). The impact of culture on technology – how do we create a clinical culture of innovation?. *Medical Journal of Australia*, 171, 508–509.

- Coiera, E. (2006). Clinical biochemist reviews. *Communication Systems in Healthcare*, 27, 89-98.
- Coiera, E. (2009). Building a national health IT system from the middle out. *Journal of the American Medical Informatics Association*, 16(3), 271-273.
- Coltman, T., Devinney, T. M., Midgley, D. F., & Venaik, S. (2008). Formative versus reflective measurement models: two applications of formative measurement. *Journal of Business Research*, 61, 1250-1262.
- Conger, J., & Kanungo, R. (1987). Toward a behavioral theory of charismatic leadership in organisational settings. *Academy of Management Review*, 12.
- Connor, T. (2002). The resource-based view of strategy and its value to practising managers. *Strategic Change*, 11(6), 307-316.
- Corbin, J., & Strauss, A. (2008). Techniques and procedures for developing grounded theory. *Basics of Qualitative Research*, 3rd ed.; Sage: Thousand Oaks, CA, USA.
- Crabtree, B. F., Miller, W. L., Tallia, A. F., & Cohen, D. J. (2005). Delivery of clinical preventive services in family medicine offices. *Annals of Family Medicine*, 3(5), 430-435.
- Cresswell, K., & Sheikh, A. (2013). Organisational issues in the implementation and adoption of health information technology innovations: an interpretative review. *International Journal of Medical Informatics*, 82(5), e73-e86.
- Creswell, J. (2007). *Qualitative inquiry & research design: Choosing among five approaches*. London: Sage.
- Creswell, J. (2009). *Research design, qualitative, quantitative and mixed methods approaches*. California: Sage Publications Inc.
- Creswell, J. W. (2011). Controversies in mixed methods research. *The Sage handbook of qualitative research*, 4, 269-284.
- Creswell, J., & Brown, M. L. (1992). How chairpersons enhance faculty research: A grounded theory study. *The Review of Higher Education*, 16, 41-62.
- Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research*: Sage Publications.
- Creswell, J. W., Fetters, M. D., & Curry, L. A. (2013). Achieving integration in mixed methods designs—principles and practices. *Health Services Research*, 48(6pt2), 2134-2156.
- Cronin, C. (2014). Using case study research as a rigorous form of inquiry. *Nurse Res*, 21(5), 19-27.
- Cunningham, J. (1993). *Action research and organisational development*. Westport, CT: Praeger.
- Curry, L. A., Spatz, E., Cherlin, E., Thompson, J. W., Berg, D., Ting, H. H., Bradley, E. H.

- (2011). What distinguishes top-performing hospitals in acute myocardial infarction mortality rates?: a qualitative study. *Annals of Internal Medicine*, 154(6), 384-390.
- Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Massachusetts Institute of Technology.
- De Haes, S., & Van Grembergen, W. (2004). IT governance and its mechanisms. *Information Systems Control Journal*, 1, 27-33.
- Denis, J., & Langley, A. (2001). The dynamics of collective leadership and strategic change in pluralistic organisations. *Academy of Management Journal*, 44.
- Denzin, N., & Lincoln, Y. S. (2011). *The SAGE Handbook of Qualitative Research* (4th ed.). Thousand Oaks CA: Sage Publications.
- Denzin, N. K. (2008). *Collecting and interpreting qualitative materials* (Vol. 3). Sage.
- Dertouzos, L. (1991). Communications, computers and networks. *Scientific American*, 265, 62-69.
- Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organisational measure development: A comparison and empirical illustration. *British Journal of Management*, 17(4), 263-282.
- Diamantopoulos, A., & Winklhofer, H. (2001). Index construction with formative indicators: an alternative to scale development. *Journal of Marketing Research*, 38, 269-277.
- Dick, B. (2005). *Grounded theory: A thumbnail sketch*. Retrieved from <http://www.aral.com.au/resources/grounded.html>
- Dobrev, A., Jones, T., Stroetmann, V. N., Stroetmann, K. A., Artmann, J., Kersting, A., ... & Lilischkis, S. (2008). Sources of financing and policy recommendations to Member States and the European Commission on boosting eHealth investment. *Financing eHealth*.
- Drengner, J., Gaus, H., & Jahn, S. (2008). Does flow influence the brand image in event marketing. *Journal of Advertising Research*, 48, 138-147.
- Drucker, P. F. (1999). Knowledge-worker productivity: The biggest challenge. *California Management Review*, 41(2), 79-94.
- Duffield, S., & Whitty, S. J. (2015). Developing a systemic lessons learned knowledge model for organisational learning through projects. *International Journal of Project Management*, 33(2), 311-324.
- Dworkin, S. L. (2012). *Sample size policy for qualitative studies using in-depth interviews*: Springer.
- Ebbes, P., Papies, D., & Van Heerde, H. J. (2011). The sense and non-sense of holdout sample validation in the presence of endogeneity. *Marketing Science*, 30(6), 1115-1122.
- Elden, M., & Chisholm, R. F. (1993). Emergent varieties of action research: Introduction to

- the special issue. *Human Relations*, 46(1), 121-142.
- Elliot, S. (2007). *Environmentally sustainable ICT: A critical topic for IS research?* PACIS 2007 proceedings, 114.
- Emirbayer, M., & Mische, A. (1998). What is agency? *American Journal of Sociology*, 103.
- Engelbrecht, H.-J. (2005). ICT research, the new economy, and the evolving discipline of economics: back to the future? *The Information Society*, 21(4), 317-320. doi:10.1080/01972240591007634
- Erumban, A. A., & De Jong, S. B. (2006). Cross-country differences in ICT adoption: A consequence of Culture? *Journal of World Business*, 41(4), 302-314.
- Evans, J. M. (2008). Do general practice characteristics influence uptake of an information technology (IT) innovation in primary care? *Informatics in Primary Care*, 16, 3-8.
- Evans, P. B., & Wurster, T. S. (1997). Strategy and the new economics of information, *Harvard Business Review*, New York, NY.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160.
- Fawcett, S. E., Smith, S. R., & Bixby Cooper, M. (1997). Strategic intent, measurement capability, and operational success: making the connection. *International Journal of Physical Distribution & Logistics Management*, 27(7), 410-421.
- Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—principles and practices. *Health Services Research*, 48(6pt2), 2134-2156.
- Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, 55(2), 1.
- Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. *Handbook of Qualitative Research*, 2(6), 645-672.
- Fornell, C., & Bookstein, F. (1982). Two structural equation models e LISREL and PLS applied to consumer EXIT-voice theory. *Journal of Marketing Research*, 19, 440-452.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18, 39-50.
- Franklin, M., Halevy, A., & Maier, D. (2005). From databases to dataspace: A new abstraction for information management. *ACM Sigmod Record*, 34(4), 27-33.
- Gagnon, M. (2009). Interventions for promoting information and communication technologies adoption in healthcare professionals. *Cochrane Database of Systematic Reviews*.

- Gagnon, M.-P., Desmartis, M., Labrecque, M., Car, J., Pagliari, C., Pluye, P., . . . Légaré, F. (2012). Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. *Journal of Medical Systems*, 36(1), 241-277.
- Gallimore, R., Goldenberg, C. N., & Weisner, T. S. (1993). The social construction and subjective reality of activity settings: Implications for community psychology. *American Journal of Community Psychology*, 21(4), 537-560.
- Gardner, W. L., & Avolio, B. J. (1998). The charismatic relationship: A dramaturgical perspective. *Academy of Management Review*, 23.
- Garmann-Johnsen, N. F. (2015). What seems to be the problem?—A study of connections between national contexts and regional e-health strategies. *Health Policy and Technology*, 4(2), 144-155.
- Geisser, S. (1975). A predictive approach to the random effect model. *Biometrika*, 61, 101-107.
- Getotz, O., Liehr-Gobbers, K., & Krafft, M. (2010). *Evaluation of structural equation models using the Partial Least Squares (PLS) approach*. Heidelberg: Springer.
- Gerow, J. E., Grover, V., Thatcher, J. B., & Roth, P. L. (2014). Looking toward the future of IT-business strategic alignment through the past: A meta-analysis. *MIS Quarterly*, 38(4), 1059-1085.
- Ghosh, M., & Ghosh, I. (2009). ICT and information strategies for a knowledge economy: The Indian experience. *Program: Electronic Library and Information Systems*, 43(2), 187-201. doi:10.1108/00330330910954398
- Glaser, B. G. (1992). *Basics of grounded theory analysis: Emergence vs. forcing*. Mill Valley: Sociology Press.
- Glaser, B. G. (1995). A look at grounded theory. *Sociology Press*, 1, 3-17.
- Glaser, B. G. (1998). *Doing grounded theory: Issues and discussions*. Sociology Press.
- Glaser, B. G. (2002). Conceptualization: On theory and theorizing using grounded theory. *International Journal of Qualitative Methods*, 1(2), 1-31.
- Glaser, B. G. (2009). Theoretical writing. *Grounded Theory Review*, 8(3), 1-17.
- Glaser, B. G. (2010). The future of grounded theory. *Grounded Theory Review*, 9(2), 1-14.
- Glaser, B. G. (2012a). Constructivist grounded theory? *Grounded Theory Review*, 11(1), 28-38.
- Glaser, B. G. (2012b). Stop. Write! Writing grounded theory (Vol. 11, pp. 2-11). *Sociology Press*.
- Glaser, B. G., & Strauss, A. L. (2017). *Discovery of grounded theory: Strategies for qualitative research*: Routledge.

- Glasgow, R. E. (2007). eHealth evaluation and dissemination research. *American Journal of Preventive Medicine*, 32(5), 119-126.
- Gobble, M. M. (2018). Digital strategy and digital transformation. *Research-Technology Management*, 61(5), 66-71.
- Granlien, M. F., Hertzum, M., & Gudmundsen, J. (2008). *The gap between actual and mandated use of an electronic medication record three years after deployment*, in: *eHealth Beyond the Horizon—Get IT There*. Goteborg: Organizing Committee of MIE, IOS Press.
- Greene, J. C., Caracelli, V. J., & Graham, W. E. (1989). Toward a conceptual framework of mixed method evaluation designs. *Educational Evaluation and Policy Analysis*, 11, 255-274.
- Greengard, S. (2008). Upwardly mobile. *Communications of the ACM*, 51(12), 17-19.
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organisations: systematic review and recommendations. *The Milbank Quarterly*, 82(4), 581-629.
- Grewal, R., Cote, J. A., & Baumgartner, H. (2004). Multicollinearity and measurement error in structural equation models: Implications for theory testing. *Marketing Science*, 23(4), 519-529.
- Groves, P., Kayyali, B., Knott, D., & Kuiken, S. V. (2016). *The big data revolution in healthcare: Accelerating value and innovation*. Retrieved from Center for US Health System Reform.
- Gruber, M., Heinemann, F., Brettel, M., & Hungeling, S. (2010). Configurations of resources and capabilities and their performance implications: an exploratory study on technology ventures. *Strategic Management Journal*, 31, 1337-1356.
- Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. CA: SAGE.
- Gudergan, S. P., Ringle, C. M., Wende, S., & Will, A. (2008). Confirmatory tetrad analysis in PLS path modeling. *Journal of Business Research*, 61(12), 1238-1249.
- Guetterman, T. C., Babchuk, W. A., Howell Smith, M. C., & Stevens, J. (2017). Contemporary approaches to mixed methods—grounded theory research: A field-based analysis. *Journal of Mixed Methods Research*, 1558689817710877, 1-17.
- Gulledge, T. R., & Haszko, R. A. (1996). *The information technology enabled organisation: A major social transformation in the USA*. Unesco-Management of Social Transformations Program.
- Haenlein, M., & Kaplan, A. M. (2004). A beginner's guide to partial least squares analysis. *Understanding Statistics*, 3(4), 283-297.
- Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate data analysis* (6th ed.): Pearson Prentice Hall.

