**The Application of Systems Thinking Approaches to the Development of Integrated Care Services for Adults with Complex Care Needs: A Systematic Review**

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**Declaration**

Yr wyf drwy hyn yn datgan mai canlyniad fy ymchwil fy hun yw’r thesis hwn, ac eithrio lle nodir yn wahanol. Caiff ffynonellau eraill eu cydnabod gan droednodiadau yn rhoi cyfeiriadau eglur. Nid yw sylwedd y gwaith hwn wedi cael ei dderbyn o’r blaen ar gyfer unrhyw radd, ac nid yw’n cael ei gyflwyno ar yr un pryd mewn ymgeisiaeth am unrhyw radd oni bai ei fod, fel y cytunwyd gan y Brifysgol, am gymwysterau deuol cymeradwy.

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# Abbreviations

|  |  |
| --- | --- |
| BOTs | Behaviour Over Time Graphs [BOTs] |
| BU | Bangor University |
| CAS | Complex Adaptive Systems |
| CLDs | Causal Loop Diagrams |
| CST | Critical Systems Thinking |
| DN | District Nursing |
| GP | General Practitioner |
| HSM | Hard systems methodologies |
| ICSs | Integrated Care Systems |
| LA | Local Authority |
| LHS | Learning Health System |
| NHS | National Health Service |
| OECD | Organisation for Economic Co-operation and Development |
| ONS | Office for National Statistics |
| OR | Operational Research |
| SD | System Dynamics |
| SSM | Soft systems methodologies |
| ST | Systems Thinking |
| UK | United Kingdom |
| WAG | Welsh Assembly Government |
| WG | Welsh Government |
| WHO | World Health Organisation |

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# Summary

**Background:** The application of systems thinking approaches is an emergent theory-based research method that focuses on examining complexities in contemporary systems. While its diffusion to healthcare is recognised in national and international research, interest in its function to investigate and delineate causalities continues to develop. However, current reform highlights the relevance of collaborative partnerships in both organisational and research contexts.

**Aims and Objectives:** The objective for this research is two-fold: a systematic review of published health and social research literature on *The Application of* *Systems Thinking Approaches to the Development of Integrated Care Services for Adults with Complex Care Needs*. Subsequently, research findings were disseminated in a *Knowledge Exchange Event* to key stakeholders in the Company partner.

**Methods:** A systematic literature review was undertaken using structured searches of electronic databases and key search terms. Inquiry extracted national and international research-based literature that provided data to inform the research question.

**Main Findings:** Although a wealth of literature provided a theoretical application of systems thinking approaches, it was research-based evidence that contributed to data synthesis. A dominant finding from the systematic literature review indicates that implementing whole system change needs to address the relationship between vision, methods and participant dynamics. Four themes emerged from the review and represented dynamic behaviours in systems: Involving Stakeholders; Leadership; Sustainability; Governance and Transformation. Interpreted themes advanced transferable lessons that could inform policy and practice for the development of integrated health and social care services for adults with complex needs.

**Conclusion:** Findings established that while there is an evolving body of research into the application of systems thinking approaches in public services, its full immersion into investigations of organisational problems to provide meaningful learning opportunities remains emergent. In recognising the inherent relationship of the themes, the application of lessons learned calls for a re-framing of intervention approaches in order to fully appreciate the multi-level complexities of systems and advance the transfer of knowledge for thinking in systems.

# Chapter 1: An Introduction

## 1.1 INTRODUCTION

This thesis presents findings from a Knowledge Economy Skills Scholarship II (KESS2[[1]](#footnote-1)) funded research project that has involved working with a Local Authority [LA] in Wales. KESS 2 links companies and organisations with academic expertise in the Higher Education sector in Wales to undertake collaborative research projects. To illustrate this, the core components of this collaborative project are shown in Figure 1. This introductory chapter provides an overview of the thesis, presenting the rationale and aims of the research project and arrangement of the chapters. Throughout this thesis, the collaborating LA is referred to as the Company partner. This chapter also introduces the core principles that underpin the research project and inform the research process.

Figure 1: The research project

## 1.2 INTRODUCING THE THESIS

One of the most significant challenges facing health, social care and public services in Wales is the management of population growth (Welsh Government [WG], 2018). Advances in medical research and technology have led to increased numbers of people living with long-term health and support needs. As a result, the demand for personalised health and social care has intensified and has fuelled the need for integrated care and support services (Lewis, 2015). Adults who require both health services and social care services often have complex needs and as such, individuals who are likely to benefit from integrated care services shall be referred to as people (the citizen[s]) with complex care needs. However, issues such as fragmentation and inequality of health and social services are commonly cited as the background for siloed working in integrated organisations, in which the [historically] separate disciplines do not collaborate to share vital information and coordinate integrated care services effectively (Kirst *et al*, 2017). This disconnection is captured using the term *silo* and is commonly used in reference to a department within a system that operates somewhat independently to others (ibid). Additionally, disparities between policy intentions and practice mean that services are failing to meet core objectives relating to the delivery of seamless care and support (Parkin, 2019).

In recent times, legislative developments have reformed the arrangement of health and social care services and have introduced different ways of working. Currently, Integrated Care Systems [ICSs] are new partnerships between the organisations that meet the health and social care needs of people across a locality to coordinate and plan person-centred care and support services that meet the needs of individuals within a specialised, multi-agency organisation (Goodwin, 2016). Subsequent literature has included examples of encouraging research methods that have emphasised the complexity of such partnership organisations and have utilised theoretical and conceptual frameworks to analyse and describe modified practice (Lewis, 2015). Nonetheless, a common challenge for multi-agency systems is integrating health and social care services in order to build an ICS that can coordinate access to a range of services that meet the complex health and social care needs of people accessing them; commonly referred to in this thesis as the ‘citizen[s] engaging with services’.

Whilst research has demonstrated that health systems are complex organisations, research that develops knowledge of how to intervene within health, social care and public systems to improve service delivery is only now materialising (Carey *et al*, 2015). Best and Holmes (2010) conclude that the limited evidence is available and called to systems science to reduce this knowledge gap by undertaking research with the ‘theoretical and methodological tools’ of a perspective known as Systems Thinking; primarily referred to in this thesis using the abbreviation ST (ibid, p406). Underpinned by theory, ST approaches view an organisation as comprising interconnected factors and relationships that influence how its system behaves (Stroh, 2015).

Since the conception of ST in 1956 by Jay W Forrester, research has seen the diffusion of ST methods and conceptions to many disciplines, including city logistics (Kunze *et al*, 2016); higher education (Siegrist *et al*, 2013); systems engineering (Arnold & Wade, 2015) and sustainable energy (Snyder & Snyder, 2008). ST offers a framework that can be used as a platform to explore the characteristics of a system, identify dynamic behaviours within that system and explain what is happening and why (Willis *et* al,2014). Although the empirical literature has offered valuable insights into health and social care systems, there is still a need for literature presenting primary data for outcomes of health and social care systems interventions (Nolte, 2020). Therefore, research-based knowledge can provide a wealth of information that offers insightful and influential data to inform policy making and practice (Borgermans & Devroey, 2017). Through situating health and social care systems in their cultural, political and economic contexts, the insights of different stakeholders can provide new forms of insightful knowledge (Goodwin, 2016). In this thesis, the term *stakeholder* denotes the actors that can influence outcomes within an organisation/system and may be employees, a company partner or the citizen engaging with services.

This research project was developed because of policy and practice-based challenges experienced in a Local Authority [LA] in Wales. The research need of the collaborating organisation was to further understand the complexities and dynamics of integrated care provision, with a focus on how ‘thinking in systems’ can inform the integration of their health and social care services provision for adults and highlight opportunities for innovation in the sector.

## 1.3 WORING IN PARTNERSHIP

The Company partner worked with the university and Primary Academic Supervisor to agree the parameters of the current project. The aim was to inform how ST can be applied to integrate local health and adult social care services to meet demand. The agreed project title was:

***The Application of Systems Thinking Approaches to the Development of Integrated Care Services for Adults with Complex Care Needs***

The project responds to the identified need of the Company partner whilst addressing a core principle of the University’s Research Strategy, namely, to promote research activity and impact. At the project design stage, Bangor University [BU] is guided by its *One Sustainable Development Principle*, which advocates long-term thinking and working collaboratively to meet the needs of local organisations and companies (BU, 2020). Similarly, Social Care Wales has a research and development strategy to foster its vision for a collaborative approach to informing and improving policy and practice (Health and Care Research Wales, 2018).

## 1.4 AIMS AND OBJECTIVES

This research project aims to use systematic review methods to find and collate literature that can inform the application of ST approaches. A narrative analysis of the literature will identify lessons that are transferable to integrated health and social care systems for the purpose of underpinning future service organisation and delivery models. The agreed systematic review question was:

***What transferable lessons are there from using systems thinking approaches in health, social care and public services to develop leading integrated care services for adults?***

The objectives for this research were two-fold and focus on (1) the achievement of a systematic review of the literature to address the area of inquiry and (2) organising and presenting a Knowledge Exchange Event to disseminate the research project findings. The steps to achieve these objectives included:

* Preparing a systematic review protocol to ensure transparency and replicability
* Performing electronic database searches informed by the protocol
* Synthesising data to identify transferable lessons
* Examining the reported effectiveness of ST approaches
* Exploring findings and their implications for integrated care organisations
* Organising and presenting a collaborative Knowledge Exchange Event to disseminate the research findings to key stakeholders in the Company partner

## 1.5 ACHIEVING INTEGRATION

The coordination of health and social care services is fundamental to create an integrated system that functions effectively as a whole (Goodwin, 2016). Partnership arrangements between integrated systems can be challenging due to constraints caused by restrictive thinking and practice (Kirst *et al*, 2017). These influences can impact on the provision of services and result in different approaches to the provision of inclusive health, social care and other public services, due to a lack of understanding about how best to achieve integration (Kirst *et al*, 2017).

When promoting multifactorial, person-centred well-being, dynamics such as health, social, economic and environmental factors are both determinants that influence well-being and potential performance outcomes for integrated services (Goodwin, 2016). Nevertheless, when implementing integrated care, dialogue between the service and the person engaging with the service is fundamental to achieving the outcomes that the individual wants (Kirst *et al*, 2017).

Although individual models of integrated care aim to promote a cohesive delivery of health and social care services, the absence of a single policy document for integrated care in Wales has caused fragmentation between providers and has resulted with current models of integrated care being unable to align with Government policies that focus on sustainability (Lewis, 2015). Current policies, such as the Social Services and Well-being (Wales) Act (2014) and the Well-being of Future Generations (Wales) Act (2015) that place emphasis on a person’s well-being underline the need for integrated services. There are seven well-being goals contained in this later Act which aim to improve the social, economic, environmental, and cultural well-being of Wales (WG, 2019a). These are:

* A prosperous Wales
* A resilient Wales
* A healthier Wales
* A more equal Wales
* A Wales of cohesive communities
* A Wales of vibrant culture and thriving Welsh language
* A globally responsible Wales

### 1.5.1 Current Challenges

In recent years, several organisations have looked to ST to address long-standing capacity problems within fragmented services and difficulty agreeing and implementing shared systems. The Vanguard Method[[2]](#footnote-2) has been used by the Company partner to focus on issues that have impacted on their integrated system’s ability to meet the increased demands of an ageing population and prioritise the individual needs of its citizen[s] engaging with their services. The Company partner was seeking further knowledge about the utility of ST to inform and promote their organisational development of integrated services and challenge barriers such as siloed thinking and task-orientated working.

A primary example of this concern are current challenges experienced by the Company partner for community-based nuring services. While the LA is required to comply with WG targets for the provision of community healthcare, a key challenge is the management of demands for DN services. An earlier driver for community healthcare has been the Welsh Assembly Government’s [WAG] vision for locality-based community nursing services (WAG, 2009). The strategy document proposed recommendations for community nursing teams to refocus on providing healthcare services and facilitate the self-management and personal responsibility of individuals and communities (ibid). However, there is a current focus on different ways of working following the integration of health and social care organisations. The historical barriers to integration between health and social care are discussed further in chapter 2.

## 1.6 THE PRACTICE-BASED PLACEMENT: AN OVERVIEW

As shown in Figure 1, a component of this KESS2 funded research was to undertake a short placement with the Company partner. In line with their focus on issues that have impacted on their community services, time was spent contributing to their current understandings of the demand for local District Nursing [DN] services. Reflections on the practice placement and how the systematic review findings can provide insightful recommendations for organisational development were used to inform discussions at a Knowledge Exchange Event. Whilst work undertaken during the placement was both informative and enjoyable, information relating to this does not have ethical approval to be reported. Accordingly, reference to this component of the research project is reflective.

## 1.7 INTRODUCING SYSTEMS THINKING

ST is a perspective that views the whole system, rather than the individual components, to enable the relationships and effects of complex dynamics to be examined (Stroh, 2015). The empirical background of ST has evolved from systems theory and this underpinning has developed considerations of its utility as a valuable framework for change. Research within the ST lens theorises the relations between different components of a system within a complex environment (Diez Roux, 2011). The systems framework contains four key approaches, as shown in Figure 2.

Figure 2: Main approaches of systems thinking

Complex Adaptive Systems [CAS] and Complex Systems are both theoretical branches that can be employed to examine the complexity of health systems and which acknowledge the complex medical and administrative environments created by technology and multiple providers (Pype *et al*, 2018). They regard a complex system as comprised of subsystems, each with their own recognisable relationships and demands that influence its performance at varying levels of operation (ibid). A CAS approach extends this view by stating that key to a system’s success is its ability to change through continual adaptions within the context of complexity (Diez Roux, 2011). Continual adaption is regarded to be a dynamic process that can be mapped using the tools of ST (ibid).

ST has developed theory-driven research in the public sector. For instance, ST approaches have been applied to change management approaches within public sector systems and have been used to inform policy making. An approach known as The Vanguard Method[[3]](#footnote-3) is designed to modify the operational behaviours of a system, through focused intervention that addresses occurrences where performance is ‘failing’. Performance *failure* is defined as something that has not been done right for the citizen during service delivery. Success is defined as instances where delivery of services had achieved efficiencies and led to improved cost effectiveness measured as stakeholder confidence (Wright & Meadows, 2012).

## 1.8 STRUCTURE OF THE THESIS

This thesis is organised into nine chapters that describe and present the findings from the systematic review. Following an introduction to the project and the core components of ST, chapter two provides a more detailed overview of the context for the systematic review with an emphasis on the need for integrated health and social care and the policy and practice context. The background, principles and theoretical underpinnings of ST approaches are provided in chapter three. This thesis is informed by a systematic review protocol and the stages of the review process are detailed in chapter four. As academic-company partner collaboration is a core component of this KESS2 project, chapter five presents the planning and protocol for a Knowledge Exchange Event that was organised to disseminate findings from the systematic review.

Moving forward, chapter six presents the systematic review search results and findings from the Knowledge Exchange Event. In this chapter, a narrative analysis presents the emergent themes, which are organised as transferable lessons. The synthesis also considers the research approaches utilised in the papers and also identifies common themes in the reported outcomes. This chapter also reports findings from a guided discussion in the Event, which are presented as factors that influence the provision and delivery of integrated care services in the Company partner. Subsequently, chapter seven discusses the application of ST interventions in the review papers and explores how findings informed the area of inquiry and address the systematic review question. In reflecting on the various stages of undertaking this research project, chapter eight considers the systematic review process and the Knowledge Exchange Event. To conclude the thesis, chapter nine presents the main conclusions arrived at, alongside reflections on the limitations of the research process and how this thesis contributes to greater understanding of the empirical use of ST approaches.

## 1.9 CHAPTER SUMMARY

This chapter has introduced the research project. In the multi-layered context of integrated care, an approach that draws on theory to understand practice can enable the exploration of factors that can impact on service provision for adults with complex care and support needs. Although many contributions in the literature have referenced the application of ST approaches, there seems to be a lack of primary empirical data to support the application of the ST framework. To understand the emergence of ST approaches as a helpful operational method for tackling complex problems, it is important to be familiar with existing research literature. This chapter has emphasised that research is paramount to capture the utility of ST and highlighted that whilst there is a growing body of international literature reporting on the use of ST, primary evidence remains deficient. Chapter 2 situates integrated health and social care in a broader global context and discusses its operation within the UK and in Wales.

# Chapter 2: Integrating Health and Social Care

## 2.1 INTRODUCTION

While there are no formal definitions of Health and Social Care in literature, the discipline of Health commonly relates to the prevention, treatment and management of an illness, disease, injury or disability and the care or support of a citizen with these needs (Coulter *et* al, 2015). Similarly, Social Care generally pertains to supporting ‘activities of daily living’; such as washing, dressing, toileting, feeding and mobility (Barbrook-Johnson *et* al, 2020). Social care also takes account of the citizen’s accommodation needs to maintain independence or manage complex care needs, participate in social interaction and be safeguarded against potential harm that may arise from vulnerability (ibid). This chapter discusses the integration of Health and Social Care, provides the policy, practice and research context for the systematic review and explains some of the multi-agency working arrangements that an ICS necessitates. Before commencing a systematic review, it is important to gain an understanding of the provision of integrated health and social care services in Wales and to develop an understanding of existing research knowledge on partnership working in health and social care. In doing so, this chapter also highlights key areas that impede the transition to integrated services and impact on organisational development.

## 2.2 POLICY BACKGROUND AND DEVELOPMENT

Table 1: Summary of policy development

|  |  |
| --- | --- |
| **Key Policy Document** | **Introduction** |
| National Health Service and Community Care Act | 1990 |
| Sustainable Social Services for Wales: A Framework for Action | 2011 |
| The Health and Social Care Act (England) | 2012 |
| Together for Health (Wales) | 2012 |
| The Social Services and Well-being (Wales) Act | 2014 |
| Community Care Act | 2014 |
| NHS 5 Year Forward View | 2014 |
| Well-being of Future Generations (Wales) Act | 2015 |
| Taking Wales Forward | 2016 |
| Reforming Local Government (Wales) | 2017 |
| All-Wales induction framework for health and social care | 2017 |
| Parliamentary Review of Health and Social Care in Wales | 2018 |
| A Healthier Wales | 2019 |
| NHS Long Term Plan | 2019 |

The historical development of the integration between health and social care has been significantly shaped by the implementation of policy and legislative requirements. Previously separate guiding principles for the delivery of independent services required transformative changes following the introduction of the National Health Service [NHS] and the Community Care Act[[4]](#footnote-4) (1990) specified that any adult aged 18 or over and is eligible for health and social care services from a LA requires comprehensive assessment of their care and support needs. This early legislation directed local authorities to provide community services for adults with complex care needs, which would prevent or delay admission to residential or nursing care. However, the focal distinction between Health and Social Care has been a prevalent obstacle to their provision of integrated services (Kuluski *et al,* 2017).

In particular, primary challenges highlighted in literature [and in the media] is the policy context in areas such as workforce development and the funding of necessary healthcare and social care services. For example, to meet nursing and accommodation needs. However, a key barrier to the integration of health and social care at the operational level has been the absence of developing and implementing skills that meet service demands (Health and Care Research Wales, 2018). Standards of service are set out in National Frameworks and benchmarked by bodies inspecting, regulating and auditing ICS in Wales and provide practice guidance regarding workforce planning for service delivery requirements (ibid). However, although identifying what skills and knowledge are needed to align with what the citizen[s] needs, practice strategies for the learning and training needs for workforce development and reform are dependent on sufficient funding for this essential service need (Hill *et al*, 2020).

In Wales, publication of a later Government paper Sustainable Social Services for Wales: A Framework for Action[[5]](#footnote-5) (2011), highlighted challenges faced by public services and provided a framework for the reform of social services that aimed to prioritise areas for action in order to meet the citizen’s needs (WG, 2020). Whilst there is no single policy paper for integrated care in Wales, an initial policy document commissioned by the Welsh Government to support integrated health and social care policy development summarised the key determinants of successful integration, with a policy objective that local organisations meet these requirements (Health and Well-being Best Practice and Innovation Board [BPiB], 2013).