- Hair, J., Sarstedt, M., Ringle, C., & Mena, J. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40, 414-433.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2013). *A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* Thousand Oaks CA: Sage.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152.
- Haluza, D., & Jungwirth, D. (2015). ICT and the future of health care: Aspects of health promotion. *International Journal of Medical Informatics*, 84(1), 48-57.
- Hamel, G. (1999). Bringing silicon valley inside. *Harvard Business Review*, 77(5), 70-84.
- Hamel, G., & Prahalad, C. K. (1989). Strategic intent. *Harvard Business Review*, 63-78.
- Hamel, G., & Prahalad, C. K. (1990). The core competence of the corporation. *Harvard Business Review*, 79-91.
- Hamel, G., & Prahalad, C. K. (1994). *Competing for the future*. Boston, MA: Harvard University Press.
- Hamel, G., & Prahalad, C. K. (2005). Best of HBR-- Strategic intent. *Market Leader* (30), 64-65.
- Hamilton III, R. D., Eskin, D., & Michaels, M. P. (1998). Assessing competitors: The gap between strategic intent and core capability. *Long Range Planning*, 31(3), 406-417.
- Hammersley, M. (1996). *Handbook of qualitative research methods for psychology and the social sciences*. Liecester, UK: BPS Books.
- Harrop, V. M. (2002). *Digital diffusion in the clinical trenches: Findings from a telemedicine needs assessment*. Massachusetts: Massachusetts Institute of Technology.
- Hart, S. L. (1992). An integrative framework for strategy-making processes. *Academy of Management Review*, 17.
- Haux, R. (2006). Healthcare information systems-past, present and future. *International Journal of Medical Informatics*, 75, 268-281.
- Heidegger, M. (1988). *The basic problems of phenomenology* (Vol. 478). Indiana University Press.
- Henderson, J. C., & Venkatraman, H. (1993). Strategic alignment: Leveraging information technology for transforming organisations. *IBM Systems Journal*, 32(1), 472-484.
- Hennig-Thurau, T., Henning, V., Sattler, H., Eggers, F., & Houston, M. B. (2007). The last picture show? Timing and order of movie distribution channels. *Journal of Marketing Research*, 71, 63-83.

- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Holden, R. J., & Karsh, B.-T. (2009). *A theoretical model of health information technology usage behavior with implications for patient safety*. Behavior & Information Technology, 28(1), 21-38.
- Holden, R. J., & Karsh, B.-T. (2010). The technology acceptance model: Its past and its future in health care. *Journal of Biomedical Informatics*, 43(1), 159-172.
- Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems*, 16(2), 91-112.
- Hulland, J. (1999). Use of Partial Least Squares (PLS) in strategic management research: A review of recent studies. *Strategic Management Journal*, 20, 195-204.
- Hult, G. T. M., Hair Jr, J. F., Proksch, D., Sarstedt, M., Pinkwart, A., & Ringle, C. M. (2018). Addressing endogeneity in international marketing applications of partial least squares structural equation modelling. *Journal of International Marketing*, 26(3), 1-21.
- Husserl, E. (1970). *The crisis of the European sciences and transcendental phenomenology*. Evanston: Northwestern University Press.
- Imenda, S. (2014). Is there a conceptual difference between theoretical and conceptual frameworks? *Journal of Social Sciences*, 38(2), 185-195.
- Jang, E. E., McDougall, D. E., Pollon, D., Herbert, M., & Russell, P. (2008). Integrative mixed methods data analytic strategies in research on school success in challenging circumstances. *Journal of Mixed Method Research*, 2.
- Jarillo, J. C. (1993). *Strategic networks: Creating borderless organisations*. Oxford: Butterworth-Heinemann.
- Johnson, B., & Christensen, L. (2012). *Educational research- quantitative, qualitative and mixed approaches* (4th ed.). California, USA: Sage Publications.
- Johnson, R. B. (2008). *The SAGE encyclopedia of qualitative research methods*. Thousand Oaks CA: SAGE.
- Johnson, R. B., & Gray, R. (2010). *SAGE handbook of mixed methods in social behavioral research*. Thousand Oaks CA: Sage Publications.
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112-133.
- Kaminski, J. (2011). Diffusion of innovation theory. *Canadian Journal of Nursing Informatics*, 6(2), 1-6.
- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). *Strategy, not technology, drives digital transformation*. MIT Sloan Management Review and

Deloitte University Press, 14, 1-25.

- Kang, Y., & Liu, Y. (2016). Natural resource-seeking intent and regulatory forces: Location choice of Chinese outward foreign direct investment in Asia. *Management Research Review*, 39(10), 1313-1335.
- Kaplan, B., & Shaw, N. T. (2004). Future directions in evaluation research: People, organisational, and social issues. *Methods Inf. Med.*, 43, 231—251.
- Kaplan, R. S., & Norton, D. P. (1996). Using the balanced scorecard as a strategic management system: *Harvard Business Review*: Boston.
- Kearns, G. S., & Sabherwal, R. (2006). Strategic alignment between business and information technology: a knowledge-based view of behaviors, outcome, and consequences. *Journal of Management Information Systems*, 23(3), 129-162.
- Kenney, M., Rouvinen, P., & Zysman, J. (2015). The digital disruption and its societal impacts. *Journal of Industry, Competition and Trade*, 15(1), 1-4.
- Khavul, S., Peterson, M., Mullens, D., & Rasheed, A. (2010). Going global with innovations from emerging economies: Investment in customer support capabilities pays off. *Journal of International Marketing*, 18(4), 22-42.
- Khoumbati, K., Themistocleous, M., Irani, Z., & Mantzana, V. (2008). Information systems and healthcare XXIV: factors affecting the EAI adoption in the healthcare sector. *Communications of the association for information systems*, 22(1), 5.
- Kierkegaard, P. (2015). Interoperability after deployment: Persistent challenges and regional strategies in Denmark. *Int J Qual Health Care*, 27(2), 147-153.
- Kleinke, J. D. (2005). Market failure and the creation of a national health information technology system. *Health Affairs*, 24(5), 1246–1262.
- Klöcker, P. N., Bernnat, R., & Veit, D. J. (2015). Stakeholder behavior in national eHealth implementation programs. *Health Policy and Technology*, 4(2), 113-120.
- Kogut, B. (1988). Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal*, 9(4), 319-332.
- Koppel, R., Wetterneck, T., Telles, J. L., & Karsh, B.-T. (2008). Workarounds to barcode medication administration systems: Their occurrences, causes, and threats to patient safety. *Journal of the American Medical Informatics Association*, 15(4), 408-423.
- Kotter, J. P. (1995). Leading change: Why transformation efforts fail. *Harvard Business Review*, 73(1).
- Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy*, 45(3), 214-222.
- Krumholz, H. M., Curry, L. A., & Bradley, E. H. (2011). Survival after acute myocardial infarction (SAMI) study: The design and implementation of a positive deviance study. *American Heart Journal*, 162(6), 981-987. e989.

- Kuhnert, K. W., & Lewis, P. (1987). Transactional and transformational leadership: A constructive/developmental analysis. *Academy of Management Review*, 12(4), 648-657.
- Kumar, S., & Phrommathed, P. (2005). *Research methodology*: Springer, US.
- Kvale, S. (1996). *InterViews: An Introduction to qualitative research interviewing*. CA: Sage.
- Kvale, S. (2006). Dominance through interviews and dialogues. *Qualitative Inquiry*, 12(3), 480-500. doi:10.1177/1077800406286235
- Lampel, J., Shamsie, J., & Shapira, Z. (2009). Experiencing the improbable: Rare events and organisational learning. *Organisation Science*, 20(5), 835-845.
- Landau, C., & Bock, C. (2013). Value creation through vertical intervention of corporate centres in single business units of unrelated diversified portfolios—the case of private equity firms. *Long Range Planning*, 46(1-2), 97-124.
- Lapointe, L., & Rivard, S. (2006). Getting physicians to accept new information technology: insights from case studies. *Canadian Medical Association Journal*, 174(11), 1573-1578.
- Lau, F. (1997). A review on the use of action research in information systems studies. In *Information systems and qualitative research* (pp. 31-68). Springer, Boston, MA.
- Leistikow, I., Mulder, S., Vesseur, J., & Robben, P. (2017). Learning from incidents in healthcare: The journey, not the arrival, matters. *BMJ Qual Saf*, 26(3), 252-256.
- Lejeune, A., & Sack, I. (2008). *Architecting organisational domains in three spaces of strategy*. Retrieved from The European Institute for Advanced Studies in Management.
- Lewis, S. (2015). Qualitative inquiry and research design: Choosing among five approaches. *Health Promotion Practice*, 16(4), 473-475.
- Lewin, K. I. (1994). *A journey through illusions*. Fithian Press.
- Lichtman, M. (2011). *Qualitative educational research*. London: Sage.
- Lichtman, M. (2013). *Qualitative research for the social sciences*. SAGE Publications.
- Lluch, M. (2011). Healthcare professionals' organisational barriers to health information technologies—A literature review. *International Journal of Medical Informatics*, 80(12), 849-862.
- Lovas, B., & Ghoshal, S. (2000). Strategy as guided evolution. *Strategic Management Journal*, 21.
- Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), 135-172.

- Mahmood, F., Khan, A. Z., & Khan, M. B. (2019). Digital organisational transformation issues, challenges and impact: A systematic literature review of a decade. *Abasyn University Journal of Social Sciences*, 12(2).
- Manikutty, S. (2010). C K Prahalad and his work: An assessment. *Vikalpa: The Journal for Decision Makers*, 35(2), 1-7.
- Mantere, S., & Sillince, J. A. (2007). Strategic intent as a rhetorical device. *Scandinavian Journal of Management*, 23(4), 406-423.
- Marangunić, N., & Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1), 81-95.
- Mark, M., & Gamble, C. (2009). *Handbook of social research ethics*. Thousand Oaks CA: Sage Publications.
- Martins, E. C., & Terblanche, F. (2003). Building organisational culture that stimulates creativity and innovation. *European Journal of Innovation Management*, 6(1), 64-74.
- Maruyama, G. M. (1998). *Basics of structural equation modelling*. CA: Sage.
- Mason, M. (2010). *Sample size and saturation in Ph.D. studies using qualitative interviews*. Paper presented at the Forum qualitative Sozialforschung/Forum: qualitative social research.
- Maxcy, S. J. (2003). *Pragmatic threads in mixed methods research in social science: Handbook of mixed methods in social and behavioral research*. Thousand Oaks CA: Sage Publications.
- Maxwell, J. A. (1992). Understanding and validity in qualitative research. *Harvard Educational Review*, 62(3), 279-299.
- McLeod, J. (2001). *Qualitative research in counselling and psychotherapy*. London: Sage.
- McMackin, R. A., & Pittel, E. (2005). A Public Health Approach to Address the Mental Health Needs of Juvenile Offenders. *In the organisational response to persons with mental illness involved with the criminal justice system* (pp. 3-25). Emerald Group Publishing Limited.
- Mc Sharry, J., Bishop, F. L., Moss-Morris, R., & Kendrick, T. (2013). 'The chicken and egg thing': Cognitive representations and self-management of multimorbidity in people with diabetes and depression. *Psychology & Health*, 28(1), 103-119.
- Meade, B., Buckley, D., & Boland, M. (2009). What factors affect the use of electronic patient records by Irish GPs?. *International Journal of Medical Informatics*, 78(8), 551-558.
- Mertens, D. M. (2010). Transformative mixed methods research. *Qualitative Inquiry*, 16(6), 469-474.
- Meskó, B., Drobni, Z., Bényei, É., Gergely, B., & Györffy, Z. (2017). Digital health is a cultural transformation of traditional healthcare. *Mhealth*, 3.