The vision for the integration of health and social care also impacts the commissioning level of integrated delivery systems. While the governance of integrated systems in Wales has diverged from developments in the United Kingdom, transformational changes implemented by central government have reformed health and social care systems to shape the provision of medical and social care services in an ICS. Policies that advocated more choice for citizens engaging with services and greater competition for National Health Service [NHS] providers were introduced. However, the establishment of an Internal Market imposed the separation of suppliers and purchasers, thereby introducing a system of provider selection and affordability as LAs received a budget for registered patients (Health and Care Research Wales, 2018). Nonetheless, the obligation for provider choice has been an ongoing area of contention in terms of payment for health and social care needs (ibid). Indeed, the core principles of the provision of ‘free’ NHS healthcare have become inextricably intertwined with a market-based approach to healthcare services, whereby health and social care commissioning utilises both public and independent services. In practice however, citizens who have healthcare and nursing care needs are engaging with the social care system, in which care is means tested.

As such, the ideology for integrated health and social care services has been somewhat blurred by imposed fixed funding objectives (Hill *et al*, 2020). The goal to ‘balance budgets’ was supported by the introduction of The National Framework for Continuing Healthcare (CHC), through which finite levels of funding are allocated for ongoing health and social care ‘packages’ subject to assessment. Nevertheless, the distinction between these related needs are frequently argued as being unclear, in circumstances where both these needs are presented by an individual. In Wales, a primary example is dementia, which can result in primary healthcare and nursing needs provided by the NHS as well as social care needs in terms of requiring supported accommodation; the responsibility of the LA (ibid).

A key feature of the vision for integrated health and social care is involving the citizen[s] to guide accessing services needed in an endeavour to circumvent fragmented delivery (Bovaird *et al*, 2014). Terms such as co-production, participation and involvement are often used interchangeably in literature to capture meaningful exchanges of information in the provision of; essential for personalised priority- and goal- setting during intervention (Tembo *et al*, 2019). Nevertheless, in the context of applying a systems thinking perspective to develop integrated care services, the term co-production is used to refer to the inclusion of the citizen, their family and carers to plan and design necessary services. As such, co-production can be regarded as a strategic platform for partnership working through fostering transparent and collaborative dialogues to improve intervention outcomes (ibid).Through being able to promote a shared understanding of explicit needs, the citizen is positioned as a key stakeholder in shaping integrated care (ibid). As such, the collaborative partnerships between citizens and health and social care professionals can facilitate a ‘rethinking’ of service delivery in the context of direct communications with people accessing services in terms of designing sustainable and efficient services that meet the needs of local populations (Turakhia & Combs, 2017).

However, applying the principles of co-production is not consistent across ICSs due to different interpretations of participation and can be somewhat tokenistic as a result (Maruthappu *et al*, 2015). Poor collaboration within authorities, particularly between different professionals, can act as a limiting factor. For example, not involving the citizen[s] in tasks such as planning and procuring services that meet their needs, due to the regulation of commissioning at an organisational level (Vanleene *et al*, 2015). Another weakness of ideas of co-production in public services can be when the citizen is viewed as a ‘consumer’, thereby establishing a context of ‘customer participation’ (ibid, p4). As such, the ideas and values of this participatory approach to planning and designing services can transmute into a somewhat organisational–driven undertaking whereby services are obtained in line with predetermined criteria for eligibility (Social Care Wales, 2017).

The shift in the legislative and policy context for integrated health and social care can be attributed to the introduction of the Health and Social Care Act in England in 2012[[6]](#footnote-6). The Act specifies that the provision of integrated health and social care services requires the cooperation between local authorities and the NHS and the key principles of integrated working are set out in the Act (LGA, 2017). Its introduction significantly reformed the way the NHS functioned, with General Practitioners [GPs] becoming part of Clinical Commissioning Groups [CCGs] having responsibility for sourcing and purchasing health and social care services (The King’s Fund, 2015). A key feature of the Health and Social Care Act was the Government’s focus of investing in services that maximise the well-being of people that engage with health and social care services (Local Government Association, 2017). The Act assigned a shared role of political leadership to local governments, Health and social care authorities to establish ICSs.

In Wales, partnership arrangements are different and reform required that health and social care services were created in each Local Health Board [LHB]) area, administrated by a Regional Partnership board that comprises Local Authorities [LAs] and LHBs (WG, 2017). The Social Services and Well-being (Wales) Act (2014) champions the key principles of integrated working specified in the Health and Social Care Act (2012), gave new legal rights for carers, empowering the citizen with a ‘voice’ in decision-making about their care and support (All Wales Forum, 2020). WG is continually evaluating the implementation of this Act and the most recent report on its implementation to date is Framework for Change (WG, 2019a). This report consolidates information collected on how the well-being of citizens engaging with services across Wales, their carers and families has been impacted by the Act[[7]](#footnote-7) and offers strategic recommendations so that the principles of the Social Services and Well-being (Wales) Act are maintained (ibid).

Another key piece of legislation is the Community Care Act (2014)[[8]](#footnote-8). The citizen is the central focus of this Act and it emphasised the need for early, preventative intervention. The Act established eligibility criteria and allocated a personal budget for the citizen and carer, which directs the arrangement of person-centred services that meets their level of care and support needs to achieve agreed outcomes (Allan, 2015). The developments of policies such as Taking Wales Forward (WG, 2014) and Well-being of Future Generations Act[[9]](#footnote-9) (WG, 2015) have further shaped practice through integrating commissioning between LAs and LHBs (ibid). More recent key policy documents such as the All-Wales induction framework for health and social care (Social Care Wales, 2017), A Healthier Wales (WG, 2019a) and the NHS Long Term Plan (2019) communicate intentions for the provision of integrated care services (WG, 2019b).

### 2.2.1 Implementing Co-Production in Integrated Care

Since the conception of co-production in health care systems in the United States in the 1960s, the collaboration of people engaging with services and professionals providing these services has modified to a current focus on the planning and development of services (Turakhia & Combs, 2017). While the value of co-production is greatly influenced by political dynamics, such as the financial constraints imposed during the procurement of services, principles of empowering citizens to access necessary integrated resources and services are further shaped by the dynamics of welfare provision (Foot *et al*, 2014). In Wales, the devolution of policy has influenced the design and delivery of integrated health and social care because of a greater choice of independent and voluntary organisations that provide these services (Philips & Morgan, 2014). Nevertheless, a guiding principle for the collaboration of health and social care ‘partner agencies’ is to promote better outcomes for local populations, while creating value through making better, more equal choices in a context of shared power (Greig, 2015).

National leadership is being provided by the Integrated Personalised Commissioning (IPC) programme, with the objective of unifying health and social care spending at the level of the citizen engaging with services (ibid). Through advocating a partnership approach for the provision of integrated services, there is a developing interest in establishing good practice frameworks for co-production in integrated health and social care services which is communicated in the research literature published by the Social Care Institute for Excellence [GB] (SCiE[[10]](#footnote-10)) and the National Development Team for Inclusion (NDTi[[11]](#footnote-11)). However, the literature cautions that while collaboration in integrated health and social care is the primary objective, the construct of co-production remains somewhat ‘absent’ in the realisation of service provision because of different interpretations of *inclusion* (Greig, 2015). The lack of a clear definition of what inclusion means can lead to ideological differences across integrated systems, causing miscommunications and competing understandings of responsibilities for inclusion within service delivery (ibid).

Nonetheless, the literature highlights that building sustainable ICSs that can achieve outcomes for the citizens accessing services must implement co-production as a pragmatic approach to planning and designing (Palumbo & Manna, 2017; Turakhia & Combs, 2017; Phillips & Morgan, 2014). An article by the Nuffield Trust informed that establishing good practice within ICSs remains challenging as different frameworks for designing and implementing effective integrated health and social care services (Kumpunen *et al*, 2019). Data collected to evaluate integrated care across and between acute and community settings highlighted that outcomes commonly used are ‘narrow’, pertaining to policy focus and health outcomes and consequently do not show a reduction in hospital admissions. While the findings resonate with ideas of ICSs as complex systems, interpreting the data within a multidisciplinary/multiagency setting emphasises that integrated care models must be designed to meet citizens needs, rather than organisational requirements. To address this issue, co-designing models and using feedback loops with all stakeholders were recommended to ensure that services are built on the needs of the individuals. In doing so, this would support commissioners to evaluate the achievement of citizen-led outcomes in a broader, ‘real world’ timescale and settings (ibid, p5).

## 2.3 FRAMING INTEGRATED HEALTH AND SOCIAL CARE

Whilst there is no agreed definition of integrated care, it is widely acknowledged that the provision of integrated health and social care services is multifaceted and comprises complex organisations and care systems with potentially competing sets of ideas and ways of working (Goodwin, 2016). The concept of integrated care is intricate and open to broad interpretation, which is shaped by people that both provide and engage with services at different levels and positions of authority. Ultimately, citizens who engage with integrated services require easy access to all the component care and support services that meet their needs (ibid).

Similarly, modern organisations also acknowledge the need to revise established one-dimensional visions. The focus on tailored, person-centred intervention recognises that the coordination of care services involves multi-agency working that occurs across a range of systems, as illustrated in Figure 4. The input of knowledge from research and academia is an essential element in helping to translate policy principles into practice through the transference of empirical evidence to inform partnership working.

In Wales, devolution of the policy context has transformed health and social care systems through the implementation of national policy and strategy documents by the devolved Welsh Government (NHS Wales, 2019). LAs are responsible for local planning, bringing together local agencies in partnership to tackle issues that require a shared approach (ibid). The collaboration between the NHS and health and social care organisations is central to delivering the NHS’s Long Term Plan strategy for transforming the provision of health and care services (Charles *et al*, 2020). Working in partnership, NHS providers and commissioners are responsible for the planning and integration of care and support services for the population resident in the LA’s area (ibid). Sustainability and Transformation Partnerships [STPs] have been formed to formalise these partnership working arrangements. Policy objectives for integrated health and social care services in Wales include the provision of integrated physical health, mental health and social care services (NHS, 2019).