- Meso, P., & Smith, R. (2000). A resource-based view of organisational knowledge management systems. *Journal of Knowledge Management*, 4(3), 224-234.
- Meurer, W. J., Lewis, R. J., Tagle, D., Feters, M. D., Legocki, L., Berry, S., . . . Zhao, W. (2012). An overview of the adaptive designs accelerating promising trials into treatments (ADAPT-IT) project. *Annals of Emergency Medicine*, 60(4), 451-457.
- Mintzberg, H. (1994a). The fall and rise of strategic planning. *Harvard Business Review*, 72(1), 107-114.
- Mintzberg, H. (1994b). *The rise and fall of strategic planning*. New York: Free Press.
- Mintzberg, H., & Waters, J. A. (1985). Of strategies, deliberate and emergent. *Strategic Management Journal*, 6.
- Mintzberg, H., Ghoshal, S., Lampel, J., & Quinn, J. B. (2003). *The strategy process: concepts, contexts, cases*. Pearson education.
- Morgan, D. L. (1997). *Focus groups as qualitative research*. California, USA: Sage Publications.
- Morgan, D. L. (1998). Practical strategies for combining qualitative and quantitative methods: Applications to health research. *Qualitative Health Research*, 8, 362-376.
- Morgan, R. E., & Page, K. (2008). Managing business transformation to deliver strategic agility. *Strategic Change*, 17(5-6), 155-168. doi:10.1002/jsc.823
- Morrow, S. L., & Smith, M. L. (1995). Constructions of survival and coping by women who have survived childhood sexual abuse. *Journal of Counseling Psychology*, 42(1).
- Morse, J. M. (1995). *The significance of saturation*. Thousand Oaks CA: Sage Publications
- Morse, J. M. (2001). Situating grounded theory within qualitative inquiry. *Using Grounded Theory in Nursing*, 1-15.
- Moustakas, C. (1994). *Phenomenological research methods*: Sage.
- Nastasi, B. K., Hitchcock, J., Sarkar, S., Burkholder, G., Varjas, K., & Jayasena, A. (2007). Mixed methods in intervention research: Theory to adaptation. *Journal of Mixed Methods Research*, 1(2), 164-182.
- Neuhofer, B., Buhalis, D., & Ladkin, A. (2015). Smart technologies for personalized experiences: A case study in the hospitality domain. *Electronic Markets*, 25(3), 243-254.
- Neuman, L. W. (2014). *Social research methods* (7th ed.): Pearson Education India.
- Neumann, J. E., & Hirschhorn, L. (1999). The challenge of integrating psychodynamic and organisational theory. *Human Relations*, 52(6).
- Newman, W. L. (2003). *Social research methods: qualitative and quantitative approach*. Sydney: Pearson Education Inc.

- Noda, T., & Bower, J. L. (1996). Strategy making as iterated processes of resource allocation. *Strategic Management Journal*, 17.
- Nonaka, I. (1988). Creating organisational order out of chaos: Self-renewal in Japanese firms. *California Management Review*, 30(3).
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York: McGraw-Hill.
- Nwankpa, J. K., & Roumani, Y. (2016). *IT capability and digital transformation: A firm performance perspective*. Association for Information Systems.
- Obeidat, B. Y., Al-Dmour, R. H., & Tarhini, A. (2015). Knowledge management strategies as intermediary variables between itbusiness strategic alignment and firm performance. *European Scientific Journal, ESJ*, 11(7).
- O’Cathain, A., Murphy, E., & Nicholl, J. (2010). Three techniques for integrating data in mixed methods studies. *BMJ*, 341, c4587.
- Onwuegbuzie, A., & Johnson, R. B. (2006). The validity issue in mixed research. *Research in Schools*, 13(1).
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organisations: Research approaches and assumptions. *Information Systems Research*, 2(1), 1-28.
- Ormston, R., Spencer, L., Barnard, M., & Snape, D. (2014). The foundations of qualitative research. *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, 2, 52-55.
- Pannucci, C. J., & Wilkins, E. G. (2010). Identifying and avoiding bias in research. *Plastic and Reconstructive Surgery*, 126(2), 619–625.
- Pare, G., & Trudel, M. (2007). Knowledge barriers to PACS adoption and implementation in hospitals. *International Journal of Medical Informatics*, 76(22-33).
- para o Trabalho, D. D. A. (2010). Achieving efficiency improvements in the health sector through the implementation of information and communication technologies. In *Achieving efficiency improvements in the health sector through the implementation of information and communication technologies: final report*.
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction*. NJ: Hillsdale.
- Pereira, R., da Silva, M. M., & Lapão, L. V. (2014). Business/IT alignment through IT governance patterns in Portuguese healthcare. *International Journal of IT/Business Alignment and Governance (IJITBAG)*, 5(1), 1-15.
- Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, 31(4), 623-656.
- Pflaum, A. A., & Gölzer, P. (2018). The IoT and digital transformation: toward the data-driven enterprise. *IEEE Pervasive Computing*, 17(1), 87-91.

- Phannaphatr, S., Uthai, T., & Chidchanok, L. (2011). Sustaining innovation in information technology entrepreneurship with a sufficiency economy philosophy. *International Journal of Innovation Science*, 3(2), 69-81.
- Pidgeon, N., & Henwood, K. (1997). *Doing qualitative analysis in psychology*. Hove, UK: Psychology Press.
- Pink, S., Horst, H., Postill, J., Hjorth, L., Lewis, T., & Tacchi, J. (2015). Ethnography in a digital world. *Digital Ethnography: Principles and Practice*, 1-18.
- Podsakoff, N. P., Shen, W., & Podsakoff, P. M. (2006). *The role of formative measurement models in strategic management research: Review, critique, and implications for future research methodology in strategy and management* (pp. 197-252): Emerald Group Publishing Limited.
- Pollalis, Y. A. (2003). Patterns of co-alignment in information-intensive organisations: Business performance through integration strategies. *International Journal of Information Management*, 23(6), 469-492.
- Porter, M. E. (1991). Towards a dynamic theory of strategy. *Strategic Management Journal*, 12(S2), 95-117.
- Prahalad, C. K., & Doz, Y. (1987). *The multinational mission*. New York: Free Press.
- Probst, G., Raub, S., & Romhardt, K. (1999). *Managing knowledge*. London: Wiley.
- Proctor, T. (1997). Establishing a strategic direction: A review. *Management Decision*, 35(2), 143-154.
- Quinn, J. B. (1992). *Intelligent enterprise*. New York: The Free Press.
- Quinn, J. B. (1995). *The strategy process*. London: Prentice-Hall.
- Rad, M. S., Nilashi, M., & Dahlan, H. M. (2018). Information technology adoption: a review of the literature and classification. *Universal Access in the Information Society*, 17(2), 361-390.
- Richardson, L., & St. Pierre, E., A. (2005). *The SAGE handbook of qualitative research* (3rd ed.). CA: SAGE.
- Richardson, S. (2006). Over-investment of free cash flow. *Review of Accounting Studies*, 11(2-3), 159-189.
- Riethmeister, V., Brouwer, S., van der Klink, J., & Bültmann, U. (2015). Work, eat and sleep: towards a healthy ageing at work program offshore. *BMC Public Health*, 16(1), 134.
- Ringle, M., Wende, S., & Will, A. (2005). *SmartPLS 2.0*.
- Robins, J. A., Tallman, S., & Fladmoe-Lindquist, K. (2002). Autonomy and dependence of international cooperative ventures: An exploration of the strategic performance of US ventures in Mexico. *Strategic Management Journal of Business Research*, 23, 881-901.

- Rogers, E. M. (2010). *Diffusion of innovations*: Simon and Schuster.
- Rosen, R., Florin, D., & Hutt, R. (2007). *An anatomy of GP referral decisions*. London: The King's Fund.
- Royal, M., & Agnew, T. (2011). *The enemy of engagement: Put an end to workplace frustration--and get the most from your employees*. Amacom Books.
- Saint Arnault, D., & Fetters, M. D. (2011). RO1 funding for mixed methods research: Lessons learned from the mixed-method analysis of Japanese depression project. *Journal of mixed methods research*, 5(4), 309.
- Sattler, H., Voelckner, F., Riediger, C., & Ringle, C. M. (2010). The impact of brand extension success drivers on brand extension price premiums. *International Journal of Research in Marketing*, 27, 319-328.
- Scammon, D. L., Tomoaia-Cotisel, A., Day, R. L., Day, J., Kim, J., Waitzman, N. J., . . . Magill, M. K. (2013). Connecting the dots and merging meaning: Using mixed methods to study primary care delivery transformation. *Health Services Research*, 48(6 Pt 2), 2181.
- Schreiber, R. S., & Stern, P. N. (2001). *Using grounded theory in nursing*. New York: Springer Publishing Company.
- Schumacker, R. E., & Lomax, R. (2004). *A beginner's guide to structural equation modelling* (2nd ed.). NJ: Erlbaum.
- Schwab, K. (2017). *The fourth industrial revolution*. New York: Crown Business.
- Seidman, I. (1998). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (2 ed.). New York: Teachers College Press.
- Senge, P. (1990). The art and practice of the learning organisation: The new paradigm in business, *Emerging Strategies for Leadership and Organisational Change*, 126-138.
- Shapiro, C., & Varian, H. (1999). *Information rules*. Boston: Harvard Business School Press.
- Shekelle, P., Morton, S., & Keeler, E. (2006). Costs and benefits of health information technology, Evidence Report/Technology Assessment No. 132. Retrieved from Agency for Healthcare Research and Quality.
- Sinkovics, R. R., Deng, Z., Kim, D., & Yuan, X. (2016). Assessing endogeneity issues in international marketing research. *International Marketing Review*.
- Sigala, M. (2018). New technologies in tourism: From multi-disciplinary to anti-disciplinary advances and trajectories. *Tourism Management Perspectives*, 25, 151-155.
- Simon, J. S., Rundall, T. G., & Shortell, S. M. (2007). Adoption of order entry with decision support for chronic care by physician organisations. *Journal of the American Medical Informatics Association*, 14(4), 432-439.
- Skinner, J., & Staiger, D. (2015). Technology diffusion and productivity growth in health care. *Review of Economics and Statistics*, 97(5), 951-964.