As such, the transformational challenge of health and social care is embedded in a context of complexity. Devolution of legislative responsibility has emphasised shifts in policy strategies, whereby the provision and delivery of health and social care is required to contend with a diversity of dynamics. Themes such as the devolution of the policy context, logistical challenges due to rurality, demographic challenges due to Welsh and non-Welsh speaking people build on the intricacies of providing integrated care services that meet the changing care and support needs of local populations (Philips & Morgan, 2014). For example, gaps in community services because of workforce issues can result in insufficient resources to respond to health and social care needs (Smith, 2015). Such service gaps can also impact on accessing specialist care in Wales, because of poor coordination between professionals (Boehmer *et al*, 2019). Citizens with chronic and complex conditions that require multi-agency and specialist input, have been identified in literature as predisposed to inequalities in accessing services to meet their needs (Boehmer *et al*, 2019; Kuluski *et al*,2017; Philips & Morgan, 2014; Smith, 2015).

In Wales, there have been political shifts in conceptions of health and social care because of decentralised policy priorities for local integrated care needs (Lewis, 2015). Current health and social care policies seek to shape the delivery of timely and effective person-centred care services, to support individuals with complex care and support needs. The organisation of local and national health and social care organisations is becoming ever more fragmented and so the complexity of accessing services that are involved in meeting the needs of citizens is increasing (Hughes, 2017). There is a variance between policy intentions and current practice, with the result that there is a failure to meet the policy objectives for unified services, such as improving partnership working through using models of joint working (Lewis, 2015).

### 2.3.1 The Importance of Integrated Health and Social Care Provision for People with Complex Care Needs

In consideration of why integrated health and social care provision is important to supporting people with complex care needs, attention commences with the underpinning ideology that integrating care systems across ‘organisational boundaries’ will translate to easier access to essential multi-agency services (Kuluski *et al*, 2017). Subsequent support will then, preferably, represent a ‘citizen-managed’ approach to the procurement of services required (ibid). For this reason, citizens living with long-term and co-existing ‘determinants of health’ (such as physical, mental, emotional and financial challenges) necessitate ‘joined up’ services to manage these conditions (NHS, 2019). For example, older people may have chronic health and support needs that require regular multidisciplinary monitoring to promote better outcomes through avoiding hospital admission[s] (ibid).

Optimising supporting citizens also requires that their families and advocates be involved in assessing health and social care needs. Through building relationships with the citizen user and their support network, the future planning of care and support services can reduce the impact of factors that can influence personalised outcomes (NHS, 2019). Similarly, through promoting choices in the provision of health and social care, the citizen user is able to engage in dialogue to discuss services accessed and empower decision making (Kuluski *et al*, 2017).

## 2.4 International Health and Social Care

Whilst there is no international consensus about the definition of integrated care or the use of a specific integration model, the integration of health and social care services has received increasing international attention in both the policy and research literature (Miller, 2016; Anandaciva, 2018). Research and discussion of strategies implemented to address complex issues, such as ageing populations and increasing demands for community services, has highlighted the need to reform care and support services (Miller & Daley, 2013; Kuluski *et al*, 2017). In particular, there is a recognition that similar factors can impede the transfer of care from a hospital setting to community-based services in both Europe and the UK (Nolte, 2018).

Although being informed of developing policy and practice has contributed to understandings of integrated care in other countries, international research of the effectiveness of different approaches and strategies remains a somewhat emergent understanding (Miller, 2016; van Duijn, 2018). Nevertheless, the founding of the Organisation for Economic Co-operation and Development (OECD) has shaped decision-making for international policies through working with the governments of numerous countries, different funding arrangements and reporting of spending for health and social care have made it difficult to evaluate and compare the provision of services world-wide (Borgermans & Devroey, 2017). Healthcare provision in developing countries such as Africa has been a focus of concern due to incidence of disease and high mortality rates (ibid). However, figures published for long-term community-based care and support service costs are commonly fragmented, due to countries’ diverging reporting of reduced or frozen spending on ongoing complex care and support services for citizens living with chronic conditions (Humphries, 2019).

From an international perspective, an inadequate economic climate to fund intervention further challenges the ability to achieve the World Health Organisation’s (WHO) goal-orientated framework for international health systems are underpinned by overarching objectives to promote and protect health, through the implementation of global strategies that focus on the provision and sustainability of health, social and well-being interventions (Kretch, 2020). However, varying uses of public or privately funded insurance to pay for services accessed in some countries furthers the disjointed reporting of health and social care costs and the impact of financial barriers (Borgermans & Devroey, 2017). As a result, no collective international report informs of cost-related problems accessing health and social care that can enable comparisons to be made (ibid).

### 2.4.1 Health and Social Care in Europe

A review of service integration across sectors in Europe by van Duijn *et al* (2018) established that a common focus for research is the collaborative practice between social services and health care. Literature has shown that intervention programmes have served as a driver for policy and practice development, with knowledge gained serving as a platform for change through health initiatives and shared ‘lessons’ (Kuluski *et al*,2017; van Duijn *et al*, 2018). Assertions of the diversity of communication, collaboration and coordination involved in integrated care services have reiterated the theme of complexity in integrated systems. As such, the literature has shown that these pivotal requirements are core factors that can impact on decision-making and policy development by practitioners (ibid). Similarly, a policy paper by Borgermans and Devroey (2017) identified that most EU countries do not have a strategic plan or long-term vision that considers a whole systems perspective.

It is extremely important that such a viewpoint is taken so that sustainable intervention incorporates the many components of the integrated system, as a common focus of policy makers is on issues such as funding (Borgermans & Devroey, 2017). Consequently, finance arrangements often takes place in a fragmented, piecemeal fashion, with policy makers focusing exclusively on single elements within the system instead of considering the whole interconnected system (ibid).

### 2.4.2 Integrated Assessment in Wales

In Wales, a prevalence of chronic conditions such as heart disease, cancer and dementia, impact on timely and unified services in addition to geographic challenges of living in rural areas (Social Care Wales, 2017). Subsequently, the process of organising integrated services to meet the needs of individuals, their carers, and families, requires comprehensive assessment by health and social care professionals, working collaboratively to identify needs (ibid). In keeping with the legislative ethos of working in partnership, as set out in the key policy documents (summarised in Table 3), the assessment process involves the sharing of information so that care services can be planned and managed appropriately (ibid). Building a unified and equal health and social care system that can assess and coordinate the complex care and support intervention was a goal of the Unified Assessment, which aimed to mobilise ‘seamless’ integrated care services across care settings (Chichlowska *et al*, 2013).

As such, involving citizens in the development of ICSs is very important to facilitate the provision of timely and effective local services, with an aim to achieve citizen desired outcomes that promote independence and wellbeing (WG, 2013). However, some health, social and well-being requirements may not be identified during initial assessment and as a result local service development initiative may not have the information they need to drive improvement (Lewis, 2015). ICSs need strategic priorities that are designed around multi-agency working, so that the delivery of care is coordinated and effective (ibid). The inclusion of citizens in the planning and arranging of integrated services is a fundamental principle highlighted in policy development. This concept lends to ideas of a shift in the dynamics of power, whereby people whom engage with services are empowered to be informed and supported, thereby having responsibility for their health and well-being (Evans *et al*, 2018). Unfortunately, research indicates that this tenet of integrated care is commonly not put into practice (Nabatchi *et al*, 2017).

However, divergences between implementing policy requirements and coordinating integrated care for older citizens with complex health and social care needs can challenge the provision of services and contravene policy intentions (Seddon *et al*, 2010b). For example, poor information sharing between multi-agency stakeholders impacts on linking discrete elements of the integrated intervention process (World Health Organisation [WHO], 2018). In particular, to ensure that GPs and health professionals fully engage with assessment processes to develop local partnership arrangements (ibid). Another divergence is arguably that an outcome-focused goal of integrated care does not align with centralised, target-based objectives (WHO, 2018). Consequently, informal arrangements by citizen users for the continuity and provision of services needed transpose the policy priority of supporting seamless interactions between integrated care and support services (WHO, 2018).

## 2.4 POSITIONING HEALTH AND SOCIAL CARE KNOWLEDGE

Discerning what is known about the workings of and delivery of health and social care systems is essential to implement integrated services. As detailed in chapter one, demographics in Wales highlight the rising elderly population living with complex care and support needs (Office for National Statistics [ONS], 2019). Subsequently, the demand for health and social care is infinite (Borgermans & Devroey, 2017). In Wales, there are additional demands on the service to embed the language and culture of Wales within provision (Health and Care Research Wales, 2020). Research that provides a better understanding of key issues faced by health and social care systems will help to inform local and national decision-making.

A common focus in current research is the positioning of health systems in pragmatic and dynamic environments, where research is situated in various disciplines and fields of interest and attends to intervention in specific contexts (Greenhalgh & Papoutsi, 2018). At an exploratory level, the complexity of health systems is frequently situated in theoretical foundations to examine and recognise their intricate organisation. However, it is essential that research addresses key contemporary issues, such as access and provision of vital services by care systems (Borgermans & Devroey, 2017). It is also crucial that research is informed by current policy and practice, to develop and improve local and national services in both public and private sectors (ibid). As such, reporting the outcomes of actions undertaken, the effectiveness of strategic programmes of intervention and/or policy implementation can further inform what is known about health and social care services.

Interpreting connections between interventions and outcomes is crucial for research and policymakers to evaluate their efficacy and minimise any negative results (Oliver *et al*, 2019). Comparable to reviewing outcomes of interventions or policy implementation, the Research, Academia and Learning component of the *Working in Partnership* illustration (Figure 3) relates to a common understanding that research shares a unity of purpose to inform practice of the development and effectiveness in areas of interest. Whilst evaluating available evidence can be a complex process, research findings can provide an evidence base for further action.

Figure 3: Working in partnership

Adapted from the Strategy Unit (2019)

## 2.4 A SHARED VISION

Visions for early and preventative intervention align with goals of the updated NHS Long Term Plan, such as supporting people engaging with the NHS to remain in their own home and access local community services that meet their needs (NHS, 2019). With a focus on enhancing well-being through person-centred care, early and preventative community-based interventions can be implemented, as advocated by the WHO (NHS, 2019). Similarly, this focus can also drive the development of good practice methods and highlights a shared vision for integration and partnership working to foster health and well-being (Charles *et al*, 2018).

To cultivate principles that can foster change, representatives of an organisation must share a collective purpose (Harnett, 2017). The prominent systems thinker Peter Senge conceived that in organisations, a shared vision emerges as a *third discipline* whereby its members learn from shared actions and experiences (Senge, 2006). Aligning with Senge’s concept of organisational *disciplines*, applying a theoretical framework is key to operationalising strategies that focus on specific difficulties (ibid). Strategies that address challenges can encourage innovative approaches to change and development within a ‘learning organisation’ (Hendry *et al*, 2020). Therefore, for goals to translate to a shared vision and create a culture of working in partnership, shared values are essential.

Involving the citizen and communities in the development of health and care services they receive, has been a common emphasis in the development of primary care services (International Foundation for Integrated Care, 2020). Ideas of empowering citizens, their carers and families, share the concept of inclusion, which is an underpinning principle in building ICSs (Kirst *et al*, 2017). Within ICSs, involvement to identify, plan and organise community services that matter to the citizen user[s] can be seen in the development of policies such as the Health and Social Care Act (2012), the Social Services and Well-being (Wales) Act (2014) and the Community Care Act (2014). These Acts embedded integrated care in community-based and community-led services and have been especially important for citizens with multiple and/or co-existing care and support needs, as the Acts all advocate a ‘New Power’ for citizens to make decisions regarding their community led care and support (Care Council for Wales, 2017 ).

Following the introduction of the Well-being of Future Generations (Wales) Act (2015), a public health strategy positions a long-term vision for the improvement of health and well-being of citizens by 2022 (Public Health Wales, 2019). As illustrated in Figure 4, realising this vision involves collaborative working in health, social services, and the inclusion of citizens in the planning and delivery of services (ibid). Subsequently, these dynamics can translate into achieving the vision of ICSs. In the same way, the purposeful inclusion of stakeholders in services speaks to participatory approaches such as ST (this will be explained further in the next chapter), in which the citizen user is empowered through contribution and involvement (NHS, 2019).

Figure 4: Dynamics of an integrated care system

## 2.5 DELIVERING INTEGRATED HEALTH AND SOCIAL CARE IN WALES

Whilst the principle of ‘a single seamless service’ is communicated in policies, there is no specific implementation plan for integrated adult care and support services across Wales. Nevertheless, the introduction of the Social Services and Well-being (Wales) Act 2014 shaped the practice of integrated health and social care services. Through establishing its principles of ‘voice and control’, early and preventative intervention and supporting the citizen user’s family and advocates, the delivery of integrated services must align with ‘what matters’ to everyone involved in designing the care and support services needed (WG, 2014). Equally, in order to implement the policy ambition for integrated care in Wales, the Act has particular implications as demographics show an increasing elderly population living with evolving complex medical and social care needs (ONS, 2019). However, the lack of an infrastructure to support these policies is impacting on principles of collaborative working and ensuring the continuance of silo working is and fragmented services (National Institute for Health Research [NIHR], 2018).

An illustration of this is the ‘invisible boundary’ between health and social care due to computer systems in the NHS not being able to link with those used by local authorities (Goodwin, 2016). This misalignment of information technology systems is especially problematic for individuals accessing services that are commissioned jointly by the NHS and the LA. In particular, the regulation of financing arrangements for different providers is critical to coordinate the provision of community care. As a result, communications between health and social care systems regarding pooled resources and funding can be convoluted and inaccessible in a timely way to meet the changing needs of citizens (ibid).

Partnership arrangements between local authorities and health boards have further shaped the delivery of community-based integrated health and social care following the introduction of regional partnership boards in 2016 (Parliamentary Review of Health and Social Care in Wales (2019). Current service delivery can involve working with charities and community organisations, which although can enhance access to a broader range of services, also makes the delivery of services more complex (Moore, 2019). For this reason, a goal that is integral for integrated services is to adopt a whole system perspective that can support meeting demands and delivering services in a timely manner (Carroll, 2020). As such, resourceful members of an ICS may develop pioneering strategies to establish guidance and direction and inspire a shared vision to provide sustainable long-term care and support services for citizens with chronic and evolving needs (ibid).

The concept of *co-production* in the delivery of integrated care has been a focus of interest for empirical consideration. The reciprocal relationship between citizens who engage with care and support services and the professionals who provide them can be viewed as ‘transformational’, as insightful knowledge that can be gained from inclusion in decisions relating to services accessed can be used to develop public services (Phillips and Morgan, 2014). Such ideas lend to adopting new approaches for integrated care practice, moving away from organisational targets and task-based models towards co-production models that promote services which meet personalised needs and objectives (ibid). Through involving citizens, a ‘from the ground up’ approach to the service delivery can both distance a *top-down* approach and enhance the citizen’s understanding of integrated care (Kirst *et* al, 2017). Similarly, shared responsibility for services promotes collective accountability and ‘ownership’ of integrated care and may reduce fragmented thinking (Maruthappu *et al*, 2015).

## 2.6 MODELS OF INTEGRATED CARE

Differing schools of thought have shaped perspectives on integrated care, which has resulted in different models being used to inform integrated service delivery ([WHO, 2016). Whilst standpoints may differ, models of integrated care share common characteristics, such as an aim to provide appropriate care and support services that enrich the quality and well-being of citizens and their families. In line with policy development, an additional feature of models is a focus on the effectiveness of multi-agency working and to inform local health and social care organisations (NHS England [NHSE], 2014; WHO, 2016). The responsibilities enshrined in the Community Care Act (2014) are open to broad interpretation and as a result, current models of integrated care are not uniform across LAs.

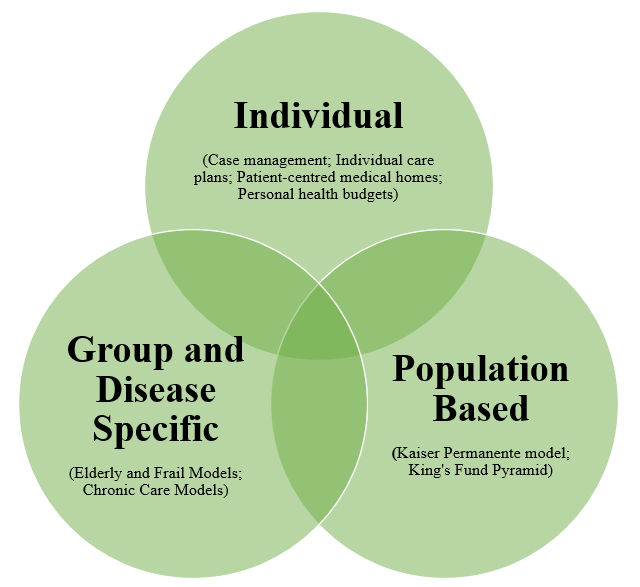
Different focuses on the citizen’s satisfaction with and access to services have resulted in models of integrated care placing emphasis on different building blocks for integration (WHO, 2016). Subsequently, when goals of intervention or services engaged in are informed by varying models, ad hoc modifications can impact on employing their methods to deliver person-focused and community-based care and support services that promote engagement and self-directed intervention; a continuum of care and support across multiple providers and professions. Consequently, data collected regarding the achievement of outcomes is commonly fragmented and therefore measuring service-level outcomes to determine impacts at a whole system-level can therefore be disjointed (WHO, 2016).

In response to the impact of increased demand for integrated care, financial constraints and workforce challenges, the NHS in England presented a *new care models* programme in 2014 that aimed to transform the delivery of integrated services (NHS England [NHSE], 2014). The *Vanguard* programme sought to redesign NHS integrated health services and encourage health and care systems to follow. A second programme was named *Integrated Care Pioneers* and this programme targeted the integration of health and social care services in England, drawing on third sector organisations to enhance the quality and effectiveness of services. A third programme introduced was the *Primary Care Home Model*, which aspired to unify health and social care authorities to develop individual and preventative community-based care (ibid).

A subsequent literature review exploring the application of integrated care models determined three distinct types of integrated care models in practice, as shown in Figure 5 (Baxter *et al*, 2018). The strategy focus of the first category is *individual*, whereby the provision of care and support for the citizen user[s] involves methods that address long-term and complex needs, determined by discrete factors such as individual care planning and a personal budget for purchasing services. The second category comprises *group and disease-specific* models for community services, such as the Chronic Care Model, Integrated Care Models for the elderly and frail and Disease-Specific models targeting conditions such as Chronic Obstructive Pulmonary Disease and diabetes. The third model is *population based* and its strategies focus on the coordination and management of integrated care needs at a population level, such as the King’s Fund Pyramid Model for health and social care services in the United Kingdom and the Kaiser Permanente stratification model and the Veterans Health Administration for services in American health systems (NHSE, 2014).

Each category illustrated in Figure 5 establishes integrated care as a complex, multidisciplinary undertaking. However, methods involved in their implementation are influenced by the tradition of the integrated care model; for example, disease focused intervention contrasted with holistic care within public health services and target-driven models are set against involvement that extends beyond one episode of care (Baxter *et al*, 2018). As such, the models used to coordinate the provision of integrated care services commonly have divergent objectives (NHSE, 2018).

Figure 5: Integrated care models



Adapted from WHO (2016)

ICSs can also increase citizen satisfaction, promoting a perception of improved quality of care and provision (Baxter *et al*, 2018). The updated Next Steps on the Five Year Forward View (2017) re-emphasises the focus on meeting the needs of citizens and advocates for the improvement of the links between hospitals and multi-agency community services (Parliamentary Review of Health and Social Care in Wales, 2018). As such, the importance of partnership working is recognised in models of integrated care and community engagement to shape local services (Gonzales-Smith, 2018). Local adaptions of integrated care models, tailored to meet local population needs, further contribute to variance in approaches to practice.