- Spencer, A. J., Buhalis, D., & Moital, M. (2012). A hierarchical model of technology adoption for small owner-managed travel firms: An organisational decision-making and leadership perspective. *Tourism Management*, 33(5), 1195-1208.
- Srinivasan, U., Ramachandran, D., Quilty, C., Rao, S., Nolan, M., & Jonas, M. (2018). *Flying blind: Australian researchers and digital health*. Retrieved from Digital Health Cooperative Research Centre.
- Srinivasan, U., Suresh, R., Ramachandran, D., & Jonas, D. (2016). *Flying blind: Australian consumers and digital health*. Retrieved from Digital Health Cooperative Research Centre: <https://flyingblind.cmcrc.com/files/files/Flying-Blind--Australian-Consumers-and-Digital-Health.pdf>
- Stalk, Evans, P., & Shulman, L. (1992). Competing on capabilities: The new rules of corporate strategy. *Harvard Business Review*, 57-69.
- Steenkamp, J.-B. E., & Van Trijp, H. C. (1991). The use of LISREL in validating marketing constructs. *International Journal of Research in Marketing*, 8(4), 283-299.
- Steininger, K., & Stiglbauer, B. (2015). EHR acceptance among Austrian resident doctors. *Health Policy and Technology*, 4(2), 121-130.
- Stewart, T. (1997). *Intellectual capital*. London: Nicholas Brealey.
- Stone, M. (1974). Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society*, 36, 111-147.
- Strauss, A. (1987). *Qualitative analysis for social scientists*. New York: Cambridge University Press.
- Strauss, A., & Corbin, J. (Eds.). (1990). *Basics of qualitative research: Grounded theory procedures and techniques* (2nd ed.). CA: Sage.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Grounded theory procedures and techniques* (2nd ed.). CA: Sage.
- Suddaby, R. (2006). From the editors: What grounded theory is not. *Academy of Management Journal*, 49(4), 633-642
- Sveiby, K. E. (1997). *The new organisational wealth: Managing and measuring knowledge-based assets*. San Francisco: Berrett-Koehler Publishers.
- Swift, L., & Piff, S. (2014). *Quantitative methods: for business, management and finance*. Macmillan International Higher Education.
- Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). Boston, MA: Pearson.
- Tan, S. L., & Lewis, R. A. (2010). Picture archiving and communication systems: A multicentre survey of users experience and satisfaction. *European Journal of Radiology* 75(3), 406-410.

- Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining the qualitative and quantitative approaches*. CA: Sage.
- Taylor, S., & Hettick, L. (2006). *What's the difference between unified communications and unified messaging*. Retrieved from <https://www.networkworld.com/article/2312411/what-s-the-difference-between-unified-communications-and-unified-messaging>
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y.-M., & Lauro, C. (2005). PLS path modeling. *Computational Statistics & Data Analysis*, 48, 159-205.
- Teo, T. S., & King, W. R. (1997). Integration between business planning and information systems planning: an evolutionary-contingency perspective. *Journal of Management Information Systems*, 14(1), 185-214.
- Torbert, W. R. (2004). *Action inquiry: The secret of timely and transforming leadership*. Berrett-Koehler Publishers.
- Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. (1990). *The processes of technological innovation. Issues in organisation and management series*. Lexington Books. Available at <http://www.amazon.com/Processes-Technological-Innovation-Organisation/Management/dp/0669203483>. Accessed June, 10, 2013.
- Tufano, J. (2009). *Information and communication technologies in patient-centered healthcare redesign: qualitative studies of provider experience*. Washington, United States: University of Washington.
- Turiano, N. A. (2014). Archival data analysis introduction. *The International Journal of Aging and Human Development*, 79(4), 323-325.
- Ussahawanitchakit, P. (2011). Transformational leadership and the antecedents and consequences: Evidence from information technology business in Thailand. *Journal of International Business and Economics*, 11(1).
- Vaast, E. (2007). Danger is in the eye of the beholders: Social representations of information systems security in healthcare. *Journal of Strategic Information Systems*, 16, 130-152.
- Van Manen, M. (2016). *The tact of teaching: The meaning of pedagogical thoughtfulness*. Routledge.
- Veneris, Y. (1990). Modeling the transition from the Industrial to the Informational Revolution. *Environment and Planning*, 22, 399-416.
- Walker, J. M., & Carayon, P. (2009). From tasks to processes: The case for changing health information technology to improve health care. *Health Affairs*, 28(2), 467-477.
- Wang, S., & Mao, H. (2012). The strategy research of modern service industry development. *Asian Social Science*, 8(2). doi:10.5539/ass.v8n2p185
- Wears, R. L. (2005). Computer technology and clinical work still waiting for Godot. *Journal of the American Medical Association*, 293(10), 1261-1263.
- Webster, F. (2014). *Theories of the information society*. Routledge.

- Weick, K., & Teece, D. J. (1987). The competitive challenge. *Substitutes for corporate strategy*, Teece, D, Cambridge, Mass., Ballinger.
- Weiss, J. W., Thorogood, A., & Clark. (2006). IT business alignment profiles. *Communications of AIS*, (18), 676-691.
- Wells, M. (2009). *Perceptions of knowledge gatekeepers: Social aspects of information exchange in an organisation undergoing change. (Ph.D.)*, University of Western Sydney, College of Business School of Management.
- West, J., & Bogers, M. (2014). Leveraging external sources of innovation: A review of research on open innovation. *Journal of Product Innovation Management*, 31(4), 814-831.
- Westbrook, J. I. (2007). Multimethod evaluation of information and communication technologies in health in the context of wicked problems and sociotechnical theory. *Journal of the American Medical Informatics Association*, 14(6), 746-755.
- Wilden, R., Gudergan, S. P., Nielsen, B. B., & Lings, I. (2013). Dynamic capabilities and performance: Strategy, structure and environment. *Long Range Planning*, 46(1), 72-96.
- Willig, C. (2013). *Introducing qualitative research in psychology*. UK: McGraw-Hill Education.
- Winter, A., Ammenwerth, E., & Bott, O. J. (2001). Strategic information management plans: the basis for systematic information management in hospitals. *International Journal of Medical Informatics*, 64, 99-109.
- Wold, H. (1980). Soft modelling: Intermediate between traditional model building and data analysis. *Mathematical Statistics*, 6, 333-346.
- Wold, H. (1985). Partial least squares. In S. Kotz & L. Johnson, (Eds.), *Encyclopedia of statistical sciences*. New York: Wiley.
- World Health Organisation (2007). *Everybody's business--strengthening health systems to improve health outcomes*. WHO's Framework for Action.
- Wong, K. K.-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1), 1-32.
- World Health Organisation. (2006). *Strengthening of health information systems*. Retrieved from Sixtieth World Health Assembly.
- Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organisational performance: Insights from a matched survey of business and IT managers. *MIS Quarterly*, 39(2), 497-518.
- Yusof, M. M. (2015). A case study evaluation of a critical care information system adoption using the socio-technical and fit approach. *International Journal of Medical Informatics*, 84(7), 486-499.

- Yusof, M. M., Stergioulas, L., & Zugic, J. (2007). Health information systems adoption: Findings from a systematic review. *Studies in Health Technology and Informatics*, 129(1), 262.
- Zhu, K., Kraemer, K. L., & Xu, S. (2006). The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business. *Management Science*, 52(10), 1557-1576.
- Zuber-skerritt, O. (2000). *Action learning, action research and process management: Theory, practice, praxis*.
- Zucker, L. G. (1987). Institutional theories of organisation. *Annual Review of Sociology*, 13, 443-464.

Appendix A: Ethics approval letters

CQU Ethics approval

Secretary, Human Research Ethics Committee
Ph: 07 4923 2603
Fax: 07 4923 2600
Email: ethics@cqu.edu.au



Dr Marilyn Wells and
Mr Raghavendra Kankanady
School of Engineering and Technology

6 May 2016

Dear Dr Wells and Mr Kankanady

**HUMAN RESEARCH ETHICS COMMITTEE ETHICAL APPROVAL MODIFICATION TO
PROJECT: H15/11-261 INFORMATION ECONOMICS: THE DISCONNECT BETWEEN ICT
STRATEGY AND STRATEGIC INTENT**

The Human Research Ethics Committee is an approved institutional ethics committee constituted in accord with guidelines formulated by the National Health and Medical Research Council (NHMRC) and governed by policies and procedures consistent with principles as contained in publications such as the joint Universities Australia and NHMRC *Australian Code for the Responsible Conduct of Research*. This is available at http://www.nhmrc.gov.au/publications/synopses/_files/r39.pdf.

On 25 November 2015, the Chair of the Human Research Ethics Committee acknowledged previous ethical approval for this project from both the [REDACTED] HREC (Approval LNR/15/171) and the [REDACTED] HREC (Approval HREC/15/QCQ/39), and has granted full approval as a CQUniversity project (H15/11-261) under chapter 5.3 of the National Statement, pending ratification by the full committee at its January 2016 meeting. On 6 May 2016, the Chair approved your request to modify the project, by means of use of an incentive, namely a draw to win two iPad minis. Please ensure that these incentives are included on the university's gift register, by contacting the Governance Unit.

The period of ethics approval will be from 25 November 2015 to 30 June 2019. The approval number is H15/11-261; please quote this number in all dealings with the Committee. HREC wishes you well with the undertaking of the project and looks forward to receiving the final report.

The standard conditions of approval for this research project are that:

- (a) you conduct the research project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments required to be made to the proposal by the Human Research Ethics Committee;
- (b) you advise the Human Research Ethics Committee (email ethics@cqu.edu.au) immediately if any complaints are made, or expressions of concern are raised, or any other issue in relation to the project which may warrant review of ethics approval of the project. (A written report detailing the adverse occurrence or unforeseen event must be submitted to the Committee Chair within one working day after the event.)
- (c) you make submission to the Human Research Ethics Committee for approval of any proposed variations or modifications to the approved project before making any such changes;



- (d) you provide the Human Research Ethics Committee with a written "Annual Report" on each anniversary date of approval (for projects of greater than 12 months) and "Final Report" by no later than one (1) month after the approval expiry date; (*Forms may be downloaded from the Office of Research Moodle site - <http://moodle.cqu.edu.au/mod/book/view.php?id=334905&chapterid=17791>.*)
- (e) you accept that the Human Research Ethics Committee reserves the right to conduct scheduled or random inspections to confirm that the project is being conducted in accordance to its approval. Inspections may include asking questions of the research team, inspecting all consent documents and records and being guided through any physical experiments associated with the project
- (f) if the research project is discontinued, you advise the Committee in writing within five (5) working days of the discontinuation;
- (g) A copy of the Statement of Findings is provided to the Human Research Ethics Committee when it is forwarded to participants.

Please note that failure to comply with the conditions of approval and the *National Statement on Ethical Conduct in Human Research* may result in withdrawal of approval for the project.

You are required to advise the Secretary in writing within five (5) working days if this project does not proceed for any reason. In the event that you require an extension of ethics approval for this project, please make written application in advance of the end-date of this approval. The research cannot continue beyond the end date of approval unless the Committee has granted an extension of ethics approval. Extensions of approval cannot be granted retrospectively. Should you need an extension but not apply for this before the end-date of the approval then a full new application for approval must be submitted to the Secretary for the Committee to consider.

The Human Research Ethics Committee wishes to support researchers in achieving positive research outcomes. If you have issues where the Human Research Ethics Committee may be of assistance or have any queries in relation to this approval please do not hesitate to contact the Secretary, Sue Evans or myself.

Yours sincerely,

A/Prof Tania Signal
Chair, Human Research Ethics Committee

Cc: Dr Kylie Radel, Dr Graeme Hart (co-supervisors)
Project file

Approved

Appendix B: Letter of introduction

Letter of introduction

Investigator: Raghavendra P Kankanady

Address:
School of Engineering and Technology
Melbourne Campus
CQUniversity
Vic 3000

Telephone:

Email: r.kankanady@cqu.edu.au

Project Title: Information Economics: “The disconnect between ICT and strategic intent.”

Dear Sir/ Madam,

I am undertaking a Ph.D. investigation to analyze the alignment of ICT (Information & Communication Technology) use and organisational strategic intent and its impact on service delivery for Healthcare organisations.