## 2.7 CHALLENGES OF INTEGRATED CARE IN WALES

ICSs are impacted by a variety of challenges. Several barriers influence the translation of integrated care policy into practice and as a result the implementation of policy is inconsistent (Hendry *et al*,2020). Complications that arise from multi-agency working impact on aligning aims and objectives and monitoring the impact and effectiveness of collaborative care (Harnet, 2017). Whilst the efficacy of integrated care models can be measured by evaluating the achievement of delivery strategies, organising the continuity of care brings its own set of challenges (Goodwin & Smith, 2016). Citizens with a range of long-term care and support needs require a network of services to meet their needs and enable them to be proactive in their managing and addressing their needs (WHO, 2016).

In Wales, challenges of organising and delivering integrated care can emerge from implementing strategies that comply with the aims and visions of policies. For example, aligning with the vision of The NHS Five Year Forward Plan (2014) requires the focus of health intervention to shift from hospitals to primary care services in community settings (NHS, 2014). In practice, coordinating the provision of complex care and support services for ageing populations is complicated by financial barriers due to discrete budget arrangements and capped personal allowances (Lewis, 2015). As a result, purchasing care and support services or equipment needed will impact on achieving outcomes that matter to the citizen and their family and carers (LGA, 2017).

### 2.7.1 Cultural Challenges

Integrated care systems (ICSs) can be influenced greatly by different cultural values and the significances afforded to them (Miller, 2016). The realisation of a shared vision for how health and social care systems need to collaborate effectively requires a change of culture at all levels of a system (Maruthappu *et al*, 2015). Whilst definitions of organisational culture vary according to different disciplines, the general consensus is that an organisation’s success hinges on its ability to merge social, health and ethnic values, beliefs and attitudes (ibid). Wales has a distinct culture, comprising of a national language and traditions, which have significance and meaning for its populations. As such, national values and cultural identity can matter greatly in terms of the ‘patient experience’ of services engaged with for achieving personal outcomes (LGA, 2017). However, a key challenge acknowledged in literature discussing ICSs is that organisational and professional cultures are ‘slow to change’, as previously separate health and social care professions need to shape a new, shared culture (Hendry *et al*,2020).

In addition to the development of policies that have shaped integrated health and social care services in Wales, a guidance paper[[12]](#footnote-12) was produced by the Welsh Government to inform of the requirements for integrated health and social care. For the citizen engaging with local services whose first Language is Welsh, the policy document acknowledged that a key influence on the accurate transfer of their health, social care and support needs is the ability to communicate their needs effectively to promote well-being and independence (WG, 2013). This aligns with previous introduction of a Welsh Language Act[[13]](#footnote-13) in 1993, to authorise its use in the documentation, correspondence and communication of local authorities and public bodies. In doing so, standards set out in the Act promote the use of Welsh and English in community services and support bilingual service delivery (ibid).

An inclusive approach to the provision of integrated services can prompt the development of policies that acknowledge health and social care services that have been outsourced independently by the citizen’s network of family, carers and/or voluntary organisations (Foot et al, 2014). Where funding for the provision of care and support services are determined by personal budgets, policy decisions that acknowledge informal arrangements can serve to augment limited funding (ibid). Likewise, empowering citizens to be proactive nudges towards policy visions that require appropriate advice and information to be provided to empower self-directed management of health conditions (Allan,2015). As such, the importance of attributes such as direction, shared communication and the vision of what integrated care involves is especially important for achieving health and social care outcomes that are of value to citizens that engage with services (ibid).

### 2.7.2 Organisational Challenges

Different cultural perspectives within health and social care have been cited as furthering organisational ‘divides’ and impeding collaborative working (Miller, 2016). As mentioned earlier, different interpretations of what integrated care means influences effective partnership working between health and social care systems and contributes to fragmented care systems (Parkin, 2019). Divergent approaches to ways of working within the same organisation can lead to siloed operational processes, with disparate goals and objectives for episodes of care and support (ibid). Ideas of a system-based approach that focuses on preventative intervention which can target the health and well-being of local populations can be contrasted to reactive involvement that focuses on treating health conditions (Allen *et al*, 2018).

An overarching organisational challenge for current health and social care systems are operational barriers that derive from inadequate staffing levels (Parking, 2019). Without an adequate workforce to plan, organise and deliver integrated services, a focus on preventing illness and tackling health inequalities in community-based services can further challenge continuity and coordination of care (BPiB, 2013; Allen *et al*, 2018). This has significance to the successful integration of community teams in Wales in particular, where GPs join to form extended Primary Care teams, as Wales has a significant shortfall (Royal College of General Practitioners, 2018). This finding has important implications considering rising demands for general practice due to an increasing population (ibid). Nevertheless, investment in securing an appropriate health and social care workforce is a key strategy detailed in the current *A Healthier Wales* strategy document (WG, 2019a).

Similarly, successful integration of health and social care requires sharing information that is needed to plan, monitor and review services which meet the needs of communities and the demands of an ageing population (WG, 2017). However, organisational differences in aligning information systems are a common barrier to sharing essential data (Parkin, 2019). Local variance in the use of digital technology impacts on quality of the infrastructure of ICSs, effecting the coordination and long-term planning of how integrated services will deliver care, with respect to fulfilling the visions of contemporary policies and the sustainability of community services (Maruthappu *et al*, 2015).

Strategies needed to realise visions for change frequently highlightdifferences between national and local principles of governance (House of Commons, 2019). Indeed, all levels of an ICS are influenced my governance arrangements; commissioning services or purchasing equipment due to prescribed funding allowances, which may not be sufficient to align with service demands (WG, 2017). Subsequently, ideas for new ways of working embrace participative management approaches and innovative leadership behaviour and strategies that inspire a collective organisational vision (ibid). As such, approaches to decision-making that enable shared control of services accessed, can instigate new models of interaction that validate a shift in authority (Phillips & Morgan, 2014). In Wales, the concept of *mutuality*, whereby citizens take an active role in planning, arranging, and receiving care and support services, is asserted by the authors as lending to notions of ‘co-ownership’ of public services (ibid).

### 2.7.3 Financial Challenges

The administration and financing of health and social care services are accomplished through separate processes (House of Commons, 2019). Whilst public health is ‘free at the point of delivery’ and provided through the NHS, funding for social care is provided through LAs, with specific amounts ‘ring-fenced’ for the provision of adult social care through personal budgets (ibid). In Wales, centralised health agendas have resulted in competing policy priorities, with funding of acute care services to improve performance measures overriding budgets for primary and community services (BPiB, 2013; Gonzales-Smith, 2018). In line England’s Care Act (2014) and visions set out in the current NHS Long Term Plan (2019), LAs and health boards have pooled budgets for spending on integrated social care and community health services (NHS, 2019). However, in the absence of a UK-wide policy for integrated care, the devolved government of Wales has made legislative changes for ways of funding integrated care that are different from England (Parkin, 2019).

Health and Well-being Boards that are governed by centralised policies, operate to distribute the shared budget between the NHS and each LA to best serve the local populations (House of Commons, 2019). Policy strategies, such as the Integrated Care Provider (ICP), aimed to mobilise health and care services from hospital-based intervention to community-based services, by means of allocating a single payment contract to commissioners (Parkin, 2019). Likewise, in Wales the introduction of the Integrated Care Fund in 2014 aimed to facilitate partnership working between health, social care and third sector services (WG, 2014). The national strategy for financing the practice of integrated commissioning between local authorities and local health boards in Wales is specified in the ‘Reforming Local Government’ (2017) report (WG, 2018).

However, reduced government funding for LAs has fuelled financial pressures (Parkin, 2019). There is a need for a consistent and well-defined integrated care policy and model, at national and local levels, to facilitate the NHS Long Term Plan’s (2019) pledge to ‘support citizens to age well’ by increasing funding for integrated care services. Secure and adequate budgets can therefore be viewed as a ‘core factor’ in enabling the successful provision of sustainable services (Maruthappu *et al*, 2015).

An example offered in the literature is that protected financial resources are critical in order to develop the effective technological infrastructure that facilitates the planning and monitoring of services to establish an ICS (WHO, 2016). Equally, investment in evaluating and measuring outcomes for adults with complex care and support can be utilised to inform local integrated care practice; for example, the achievement of citizen-led goals and to drive financial incentives investing in preventative and early intervention (Gonzales-Smith, 2018).

## 2.8 CHAPTER SUMMARY

This chapter has provided the policy context for the systematic literature review and presented an understanding of current health and social care services in Wales, following changes to their partnership arrangements. Different models of integrated care have been discussed, with a focus on how different models emphasise different building blocks. Insights about integrated care from Europe and the international literature have also been offered. This chapter has additionally drawn on literature examining integrated health and social care organisations from the standpoint of different levels within systems, from the role of Government at a macro level, to that of stakeholders at a micro level. Chapter 3 introduces the discipline of Systems Thinking, its key components and its contribution within research.

# Chapter 3: Contextualising Systems Thinking

## 3.1 INTRODUCTION

This chapter provides the reader with an introduction to Systems Thinking [ST] and its conceptual framework, explains its distinctive language and terminology used and defines its key tools. This chapter also discusses the core principles that underpin ST and places an emphasis on the strength of using ST to focus on the connectivity of the system as a whole and investigate the complexities of the components interactions. Similarly, this chapter considers the key role of stakeholders within ST approaches and combined with systems analyses, discusses how ST can provide valuable insights of the dynamic relationships that influence how a system is performing. However, collecting meaningful information can be difficult in complex systems such as ICSs, when different departments or professionals start work in silos (Kumpunen *et al*, 2019). Equally, viewing ST through a more critical perspective also offers that while its lens can provide such beneficial understandings of a system, it can be difficult to establish a shared purpose to effect long-term positive changes and reinforce a collective impact on an identified problem or point of leverage (Checkland, 1981). Although obtaining a systems view of a problem is a valuable tool for strategic planning, such operational limitations impact on the success of interventions (Dobbins *et al*, 2018). Similarly, this chapter also presents the current application of ST in research and healthcare knowledge.

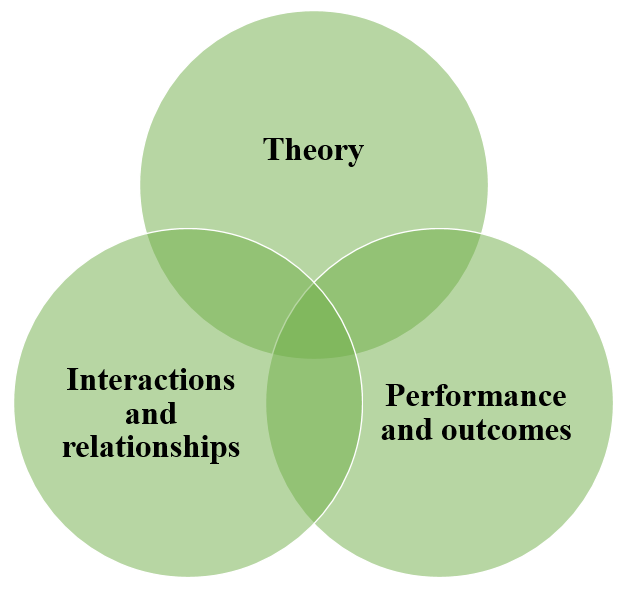
## 3.2 THINKING IN SYSTEMS

Applying a ST lens to complex problems can be helpful to map the dynamic forces that influence the system. By utilising the theoretical and conceptual frameworks to underpin analysis of processes, the relationship between components of the system can be described in ways that explain how they affect its functioning (Arnold & Wade, 2015). Pioneering approaches to examining organisational problems saw a division of *hard* and *soft* ST, each having its own methodology developed to explore the system’s behaviours (Yadin, 2013). *Hard systems* methodologies [HSM] used technological and quantitative methods to analyse ‘predictable’ behaviours, such as the properties of feedback regimes within the system, whilst *soft system* methodologies [SSM] were developed to investigate management problems by exploring ‘people-orientated’ unpredictable behaviours, such as communication practices within the system (Checkland, 1981).

The ST lens was agreed collaboratively between the academic and company partners at the application stage of the KESS2 funded project and applied in response to the Company partner’s identified need. As discussed in the previous chapters, integrated systems are recognised in the research literature as complex systems and require exploration of the whole system. Accordingly, the Company partner was applying the Vanguard Method to focus explicitly on service demands and utilise its ST lens to provide a well-established framework for examining the characteristics of operational difficulties at a whole system level. While utilising instruments such as graphics to examine cause and effect relationships can provide valuable data, their narrow focus is insufficient to acknowledge the myriad interconnections that influence and impact on service delivery. Similarly, although a systems dynamic[[14]](#footnote-14) approach (SD) can connect multi-level system analysis, its methodology for modelling and simulating complex systems can also present empirical limitations as a result of producing engineered data (Carey *et* al, 2015). Whereas both SD and Graphics can support decision-making through illustrating the *emergent properties[[15]](#footnote-15)* of complex systems, the holistic ST conceptual framework is well positioned to facilitate comprehensive enquiries into causative factors in a broader setting range. Therefore, a systems-based lens was employed to support the Company partner’s ongoing multi-dimensional investigation of their ICS.

Similarly, ST tools can illustrate the structure of the system and how it performs, highlighting factors inside and outside the system that influence outcomes. As illustrated in Figure 6, the paradigms of ST are intrinsically connected and demonstrate the degrees of conceptual overlap between the theoretical underpinnings, core interrelationships and effect of the application of ST. The distinctive conceptions represent ideas and events that are described in the literature as understandings and ideas of systems-based intervention.

Figure 6: Paradigms of systems thinking



## 3.3 LEVELS OF A SYSTEM

Systems may be viewed as hierarchical, with government legislations and policies, as well as the economic situation, influencing at a national, macro level. Equally, economic factors can shape local organisations and community services at the subsequent meso level. Other meso level influencers are the implementation of local policies and the provision of effective support and guidance. Similarly, systems can be affected by the actions and behaviours of individuals involved in the delivery of services at a micro level, such as self-directed behaviours to ensure services needed are accessed and delivered. Therefore, in order to evaluate the performance of a system, understanding how the system’s components behave is central to appraising outcomes and knowing where to intervene to address identified issues and minimise unintended consequences.

In keeping with the challenge of an increasing population of citizens with complex care and support needs, an example of an unplanned outcome is that as the boundaries of health and social care systems are more difficult to define, implementing and evaluating social and public health policies is problematic for evidence-informed decision-making for the whole care process (Dobbins *et al*, 2018). Similarly, an example of an unintended consequence of ICS provision is that while health funding has a focus on the provision of critical care in hospitals, community services can consequently be under financed. As a result, the implementation of early and preventataive interventions can be ineffective.

Figure 7: Levels at which systems operate

Integrated care is similarly comprised of interconnected, interdependent parts. Integrated systems can constitute small, local organisations, or national and global systems. Therefore, understanding how a system functions as a whole is dependent upon understanding and interpreting the system’s adaptive behaviours at their various levels of operation. Subsequently, the analysis of processes and behaviours within whole systems can also be developed to acknowledge at what level the action occurred, in order to implement change strategies. In line with this perspective, the broken boundary lines in Figure 7 depict the component levels of a system and illustrate that they cannot be separated from their broader context.

## 3.4 POSITIONING SYSTEMS THINKING

The middle of the 20th century saw a shift in the scientific investigation of how systems were organised with the founding of general systems theory by Ludwig von Bertalanffy [1901-1972]. Perceptions of a system progressed from the traditional reductionist view which reduced a system to its separate components for analysis, to a more holistic method that considered the relationships and boundaries of a system as being important influences (Arnold & Wade, 2015). ST’s principles of organisation appealed to other fields of study as it enables purposeful exploration of activities in a system, with key contributions from W. Ross Ashby [1903-1972]. Ashby was a pioneer in cybernetics and the pertinence of ST was extended to studying the limitations and possibilities of the structure of systems as a whole (Adams *et al*, 2013).

Explorations considered the interconnection of processes, such as feedback and the system’s ability to self-regulate and adapt (ibid). Further contributions in the field of cybernetics were made by Professor Jay Forrester [1918-2016], a pioneering systems thinker who introduced the use of a digital computer simulation model to forecast non-linear behaviours of processes using various graphs and diagrams, thereby founding an approach known as system dynamics [SD][[16]](#footnote-16). The approach uses diagrams to analyse the feedback of data and digitally map circular causality relationships to visualise phenomena of interest. In this context, Forrester is cited in the literature as the pioneer of ST, although this term was conceived later in 1987 by another key systems thinker called Barry Richmond.

Table 2: Key development of systems thinking

| Influence | Contributor(s) |
| --- | --- |
| *General Systems Theory* | Ludwig von Bertlanffy [1901-1972] |
| Diffusion of Systems Theory | W. Ross Ashby [1903-1972] |
| Transference to *Cybernetics* = *System Dynamics Approach (1956)* | Prof J Forrester [1918-2016] |
| Evolution of Systems Thinking in *general management* | Peter Checkland [born 1930], Russel Ackoff [1919-2009], Stafford Beer [1926-2002] |
| Division of systems into *Hard* and *Soft Models* | Peter Checkland [born 1930] |
| *Soft Systems Methodology*: action research, intended for management problem solving | Peter Checkland [born 1930] |
| Transference to *Operational Research* | Stafford Beer [1926-2002] |
| Operationalisation of *Soft Systems Methodology* | Peter Senge [born 1947] |
| *Stakeholder Concept* in management literature | R.E. Freeman (in 1999) |
| Conception of the term *Systems Thinking* | Barry Richmond (in1987) |
| Other leading Systems Thinkers | C. West Churchman [1913-2004], David P Stroh [born 1950]; Donella Meadows [ 1941-2001] |
| Combination of Systems Theory + Intervention Theory= *The Vanguard Method* | John Seddon [born 1952]. The approach targets changing management thinking in organisations |
| Publication of *The Fifth Discipline* (1990) | A seminal book to empower systems thinkers to collectively develop learning organisations by Peter Senge [born 1947] |
| Publication of *The Fifth Discipline* [2nd Ed] (2006) | Senge’s second edition of his seminal book |

During the latter half of the 20th century, evolving conceptions of systems theory provided a platform for advancing interest in the behaviours of a system and for the diffusion of ST into other fields, such as general management, by prominent scholars such as Peter Checkland [born 1930], Russel Ackoff [1919-2009] and Stafford Beer [1926-2002] (Reynolds & Holwell, 2010). Checkland modified the *hard systems* approach to examining problems that used technological and quantitative methods, by developing the SSM for exploring difficulties in management. The approach was transferred directly to operational research by Beer as a method to aid policy decisions. Similarly, Ackoff was a key systems thinker and employed the approach for involving stakeholders in investigations in his contributions to operations research (Table 2). Although this is not an exhaustive list of all those who have prominence in this field, their collective influences have received world-wide recognition in the literature.

## 3.5 THE LANGUAGE OF SYSTEMS THINKING

ST uses a specific vocabulary to refer to the characteristics of systems. Its accompanying language communicates the complexities and intricate relationships within a system, by describing the influences on a systems’ behaviour over time to explain its performance (Arnold & Wade, 2015).