The aim of this research project is to identify if there is a disconnection between organisational' strategic intent and ICT, such as, analyze ICT from various perspectives concerning the organisation's business objectives in an information economy and report findings. It also aims to understand if organisations are using ICT as an enabler and strategic driver to achieve the desired business outcomes. The research will aim to investigate public providers with enterprise sustainability as the research goal in the healthcare sector. The research will also aim to investigate further if this ICT transformation is creating any patterns or themes within the organisation.

This investigation is studying ICT transformation across the organisation from the perspective of staff, and management and will specifically seek to determine the disconnect existing between ICT use and strategic intent in an information economy.

The investigation will consist of a survey and semi-structured interviews at multiple sites. Your hospital has been chosen to be one of the organisations in this investigation.

It is anticipated that the resulting information may be of use in improving the design and implementation of ICT transformation programs to healthcare, provide a “voice” for employees experiencing such ICT transformation and provide a consolidated view of ICT use in this era of the information revolution. The outcome of this study will be useful to your hospital in accommodating the new healthcare ICT initiatives. The findings will seek to inform possible guidelines for consideration when organisational strategy and ICT transformation programs are initiated and implemented in the future.

The purpose of this correspondence is twofold:

To seek your support for staff within your organisation to participate in this investigation by way of participation in a survey and semi-structured interviews aimed at providing organisational context and data for the investigation. Further content would subsequently be sought from secondary interviews and the use of archival organisational documentation.

If your organisation is agreeable to participating, we would like to invite your staff to undertake a survey and semi-structured interview(s). The interview will be conducted on a one-to-one basis or in group workshops and will be recorded on audiotape and subsequently transcribed. As the research progresses, it may also be useful to interview additional staff within your organisation.

I have included for your consideration, the information sheet and letter of consent to be forwarded to staff. The identity of research participants will always be protected. Data collected from the research will be stored following the CQUniversity policy and guidelines. The investigation has sought ethical clearance from CQUniversity’s Human Research Ethics Committee.

I hope your organisation can be a part of this research, and I would be very happy to answer any questions you may have regarding this investigation. Please send me an email (r.kankanady@cqu.edu.au) to confirm your agreement to participate.

Raghavendra P Kankanady

School of Engineering and Technology

Melbourne Campus

CQUniversity

Melbourne Vic 3000

Phone:

Email: r.kankanady@cqu.edu.au

Alternatively, you may contact my supervisor Dr. Marilyn Wells

Dr. Marilyn Wells

School of Engineering and Technology

CQ University

Rockhampton

Qld 4702

Phone: 07 49232758

Email: m.wells@cqu.edu.au

If you have any concerns about how this research is to be conducted, please contact the Office of Research at Central Queensland University, phone 07 49232603, or email ethics@cqu.edu.au.

Thank you for your time and potential interest in the project.

Yours sincerely

Raghavendra P Kankanady

Ph.D. Candidate

CQUniversity

Appendix C: Information sheet

INFORMATION SHEET

Project Overview

This investigation in studying the organisational strategic intent and alignment of ICT in an information economy from staff and management perspective will specifically seek to determine if disconnect exists between ICT use and strategic intent in the experiences of staff when subject to ICT transformation in an information economy. The findings will seek to inform possible guidelines for consideration when organisational strategy and ICT transformation programs are initiated and implemented in the future within healthcare.

This research is intended to be submitted as a thesis for the awarding of a PhD.

Participation Procedure

There will be three categories of participants in this research. Participants will be asked to take part in a multi-phase research process.

All staff who have provided consent to participate in research investigation will be asked to complete a survey. It is anticipated that the survey will require approximately 15-30 min. The purpose of the survey is to provide insight into ICT acting from different perspectives within the organisation.

The participant group, 1 for the main body of the research, is the clinical and non-clinical staff (administrative, nursing staff, and doctors). Phase one will see the participants being asked to take part in a semi-structured interview. It is anticipated that the interview will require approximately 1 – 1.5 hours. Phase Two, if required, will see selected participants asked to take part in a further series of interviews. It is anticipated that this second series of interviews will require approximately 1 hour per interview.

The second participant group consisting of Senior Management representatives will be asked to take part in a semi-structured interview. It is anticipated that the interview will require approximately 1- 1.5 hours. The purpose of this interview is to provide an overview of organisational strategy and ICT transformation and ICT use context for the research. Phase Two, if required, will see selected participants asked to take part in a further series of interviews. It is anticipated that this second series of interviews will require approximately 1 hour per interview.

The third participant group consisting of ICT Management representatives will be asked to take part in a semi-structured interview. It is anticipated that the interview will require approximately 1- 1.5 hours. The purpose of this interview is to provide an overview of ICT strategy and ICT transformation and ICT use context for the research. Phase Two, if required, will see selected participants asked to take part in a further series of interviews. It is anticipated that this second series of interviews will require approximately 1 hour per interview.

Participation in the interview(s) and the survey is voluntary. Participation or non-participation will not affect the participants' employment, organisational, or academic standing.

Benefits and Risks

The information resulting from this research may be of use in improving the design and implementation of future ICT transformation initiatives within healthcare;

Findings from this research can be applied to corporate and business strategies to drive strategic intent; ICT is currently strongly underpinning the business. The reported findings will enable a better understanding of ICT transformations and would also enable guidance of technology innovation in the right direction which is required for growth and sustainability;

The project recommendations will drive innovation within a candidate organisation promoting organisational learning, enhancing servicing capabilities and growth;

The research recommendation can be applied to the greater business community and thus leading to a better understanding of the bigger picture, which could lead towards fewer job losses of knowledge or process workers and enhance service delivery in healthcare; and

The research findings will also help a better understanding of healthcare by ICT practitioners.

It is not expected that participants will be subjected to any risk. Individual research participants will not be identified within the research findings. Research findings will be securely stored to ensure anonymity further. With the permission of the research participants, audio from the interviews will be recorded and transcribed by the researcher. Research participants will be provided with a copy of the notes transcribed by the researcher and be invited to provide feedback to ensure accuracy in interpretation.

Confidentiality / Anonymity

Participant names and participant organisational roles (if identifying), either in their current or past employment, will be excluded from the research publication. Pseudonyms may be used in

research publications to preserve participant confidentiality and anonymity. CQ University policy requires research data, collected as part of the research, is securely stored for five years.

Publication of Results

This research is to be submitted as a thesis for the awarding of a Ph.D. degree. Elements of this research may be submitted for publication to academic journals.

Consent

The attached consent form is to be signed by all participants agreeing to take part in the study.

Right to Withdraw

At all times, participants have the right to withdraw from this research without penalty by contacting the researcher directly.

Feedback

Participants may indicate that they wish to receive a summary of the findings resulting from this research, and this will be duly provided in the form of a Plain English statement.

Questions/ Further Information

The researcher may be contacted via email on r.kankanady@cqu.edu.au

Concerns/Complaints

Please contact CQ University's Office of Research (Tel: 07 4923 2603; E-mail: ethics@cqu.edu.au; Mailing address: Building 32 CQ University, Rockhampton QLD 4702) should there be any concerns about the nature and/or conduct of this research project.

Appendix D: Interview design - staff

Initial Interview Design – Staff

Information Economics: “Disconnect between ICT and strategic intent.”

PHASE ONE INTERVIEW – S

Thank you for agreeing to meet with me today to assist with my research investigation. As explained in the information letter, the research is seeking to determine the experiences and perspectives of staff on strategic intent and ICT alignment in a contemporary information economy.

From the research, it is hoped to determine if there is a disconnect between organisational strategic intent and ICT. The findings will seek to inform possible guidelines for consideration when organisational strategy and ICT transformation programs are initiated and implemented in the future.

To begin I would like to confirm some demographic information:

Name: _____

Position: _____

Are there any questions you have of myself as the researcher?

Thank you for your time.

Appendix E: Interview design – senior management

Initial Interview Design – Senior Management

Information Economics: “Disconnect between ICT and strategic intent.”

PHASE ONE INTERVIEW – SENIOR MANAGER

Thank you for agreeing to meet with me today to assist with my research investigation.

To begin, I would like to confirm some demographic information:

Name: _____

Position: _____

Are there any questions you may have of myself as the researcher?

Thank you for your time.

Appendix F: Interview Questions

Staff

Interview Questions

Name

Role

Are there any questions you have of myself as the researcher?

Can you define your role in the organisation?

What percentage of your job involves use of ICT systems and applications?

1 Strategic direction

What is your view on the organisation's strategic goals?

Do you think you understand the organisation's strategic goals and if so, why?

What is your view of your organisation's ICT strategy?

Do you think you understand ICT strategic goals and if so, why?

Do you think the ICT strategy and goals of the organisations are the right ones at this time?

Do you think eHealth implementation goals are the right ones at this time?

How do you think hospital management can execute the strategy better?

How can business unit managers contribute to ICT strategy development?

How does technology change impact your organisation's strategy?

How does think technology change impact ICT strategy?

Is there anything that you would like to add further to this topic?

2 Enablement

How do you think ICT is enabling staff?

Can you give me some examples of ICT systems and applications being beneficial or hindrance to staff?

Do you feel that you are enabled from an ICT perspective to deliver on the organisation's strategic intent?

What are the major issues that you face with ICT use?

What short term, medium-term and long term changes have been planned to enable staff?

Do you feel you have been provided with the necessary resources to deliver Organisation's goals and objectives?

How do you think hospital management is committed to innovation?

How do you think ICT services are used to deliver high-quality services to patients?

How do you think enablement can be improved?

Is there anything else that you would like to add?

Is there anything that you would like to add further to this topic?

3 Strategically leverage ICT

How has hospital management used ICT to improve patient care?

How has hospital management used ICT to reduce the cost of patient care?

What ICT changes are hospital management implementing in the next three years to improve the quality of patient care?

How do you think ICT can deliver these changes?

How do you think hospital management is implementing technologies like big data and analytics to improve the quality of patient care?

How do you think your organisation will move with technological changes to deliver to

patient's needs?

Do you feel staff are using ICT technologies to collaborate between different departments?

How can hospital management improve quality of care through ICT?

What are the current gaps?

Is there anything that you would like to add further to this topic?

4 Digital transformation

How is hospital management planning to deliver high-quality services to patients via technology transformation?

What type of technology transformations has the organisation undergone in recent years?

How did this technology transformation relate to organisation strategy?

How did this technology transformation benefit the organisation?

How did these technological changes relate to the strategic intent of the organisation?

What adverse effects did these technological changes have on your organisation?

What ICT transformational projects are hospital management currently implementing to achieve organisational objectives?

How do you feel that these technological changes and ICT transformation will improve the outcome for the hospital?

Why do you feel that ICT transformational projects are delivered successfully by the ICT department?

Can you please tell me about your personal approach to the implementation of ICT transformation and change?

Can you please give me two examples

A large scale successful ICT transformation for your organisation

An unsuccessful ICT transformation for your organisation

What do you think are the most important elements to have in place to ensure successful ICT transformation?

What factors do you believe contributed to this success/failure?

What do you think are the current gaps?

Is there anything that you would like to add further to this topic?

5 Organisational learning

Why do you feel that you are learning new technologies?

Do you feel that you have received sufficient training in the last 12 months?

Why do you feel that staff receive the necessary training during new ICT project implementations?

How is hospital management implementing technologies to improve knowledge management?

How do you think ICT can improve efficiency by implementing knowledge management systems?

How does the organisation record lessons learnt for ICT use?

How does the organisation use previous lessons learnt to improve quality of care through the use of ICT?

Is there anything that you would like to add further to this topic?

Is there anything that you would like to add further to this topic?

6 Culture

How would you describe the collaboration between the staff right now?

How do you think the staff adapt to new technological change?

Why do you feel that staff always supports new ICT projects?

How is hospital management providing a work climate that promotes collaboration?

How do you think ICT can drive a culture change to improve quality of patient care?

Is there anything that you would like to add further to this topic?

7 Investment

Do you feel that sufficient investments are being made in ICT from hospital management?

Do you feel that the investments made in ICT by hospital management are strategic in intent?
 Why do you think the investments made by the hospital management are in the right areas?
 How do you think that the current investments in ICT will deliver the right outcome for the hospital?
 What do you think needs to be improved?
 Is there anything that you would like to add further to this topic?

8 ICT Operations

Do you feel that ICT applications and systems are correctly aligned to the hospitals business process?
 Could there be a better way in which business processes can be aligned to ICT?
 What are the major issues that you face with the use of ICT systems and applications?
 Do you feel that the ICT department provides you with the required level of operational support?
 What do you think the ICT department can improve from a service delivery perspective?
 Do you think ICT systems meet the performance and availability requirements that are required for doing your role?
 Do you think the ICT department is well structured for service delivery?
 What are the other major issues that you face with ICT use?
 Is there anything that you would like to add further to this topic?

9 Information Management

Do you think the hospital has a strategy to manage information?
 Do you feel important patient information is often lost?
 Do you feel problems occur in exchange of information between hospitals?
 Do you feel you can trust the information that you receive from the ICT systems?
 How do you think hospital management protects patient information during data exchange between hospitals?
 How do you think eHealth implementation will improve information exchange standards?
 Do you think patient history can be accessed from other hospitals?
 Do you feel ICT systems currently adhere to compliance and regulatory standards for information management and exchange?
 Do you think there are effective information management processes in place to protect patient information between hospitals?
 How do you think better information management and data exchange standards can benefit the organisation?
 Is there anything that you would like to add further to this topic?

10 Governance

How would you describe the governance structure within your organisation?
 What are the current processes in place for effective governance?
 What do you think needs to be done to improve it?
 How do you think the hospital management is organised for risk management?
 How do you think hospital management is structured for service delivery?
 How do you think hospital management is organised to implement organisational change?
 Is the ICT part of corporate governance?
 Are there any other comments which you would like to add to our discussions?
 Is there anything that you would like to add further to this topic?

11 Engagement

How has the hospital management communicated its organisational strategy to all staff?
 How has hospital management engaged with the patients to incorporate their needs and requirements?
 How has hospital management engaged with staff during technology transformation projects?
 How are staff and patient feedback incorporated into strategy?

What changes have hospital management implemented to communicate organisations goals, objectives and clarity of direction to staff?

What are the current gaps?

Are there any other comments which you would like to add to our discussions?

Is there any other area that you would like to comment?

Senior Management

Interview Questions

Name

Role

Are there any questions you have of myself as the researcher?

Can you define your role in the organisation?

What percentage of your job involves the use of ICT systems and applications?

1 Strategic direction

What is your view on the organisation's strategic goals?

Do you think your staff understands the organisation's strategic goals and if so, why?

What is your view of your organisation's ICT strategy?

Do you think staff understand ICT strategic goals and if so, why?

Do you think the ICT strategy and goals of the organisations are the right ones at this time?

Do you think eHealth implementation goals are the right ones at this time?

Why do you think your staff understand the organisation's strategy?

How do you think hospital management can execute the strategy better?

How can business unit managers contribute to ICT strategy development?

How do you think technology changes impact your organisation's strategy?

How does think technology change impact ICT strategy?

Is there anything else that you would like to add?

2 Enablement

How do you think ICT is enabling staff?

Can you give me some examples of ICT systems and applications being beneficial or hindrance to staff?

Do you feel that your staff are enabled from an ICT perspective to deliver on the organisation's strategic intent?

What are the major issues that you face with ICT use?

What short term, medium-term and long term changes have you planned to enable staff?

Do you feel you have the necessary resources to deliver the organisation's goals and objectives?

How do you think hospital management is committed to innovation?

How do you think ICT services are used to deliver high-quality services to patients?

How do you think enablement can be improved?

Is there anything else that you would like to add?

3 Strategically leverage ICT

How has hospital management used ICT to improve patient care?

How has hospital management used ICT to reduce the cost of patient care?

What ICT changes are hospital management implementing in the next three years to improve quality of patient care?

How do you think ICT can deliver these changes?

How do you think hospital management is implementing technologies like big data and analytics to improve the quality of patient care?

How do you think your organisation will move with technological changes to deliver to patient's needs?

Do you feel staff using ICT technologies to collaborate between different departments?

How can hospital management improve quality of care through ICT?

What are the current gaps?

Is there anything else that you would like to add?

4 Digital transformation

How is hospital management planning to deliver high-quality services to patients via technology transformation?

What type of technology transformations has the organisation undergone in recent years?

How did this technology transformation relate to organisation strategy?

How did this technology transformation benefit the organisation?

How did these technological changes relate to the strategic intent of the organisation?

What adverse effects did these technological changes have on your organisation?

What ICT transformational projects are hospital management currently implementing to achieve organisational objectives?

How do you feel that these technological changes and ICT transformation will improve the the outcome for the hospital?

Why do you feel that ICT transformational projects are delivered successfully by the ICT department?

Can you please tell me about your approach to the implementation of ICT transformation and change?

Can you please give me two examples

A large scale successful ICT transformation for your organisation

An unsuccessful ICT transformation for your organisation

What do you think are the most important elements to have in place to ensure successful ICT transformation?

What factors do you believe contributed to this success/failure?

What do you think are the current gaps?

Is there anything else that you would like to add?

5 Organisational learning

Why do you feel that staff are learning new technologies?

Do you feel that staff have received sufficient training in the last 12 months?

Why do you feel that staff receive the necessary training during new ICT project implementations?

How is hospital management implementing technologies to improve knowledge management?

How do you think ICT can improve efficiency by implementing knowledge management systems?

How does the organisation record lessons learnt for ICT use?

How does the organisation use previous lessons learnt to improve quality of care through the use of ICT?

Is there anything else that you would like to add?

6 Culture

How would you describe the collaboration between the staff right now?

How do you think the staff adapt to new technological change?

Why do you feel that staff always supports new ICT projects?

How is hospital management providing a work climate that promotes collaboration?

How do you think ICT can drive a culture change to improve quality of patient care?

Is there anything else that you would like to add?

7 Investment

Do you feel that there are sufficient investments being made in ICT from hospital management?

Do you feel that the investments made in ICT by hospital management are strategic in intent?

Why do you think the investments made by the hospital management are in the right areas?

How do you think that the current investments in ICT will deliver the right outcome for the hospital?

What do you think needs to be improved?

Is there anything else that you would like to add?

8 ICT Operations

Do you feel that ICT applications and systems are correctly aligned to the hospitals business process?
 Could there be a better way in which business processes can be aligned to ICT?
 What are the major issues that you face with the use of ICT systems and applications?
 Do you feel that the ICT department provides you with the required level of operational support?
 What do you think the ICT department can improve from a service delivery perspective?
 Do you think ICT systems meet the performance and availability requirements required for doing your role?
 Do you think the ICT department is well structured for service delivery?
 What are the other major issues that you face with ICT use?
 Is there anything else that you would like to add?

9 Information Management

Do you think the hospital has a strategy to manage information?
 Do you feel important patient information is often lost?
 Do you feel problems occur in exchange of information between hospitals?
 Do you feel you can trust the information that you receive from the ICT systems?
 How do you think hospital management protects patient information during data exchange between hospitals?
 How do you think eHealth implementation will improve information exchange standards?
 Do you think patient history can be accessed from other hospitals?
 Do you feel ICT systems currently adhere to compliance and regulatory standards for information management and exchange?
 Do you think there are effective information management processes in place to protect patient information between hospitals?
 How do you think better information management and data exchange standards can benefit the organisation?
 Is there anything else that you would like to add?

10 Governance

How would you describe the governance structure within your organisation?
 What are the current processes in place for effective governance?
 What do you think needs to be done to improve it?
 How do you think the hospital management is organised for risk management?
 How do you think hospital management is structured for service delivery?
 How do you think hospital management is organised to implement organisational change?
 Is the ICT part of corporate governance?
 Are there any other comments which you would like to add to our discussions?
 Is there anything else that you would like to add?

11 Engagement

How has the hospital management communicated its organisational strategy to all staff?
 How has hospital management engaged with the patients to incorporate their needs and requirements?
 How has hospital management engaged with staff during technology transformation projects?
 How are staff and patient feedback incorporated into strategy?
 What changes have hospital management implemented to communicate organisations goals, objectives and clarity of direction to staff?
 What are the current gaps?
 Are there any other comments which you would like to add to our discussions?
 Is there any other area that you would like to make a comment on?

Appendix G: Online Survey Questions

	Email
	Gender
	Role
ID	
	Enablement
ENA01	ICT use in my job allows me to be as productive as I can be.
ENA02	I am aware of Hospital Management's commitment to innovation in ICT.
ENA03	Hospital Management will provide the right advancements in technology as technological changes happen.
ENA04	Hospital Management is continuously implementing new innovative ICT technologies to improve the quality of patient care.
ENA05	We have resources that are needed to deliver business goals.
ENA06	ICT use is required to deliver high-quality services to patients.
	Culture
CUL01	Staff feel that they can easily learn new technologies.
CUL02	Staff is always ready to adapt to new ICT tools and applications.
CUL03	Staff always supports new ICT projects.
CUL04	Hospital management provides a work climate that promotes collaboration.
CUL05	Staff is using collaborative ICT technologies that enable them to improve the quality of patient care.
	Engagement
ENG01	Hospital Management is customer-focused (i.e., it seeks to understand and meet its patient's needs and requirements).
ENG02	Staff understand what is required of them during technology transformation projects.
ENG03	Hospital's ICT department understands the patient's needs and requirements.
ENG04	My direct manager clearly communicates how new ICT technologies can improve healthcare by reducing the cost of patient care.

	Leverage ICT
LVG01	Staff leverage new ICT technologies such as social media (e.g. Facebook, Yammer, Twitter, etc.) to collaborate.
LVG02	I would like to see big data technologies and analytics implemented to improve the quality of patient care by the ICT department.- R(Reverse coded)
LVG03	Hospital Management promotes ICT use to reduce patient wait time.
LVG04	Hospital Management promotes ICT use to reduce the cost of patient care.
	Strategic direction
SDD01	I have a good understanding of the strategy and goals of my organisation.
SDD02	I have a good understanding of the strategy and goals of DHS (Department of Human Services Department) and eHealth implementation goals.
SDD03	Strategy and goals in my organisation are the right ones at this time.
SDD04	I have a good understanding of the ICT strategy and goals.
SDD05	Hospital's ICT strategy and goals are the right ones at this time.
SDD06	DHS's strategy and eHealth implementation goals are the right ones at this time.
SDD07	I understand the relationship between my job and the strategy and goals of my organisation.
SDD08	I understand the relationship between my job and the ICT strategy and the goals of my organisation.
SDD09	I understand the relationship between my job and eHealth implementation goals.
SDD10	I understand the expected business outcomes from the organisation's business strategy.
	Tech Transformation
TTT01	New ICT transformation projects will improve business outcomes.
TTT02	Hospital Management is currently implementing technology transformation projects to improve business outcome.
TTT03	Hospital Management seeks to deliver high-quality services via ICT transformation projects.
TTT04	ICT Transformation projects are delivered successfully by the ICT department.
	ICT Operations
OPS01	The ICT department supplies the required level of support to assist me in performing my everyday job activities.

OPS02	ICT procedures and IT systems are well-organized for service delivery.
OPS03	I would like to see improvements to the Hospital's existing ICT practices. R(Reverse coded)
OPS04	The ICT department is well structured for service delivery.
OPS05	ICT systems and applications are correctly aligned to the hospital's business process.
OPS06	I always get the required level of operational support from the ICT department.
	Governance
GOV01	I always get Hospital management support to implement ICT changes correctly.
GOV02	Hospital Management is well organised for good service delivery.
GOV03	Hospital Management is well organised for risk management.
	Organisational learning
OGL01	Hospital currently uses previous lessons to enhance ICT use.
OGL02	ICT technologies can improve operational efficiencies by implementing knowledge management applications.
OGL03	Hospital Management is currently implementing technologies to improve knowledge management.
OGL04	There are good opportunities for learning new ICT technologies in my department.
OGL05	In the last 12 months, I have received the appropriate amount of technical training for my position.
OGL06	I am happy with the level of training provided to me with new ICT technologies during technology transformation projects.
	Information management
INM01	Important patient care information is often lost. R(Reverse coded)
INM02	Problems often occur in the exchange of information across hospital units. R(Reverse coded)
INM03	I trust the information and data that I receive from existing IT systems and applications.
INM04	Hospital IT department protects patient information during data exchange between different hospitals.
INM05	Patient history can be accessed from other hospitals.
INM06	eHealth implementation will improve information exchange standards between healthcare service providers.

INM07	We are aware of information standards that currently exist for data exchange.
INM08	Quality of information management can be improved. R(Reverse coded)
	Investment
INV01	There is sufficient investment in ICT projects from Hospital Management.
INV02	Investments made by the Hospital Management are in the right areas.
INV03	Investments in ICT by Hospital management are strategic in intent.
INV04	ICT Investments will deliver the right outcome for the hospital.
	Open-ended question
Open-Ended	Do you have any additional comments or feedback?

Appendix H: Qualitative analysis participant references

Regional hospital	Exec 1	Exec 2	Exec 3	Exec 4	Exec 5	Exec 6	Staff 1	Staff 2	Staff 3	Staff 4	Staff 5	Staff 6	Staff 7	Staff 8	Staff 9	Staff 10	Staff 11	Staff 12	Staff 13	Staff 14	Staff 15	Staff 16	Open-ended survey responses	n
Access Information	0	0	0	0	0	0	2	2	3	1	0	1	0	6	4	1	0	3	7	0	2	0	4	36
Accountability	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	8
Agility	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	14
Availability and Capacity issues	0	0	0	0	0	0	0	2	2	0	0	0	3	2	0	0	0	0	1	1	0	0	0	11
Benefits	4	6	12	6	4	8	7	2	4	14	0	0	2	1	5	3	2	2	3	8	6	8	11	118
Budget	0	0	1	0	0	0	1	6	1	0	5	0	0	0	0	0	0	0	0	2	1	0	0	17
Bureaucracy	0	1	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	13
Collaboration	0	0	0	0	0	1	2	2	4	3	2	4	5	4	0	0	1	4	1	3	3	5	1	45
Communication	0	1	0	1	0	0	0	1	2	0	3	3	1	4	2	1	2	6	9	9	4	3	3	55
Cost	0	2	1	3	0	0	1	0	0	0	1	0	0	0	0	1	0	0	2	1	3	0	3	18
Culture	0	4	5	0	3	4	6	10	9	4	3	5	7	7	3	1	6	13	6	8	11	21	2	138
Data analytics and reporting	5	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	13
Data Integrity	0	4	0	1	0	1	4	2	2	1	4	3	1	1	0	3	1	0	0	1	1	1	4	35
Design issues	0	0	0	0	0	0	0	1	1	1	1	0	1	2	0	4	0	0	6	0	3	0	8	28
Document Management systems	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Duplicate applications and process	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	3
Duplicate work	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	3	0	0	2	0	0	0	1	9
Ecosystem	2	3	4	3	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	3	0	32
Efficiency	0	0	1	1	0	0	2	0	4	10	0	0	0	0	0	0	0	0	0	2	0	1	0	21
Enablement	1	9	5	5	7	5	5	8	10	1	8	2	14	8	2	4	0	9	14	21	16	18	12	184
Enabling Technology	4	4	2	1	1	4	4	0	1	4	0	1	2	3	0	0	1	0	3	2	8	7	0	52
Engagement	0	3	5	1	0	6	10	4	5	2	11	6	3	4	8	1	7	12	17	17	16	6	5	149

Ethics	0	1	1	0	0	0	9	5	2	1	0	0	0	0	2	0	0	6	0	0	7	1	0	35
Facilities	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Financial model	0	1	5	10	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	5	0	40
Geographic spread	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5
Governance	2	13	1	7	11	4	20	17	20	3	11	10	17	11	6	10	4	18	14	16	25	21	5	266
Health literacy	7	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	0	0	24
ICT Application Support	0	0	0	0	0	0	0	1	0	0	6	1	0	3	0	2	0	1	2	4	1	0	1	22
ICT Change management	0	1	2	1	3	1	1	0	4	0	0	2	2	2	0	3	2	0	5	3	2	1	0	35
ICT Infrastructure	0	5	1	3	6	0	0	3	3	0	3	5	1	3	3	0	4	0	0	3	1	3	2	49
ICT Operations	0	14	1	3	9	5	2	11	13	0	11	9	7	20	8	7	9	2	29	12	13	6	9	200
ICT Process	0	9	0	0	1	5	2	1	6	0	1	1	1	11	4	1	4	0	13	3	6	2	4	75
ICT Support	0	5	0	0	3	0	0	9	6	0	8	4	2	5	1	9	1	3	34	8	11	2	5	116
ICT Use	10	35	12	14	23	15	41	31	33	34	20	34	34	52	26	46	32	20	51	36	45	36	39	719
Inaccurate Measurements	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	5
Information continuum	2	2	6	0	7	4	5	9	1	4	0	1	0	5	0	0	0	0	0	4	5	1	0	56
Information Currency	0	1	0	0	0	0	2	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	6
Information flow	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	7
Information Management	5	16	1	1	7	3	21	9	8	11	5	8	10	12	5	8	4	5	7	6	12	6	19	189
Information standards	0	1	0	0	0	0	3	5	0	1	2	1	5	1	0	0	0	0	0	1	2	2	0	24
Innovation	4	7	4	6	0	1	0	0	3	0	0	0	1	0	1	0	0	5	0	0	3	5	0	40
Interoperability	0	1	0	0	0	0	4	1	2	2	1	1	1	4	2	1	0	0	0	0	0	1	8	29
Investment	0	4	0	0	4	2	6	1	2	1	2	2	3	5	1	1	5	9	2	5	2	6	5	68
Investment planning	3	6	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	15
IT Strategy	0	4	0	0	4	1	6	5	11	0	0	6	8	4	1	4	11	14	10	4	6	4	6	109
Knowledge Gap	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	6
Knowledge management	0	2	0	0	0	2	0	2	1	2	2	1	2	5	0	3	1	2	0	0	3	4	0	32
Leadership	0	3	0	4	5	0	8	6	3	0	0	0	0	2	4	1	0	6	0	9	6	9	1	67

Leadership style	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	4
Legacy systems	0	0	0	0	0	0	0	1	0	0	1	2	1	0	0	6	5	0	0	1	2	0	0	19
Lessons learnt	0	0	0	0	0	0	0	3	1	0	0	1	2	1	0	1	0	1	2	1	0	2	0	15
Leveraging ICT	6	11	6	7	2	5	12	4	7	10	0	7	12	12	12	15	2	11	3	10	12	23	2	191
Manual workarounds	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	1	0	1	0	7	13
Measurements	2	1	9	7	0	7	6	3	0	0	0	0	0	0	0	0	0	0	0	6	6	20	0	67
Organisation state	0	0	0	0	0	0	0	0	1	1	1	1	4	0	0	4	0	1	0	1	0	2	0	16
Organisational learning	0	4	0	0	4	4	2	9	4	4	12	5	7	12	1	7	8	19	20	15	15	12	3	167
Patent centric design	1	2	1	2	4	3	6	0	1	5	0	0	0	0	0	0	0	0	0	3	0	1	2	31
Platform	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	9
Policies and Procedure	0	0	0	0	4	1	1	2	2	0	2	0	2	1	0	0	0	5	2	2	6	8	1	39
Power	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6
Prevention	3	1	8	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	1	0	29
Privacy and confidentiality	0	5	0	0	6	2	5	0	0	4	0	0	2	0	0	0	0	2	0	4	2	1	2	35
Procurement	0	7	7	2	3	2	4	0	0	0	0	6	0	0	0	0	0	0	0	3	7	3	0	44
Project Management	0	0	0	0	0	0	0	0	6	0	0	0	6	0	3	2	0	0	0	1	0	4	0	22
Proper engagement	0	0	0	0	0	1	5	2	3	2	5	2	1	0	4	0	1	0	3	2	2	3	0	36
Quality	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	5
Resources	0	6	1	0	2	1	1	3	3	0	3	1	6	4	1	2	0	1	4	14	8	2	8	71
Risk Management	2	2	0	0	0	2	7	4	7	1	5	1	6	6	0	5	0	0	4	2	1	3	4	62
Safety	0	0	1	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	8
Security	0	2	0	0	4	0	2	0	1	3	0	0	1	0	0	3	1	0	0	0	5	1	2	25
Shadow IT	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Skills	1	3	4	5	7	4	2	5	5	0	1	0	5	2	0	1	0	5	2	14	7	16	0	89
Stakeholder Engagement	0	2	2	0	0	5	2	1	0	0	0	1	1	0	2	0	2	3	5	5	4	0	2	37
Stakeholder requirements	0	0	4	0	0	0	4	0	0	0	3	0	0	0	0	0	1	2	3	1	6	0	0	24
Strategic Alignment	11	36	31	25	24	25	47	34	41	8	28	27	38	34	9	29	24	49	52	60	67	74	11	784
Strategic direction	3	7	4	5	10	3	9	9	19	3	10	16	15	8	7	14	14	25	18	20	20	22	9	270

Strategic intent	6	20	21	15	28	18	39	39	44	13	30	30	38	33	23	21	26	61	47	67	66	70	25	780
Strategic planning	2	4	3	5	7	1	1	3	6	0	7	4	1	3	4	3	4	10	10	13	9	10	3	113
Strategic priority	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
Strategy implementation	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	3	2	6	0	14
Structure	0	9	0	7	4	1	3	6	3	1	3	9	4	3	1	3	4	10	10	11	10	6	1	109
Support change	0	1	1	0	1	1	3	2	5	0	0	0	0	0	1	0	4	2	5	2	4	4	1	37
Sustainability	10	8	21	14	6	13	0	0	0	0	0	0	0	0	0	0	0	0	0	15	12	7	0	106
System Design	1	8	1	4	6	8	15	9	6	16	4	10	5	14	2	18	19	3	18	11	10	2	32	222
System Requirements	0	0	0	0	0	0	0	1	1	4	0	1	0	2	0	2	4	0	7	0	0	0	21	43
System Useability	0	1	0	1	0	4	5	2	2	4	2	4	3	4	1	0	1	3	1	2	0	1	4	45
Systems integration	0	5	0	1	2	5	4	6	1	5	0	2	0	6	2	6	9	0	5	5	5	0	10	79
Technology Impact	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	2	0	6
Technology implementation	0	1	6	0	0	1	6	6	7	0	3	2	7	3	1	0	4	2	10	10	2	3	1	75
Technology planning	0	1	0	0	0	0	2	2	7	0	0	5	5	3	0	3	6	10	9	2	4	2	2	63
Technology transformation	0	4	9	1	3	2	12	9	16	0	4	5	13	6	1	11	8	4	17	13	5	9	1	153
Technology upgrades	0	2	2	0	0	0	5	3	5	0	1	1	4	2	0	6	2	0	3	1	1	2	0	40
Time constraints	0	0	0	0	0	0	2	0	0	1	4	1	3	3	1	1	0	2	7	3	1	1	4	34
Time constraints-system issues	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	4	8
Training	0	3	0	0	4	3	3	6	4	3	13	4	1	8	1	4	9	19	24	18	14	7	6	154
Training strategy	0	0	0	0	0	1	1	2	0	2	7	2	0	4	1	2	3	12	10	10	8	4	0	69
Transparency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6
Trust	0	0	0	0	0	0	3	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	1	8
Understanding IT strategy	0	0	0	0	0	0	1	0	0	2	1	2	2	2	0	1	0	0	0	0	1	0	1	13
Understanding organisation strategy	0	0	0	0	0	0	1	0	1	0	1	5	0	1	2	2	0	0	0	0	2	1	2	18
Use of technology	0	0	0	0	1	0	7	4	3	4	0	6	9	9	11	15	1	6	0	5	1	12	0	94

Metropolitan hospital	Exec 1	Exec 2	Exec 3	Exec 4	Exec 5	Exec 6	Exec 7	Exec 8	Staff 1	Staff 2	Staff 3	Staff 4	Staff 5	Staff 5	Staff 6	Staff 7	Staff 8	Staff 9	Staff 10	Staff 11	Staff 12	Open-ended survey response	n
Access information	0	0	0	1	1	0	0	0	2	0	5	1	1	1	0	1	0	4	0	0	1	0	18
Accountability	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	3	1	0	8
Availably, performance and capacity issues	0	0	1	1	1	0	0	0	0	2	2	6	1	0	1	0	0	2	1	0	2	1	21
Behaviour	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	4	0	0	1	0	0	0	8
Benefits	1	1	1	2	1	1	5	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0	18
Budget	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	4	0	1	0	9
Bureaucracy	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	4
Collaboration	1	1	0	0	0	0	0	1	4	3	1	4	1	2	10	1	1	1	4	11	6	2	54
Communication	0	0	0	0	0	0	1	0	2	2	6	2	5	1	5	5	2	3	7	4	7	2	54
Cost	0	0	2	0	0	0	0	0	0	0	2	1	0	1	0	0	0	1	1	0	0	0	8
Culture	3	5	1	2	7	1	5	2	6	4	2	4	1	4	11	7	2	1	5	13	16	7	109
Data analysis and reporting	3	1	3	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
Data Integrity	1	0	1	0	1	1	0	0	2	7	4	2	0	3	0	2	0	1	2	2	0	6	35
Delivery	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Design constraints	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Design issues	0	1	0	1	0	1	0	0	4	2	0	7	2	2	0	1	0	3	0	1	0	11	36
Document management systems	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Ecosystem	2	4	0	0	6	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
Efficiency	0	0	2	0	0	0	0	0	0	1	3	1	3	0	4	4	0	5	2	4	1	0	30
Empowerment	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Enablement	3	4	2	3	7	4	4	5	2	10	5	0	1	7	4	3	0	8	5	11	14	9	111
Enabling technology	0	0	0	1	3	1	1	0	1	1	0	7	3	0	2	1	1	0	0	3	0	0	25
Engagement	4	4	1	2	1	9	3	1	2	11	9	8	9	14	5	5	2	17	11	6	10	9	143

Ethics	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	3	5	2	13
Financial models	0	0	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Governance	5	6	8	2	5	4	5	4	12	21	6	6	6	12	5	9	2	7	13	28	18	20	204
ICT Application support	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	3	0	0	3	11
ICT change management	1	1	2	1	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	3	0	0	14
ICT Infrastructure and devices	3	0	5	3	4	2	0	0	2	0	6	4	2	4	0	3	0	4	1	5	2	19	69
ICT Operations	4	2	10	4	8	9	2	1	9	21	18	12	10	17	15	13	5	15	15	13	7	55	265
ICT Process	0	2	2	1	4	7	0	1	5	11	8	2	6	13	7	9	4	5	9	8	1	17	122
ICT Support	1	0	2	0	1	0	2	0	3	7	1	0	1	1	7	2	1	5	2	1	2	21	60
ICT Use	11	6	18	20	33	16	3	9	39	27	37	39	33	47	19	36	10	47	27	33	39	123	672
Inaccurate measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Information Access	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	8	9
Information continuum	3	0	1	1	5	0	3	6	10	1	5	0	1	8	0	1	1	4	3	2	1	0	56
Information currency	0	0	0	0	0	0	0	0	2	1	1	0	2	0	0	5	0	2	0	0	1	0	14
Information flow	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Information Management	5	2	3	5	9	3	0	2	10	7	10	3	11	10	1	13	2	10	2	3	3	28	142
Information standards	0	0	0	0	2	0	0	0	0	1	0	1	6	10	2	1	1	1	1	0	0	0	26
Innovation	0	2	2	4	10	0	0	2	0	0	1	0	0	3	1	0	0	2	2	3	2	1	35
Interoperability	0	0	0	1	0	0	0	0	2	0	0	0	2	4	1	3	0	3	0	0	0	16	32
Investment	5	5	4	7	12	2	11	8	3	1	6	4	3	4	3	5	1	6	10	8	2	12	122
Investment planning	2	0	0	0	0	0	2	1	3	1	2	1	2	3	0	3	0	1	4	2	0	0	27
IT Strategy	4	1	5	2	3	2	1	6	3	2	1	5	1	2	2	1	0	1	4	10	6	16	78
Knowledge gap	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	1	0	5
Knowledge management	0	0	0	0	0	0	0	0	0	2	1	1	1	0	5	1	2	0	3	0	3	0	19
Leadership	2	8	3	2	1	3	3	6	1	2	0	0	1	0	0	1	0	0	2	5	0	0	40
Leadership style	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Legacy systems	0	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	1	0	3	0	8

Lessons learnt	0	0	0	0	0	0	0	0	1	1	2	0	1	1	1	1	0	2	2	1	0	0	13
Leveraging ICT	0	2	3	7	13	1	1	2	2	2	6	13	6	4	3	6	1	9	3	8	16	20	128
Measurements	1	1	0	1	4	1	0	0	0	1	2	0	0	3	1	4	0	0	2	0	0	0	21
Organisation state	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	3
Organisational learning	1	1	1	2	2	4	1	1	3	5	9	8	8	4	8	10	3	6	11	5	7	14	114
Patient centric design	0	0	0	3	6	0	0	0	10	0	0	0	2	4	0	1	0	3	5	0	3	2	39
Platforms	1	0	0	4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Policies and procedures	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	4	0	4	0	6	1	2	23
Politics	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	5
Power	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Privacy and confidentiality	2	1	0	1	2	0	0	2	3	0	0	0	4	0	0	2	0	0	0	1	0	0	18
Procurement	2	1	1	2	2	1	4	3	0	2	0	3	0	0	0	0	0	0	0	1	0	0	22
Project Management	0	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	0	0	1	3	0	1	12
Proper engagement	0	0	1	0	0	2	0	0	0	2	2	0	0	5	0	0	0	7	1	1	3	0	24
Quality	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3
Resources	1	2	2	3	6	2	1	0	2	2	1	0	0	1	3	3	0	5	4	2	5	8	53
Risk Management	1	0	1	0	2	1	0	0	6	3	3	1	3	5	3	2	2	1	4	2	2	11	53
Security	0	0	0	2	0	0	0	0	0	1	0	1	3	1	0	2	2	0	0	0	1	9	22
Shadow IT	0	0	1	2	0	0	0	0	1	0	0	2	0	0	0	3	0	0	0	1	2	0	12
Skills	2	2	0	0	2	1	3	5	0	8	0	0	0	1	1	0	0	2	1	9	9	0	46
Stakeholder Engagement	0	0	0	1	1	1	2	1	0	1	0	3	2	2	1	0	0	5	1	1	0	2	24
Stakeholder requirements	0	1	0	0	0	6	0	0	0	6	1	3	2	8	0	0	0	3	2	0	1	0	33
Strategic Alignment	14	14	22	16	26	16	26	21	21	32	24	23	19	24	22	27	6	20	41	47	30	57	548
Strategic capabilities	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Strategic direction	10	11	17	6	12	4	4	15	16	7	7	9	6	10	9	10	2	3	15	16	11	26	226
Strategic Intent	22	30	22	14	30	15	19	27	25	31	22	18	16	33	28	24	6	28	37	46	45	48	586
Strategic planning	3	6	4	3	6	1	3	8	9	4	4	2	2	7	3	3	0	2	7	7	3	14	101
Strategic priority	3	3	7	0	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19

Strategy implementation	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	2	0	0	3	0	0	0	9
Structure	3	4	5	0	2	1	5	2	5	13	1	4	3	3	2	3	0	2	8	15	10	4	95
Support Change	2	1	1	0	0	0	1	0	1	1	0	0	0	1	2	2	0	0	0	0	3	1	16
Sustainability	2	1	2	6	3	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
System Design	3	2	4	12	12	6	0	0	24	3	11	18	13	27	2	8	3	20	10	10	17	52	257
System integration	0	1	3	2	3	3	0	0	4	1	2	1	2	4	1	0	2	2	0	3	2	0	36
System Requirements	0	0	0	1	0	1	0	0	5	0	0	3	1	1	1	0	0	2	0	0	0	31	46
System Useability	4	0	1	5	3	1	0	0	1	0	9	10	8	15	0	7	2	11	5	7	8	21	118
Technology construct	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Technology impact	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Technology implementation	0	0	1	2	0	4	1	1	2	2	3	1	3	0	4	1	0	1	3	2	3	12	46
Technology planning	0	0	0	1	0	0	0	0	1	0	1	4	1	4	3	1	2	2	2	4	3	30	59
Technology state	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	2	1	0	0	0	7
Technology transformation	1	1	7	2	3	5	2	7	3	3	3	3	3	2	6	3	0	1	7	7	4	12	85
Technology upgrade	0	0	4	0	1	0	0	0	0	0	0	2	0	2	1	2	0	0	4	2	1	0	19
Time constraints	0	0	0	1	0	2	0	0	0	0	4	1	1	4	0	0	0	4	0	2	2	15	36
Time constraints-system issues	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Training	1	1	1	3	4	7	0	2	2	3	7	9	7	3	3	9	1	4	7	4	4	26	108
Training strategy	0	1	1	1	0	0	0	0	0	1	5	5	5	3	3	6	0	2	2	3	3	0	41
Transparency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	3
Trust	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	3
Understand IT strategy	0	0	2	0	0	0	0	0	2	1	1	0	2	0	2	3	1	1	1	0	0	0	16
Understand organisation strategy	0	0	0	0	0	0	0	0	2	0	1	2	1	0	1	1	1	0	0	0	1	1	11
Understanding capability of existing systems	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Use of technology	0	0	0	0	0	0	0	0	0	1	5	2	3	1	0	3	0	7	1	0	11	0	34