Table 3: The key language of systems thinking

| Terminology | Definition |
| --- | --- |
| Hard and Soft Systems | A hard systems approach uses scientific methods that are systematic and objective, commonly using systems engineering methods to design, construct and evaluate a problem; a soft system approach uses stakeholder’s opinions and insights to interpret a problem, using Checkland’s methodology; both approaches map processes within an organisation to promote greater understanding of their complexities. |
| Stakeholders | Included in ST interventions to achieve a representative perception of the whole system. The term refers to the whole range of people who commission, provide, deliver and receive services. |
| Causal thinking | Causal thinking is a key concept that examines internal and external cause and effect relationships. |
| Adaption and feedback | A concept that considers a system’s ability to respond to its environment. |
| Unintended consequences | These behaviours are not planned and are not purposely generated. They are a result of the system adapting to new contexts or interventions. |
| Failure demand | A term used in the Vanguard Method. The term refers to something that has not been done right for the citizen during service delivery. |
| Waste demand | A term used in the Vanguard Method. It refers to something that is not done correctly in a process of providing a service; for example, time spent on resolving a ‘man-made’ problem, such as operational issues caused by human error. |
| *Value demand* | A Vanguard term used to define demand which is a normal part of providing the service and is wanted by the organisation. |
| *Non-linearity* | In ST, the non-linear processes within a system are viewed as *cause and effect behaviours*, illustrated using circular maps to depict mutually contributing influences. |
| *Dynamic behaviour* | The interconnections and influences that form feedback loops within a system. |
| *Leverage Points* | An entry point within a system [for policymakers and leadership initiatives] where operational or policy intervention can target a specific part of the process. |
| *Command and Control* | A ‘top-down’ managerial approach to service delivery, which considers meeting organisational targets as a priority, rather than meeting the citizen’s needs. The Vanguard Method looks beyond traditional management thinking by studying the demand for health and care services. |

## 3.6 THE TOOLS OF SYSTEMS THINKING

Various tools are used to analyse the different components of systems in their dynamic context. Analyses can scrutinise both internal and external factors involved in a problem and ‘visualise’ the ways in which a system responds to complex interrelations or interventions (Adams *et al*, 2013). Peters (2014) asserts that the framework of ST offers some tools that can be applied in research projects. For example, systems dynamic modelling continues to be a popular tool to illustrate the unintended consequences of policy interventions and for examining their feasibility in primary healthcare services (Semwanga *et* al, 2016; Cepoiu-Martin & Bischak, 2017; Calancie *et al*, 2018). Subsequently, influences that generate positive or negative responses within a system, such as adaption and feedback, can be visualised and understood within their environment (Stroh, 2015). Correspondingly, ST tools can help to understand seemingly chaotic relations between contextual factors and offer a method for identifying and explaining complex organisational problems at local, regional and national (or global) levels of functioning (Wright & Meadows, 2012). The key tools referred to in this thesis are presented in Table 4.

Table 4: Key tools defined

|  |  |
| --- | --- |
| Tool | Function |
| *Causal Loop Diagrams (CLDs)* | Capture dynamic feedback relations, depicted by causal links (arrows) with a positive or negative sign (+ or -) and delays (||) at the arrowheads to illustrate the type of relationships. |
| *Feedback loops/correcting loops* | Together with CLDs, these provide a visual interpretation of a problem using circular bi-directional arrows (to illustrate the inflow and outflow of unintended consequence; can be qualitative diagrams or computer simulated models captured through system dynamics; observes how a factor indirectly influences itself over time. |
| *Behaviour Over Time Graphs (BOTs)* | A data analysis tool used to examine patterns and interrelationships over time, also to build causal theories. |
| *Stocks and Flow Charts* | A systems dynamic tool that is a calculable representation of a system; stocks measure activity in parts of a system at one specific time and flow captures a systems behaviour and what causes them to change. |
| *Causal/Process Maps* | Illustrate the network of multiple causes in order to understand the interactions of different influencing factors in complex systems; can support policy and action plans. |
| *Causal Models* | Represent components (sub-systems) and their relationships in a system. These models enable decision makers to analyse the impacts of their decisions. |

Adapted from: <https://thesystemsthinker.com> (2018)

## 3.7 SYSTEMS THINKING AND HEALTHCARE KNOWLEDGE

ST has been discussed in healthcare literature at national and international levels. Empirical research has contributed a wealth of knowledge about a systems approach to healthcare design, drawing on practical and theoretical applications of ST as well as technological approaches, where computer-generated data can provide a basis for predicting the behaviour of a system and *simulating* projected results. Together, research has developed understandings of ST by strengthening its aptitude for exploring the complexities of health systems, through illustrating the economic, political and social environments to achieve system levels of analyses and intervention. In the same way, research can contribute knowledge and insights to inform organisations regarding decision-making for policy development and implementation.

Research in public healthcare has applied the principles of ST to structure intervention approaches and accomplish a systematic exploration of specific areas of enquiry. An early example of this is policy and practice research, in which systems science was employed to investigate behavioural and public health challenges in the field of tobacco control and prevention by ISIS[[17]](#footnote-17). In this study, the researchers harnessed the forward-thinking field of systems engineering to propose a framework for implementing ST in tobacco control and public health. Crucially, the application of ST enabled a focus on the dynamic interconnections between people and processes through positioning tobacco use as a *complex problem*, thereby applying the concept of CAS to the tobacco system (NCI, 2007). However, while discussion of research outcomes asserted that systems methodologies facilitated ‘the translation of science into practice’ (ibid, p5), further research of the application of ST in this area of public health was not retrieved in the systematic review. Therefore, further research is needed to develop knowledge of integrated healthcare and the application of ST approaches in public health (Royal Academy of Engineering, 2017; Bovaird *et al*, 2014).

### 3.7.1 Adopting a Critical Approach to Thinking in Systems

In the field of ST, reviewing a system’s ability to function effectively incorporate approaches that apply a critical lens to examine operational ‘symptoms’ (Campbell, 2016). While systems approaches are frequently complemented by theory-driven interventions, the founding theoretical conceptions of ST by pioneers such as Ackoff and Churchman have evolved. In response to dynamic changes in Health and Social care, the development of ST has appreciated the relationship between theory and practice and has contributed approaches to explore and evaluate systems from a perspective of supporting principles of best practice (Burns, 2015).

Areas of research in which context is essential to frame meaningful investigation can benefit from ST approaches (Novani & Mayangsari, 2017; Dunne, 2015; Flood, 1990). As such, it is the analysis of a system’s environment that aligns with the *whole system* assumption of ST; of building a learning system (Novani & Mayangsari, 2017). In searching for new understandings and knowledge of causalities, research in Public Services also employs approaches that combine ideologies of Social Theory with principles of systems-based theories and methodologies, such as Critical Systems Thinking [CST] and Operational Research [OR].

As a branch of ST, CST perceives a system as “an abstract organising structure” requiring investigations that provide insightful information about situations (Flood, 1990; p51). For this reason, CST shares ideas of fostering critical thinking skills and learning through analytical inquiries of complicated situations (Dunne, 2015). Literature often includes discussions of the application of the analytical framework to explore a system’s boundaries, where context is essential to promote critical thinking and enhance the problem-solving skills of its stakeholders. Equally, the interconnected concepts of CST and ST can be viewed as aligning in their recognition of ‘*criticality*’; dynamics requiring analysis in the quest for truth and continuous learning (ibid).

Subsequently, research makes use of systems methodologies to generate data that is a holistic representation of context-bound problems (Dunne, 2015). In line with the process-orientated approach of Soft Systems Methodology [SSM], research can utilise systems concepts to examine relationships and causalities. Equally, participants provide a multi-perspective approach through sharing evidence, experiences and crucially, facilitating learning from knowledge gained (Novani & Mayangsari, 2017).

In line with the viewpoint of organisations as social systems, OR commonly employs the analytical methods of SSM and theoretical principles of Social theory to examine complex dynamics and identify levels of impact in social organisations (Ulrich, 2012). Original conceptions of OR also align with principles of SSM, with analyses of a system’s behaviour providing discrete data sets to inform a whole-system perspective of professional practice (Meyer *et* al, 2012). However, Ulrich (2012) argues that traditional practice of operational research as a ‘scientific tool’ uses quantitative techniques to measure outputs, yet falls short in capturing ‘the nature of professional practice’ (ibid, p1229); this is where it connects with the principles of SSM.

Similarly, the evolution of systems methodologies has drawn on Hard Systems Methodology [HSM] to provide quantitative data to evaluate and measure the success of interventions or effectiveness of policy intervention[s]. In OR, the application of critical ST in empirical inquiries has connections with another theory-driven discipline known as Action Research (AR), although not typically quantitative in nature. AR is an empirical approach that is also referred to as Participatory Action Research (Flood, 2010; Burns, 2015). The systems-orientated approach to examining organisational change draws on the analytic framework of ST to identify *leverage points* in a system, such as freeing up capacity to manage operational demands (Flood, 2010). Through a continuous process of measuring processes of change, appraisal of improvements, establishing shared visions and knowledge through critical reflection of practice can be built (Burns, 2015). Equally, appraisal of situation based and context specific phenomena in social systems can inform organisations that practice health and social care social research of the effectiveness of policy or operational intervention (Ulrich, 2012).

## 3.8 ENHANCING SYSTEMS THINKING

A thematic series of the application of ST in health in low- and middle-income countries by Taghreed (2014) answered an earlier plea for further research in this field by Best and Holmes (2010) and a systematic review of systems science literature by Carey *et al* (2015) has responded to Taghreed’s aim to encourage further research in the field of public health. Review findings indicated that systems methodologies were not being employed fully and that a majority of the papers were ‘calls for action’ (ibid, p4). Further analysis of the categories drew attention to areas in which systems science may improve public health intervention. However, as a large number of the papers discussing the application of ST focus on initiatives that are taking place at a national and international level, it can be problematic to evaluate its effectiveness as a framework for exploring more discreet, organisation-focused interventions.

As understandings of integrated care continue to be informed by research and practice, there is a need to maintain the drive for research that addresses the apparent challenges inherent in real life systems as detailed above. The theoretical principles of systems theory can augment the multidisciplinary attributes of integrated care through its tenet of investigating phenomena holistically, to understand and interpret factors that influence a systems performance (Figure 1, chapter 1) (Stroh, 2015). Literature has focused on the importance of understanding how systems work and theoretical contributions have also provided a platform for research to further explore the application of ST’s conceptual framework. Studies have presented evidence that establishes its framework as a starting point to communicate the interrelationships between internal and external variables at different levels in order to identify the root drivers of a system’s behaviour.

At a delivery level, studies have utilised the *tools* of ST to identify and address operational dilemmas (Arnold & Wade, 2015; Kunze *et al*, 2016; Cabrera & Cabrera, 2018). Equally, the application of system thinking approaches in the public, private and non-profit sectors has been championed following assertions of their ability to understand and explain the impact of cause and effect (Kodner & Spreeuwenberg 2002; Billings & Davis, 2016).

Moving on, the integration of ST to healthcare has progressed from theoretical papers to empirical papers presenting primary research findings. Nevertheless, the diffusion of the key principles of ST to integrated health and social care provision remains a somewhat narrow area of focus in applied research (Trochin *et al*, 2006; Billings & Davis, 2016). Further empirical investigation of the fusion of ST and integrated health and social care organisations is needed to enrich our understandings of how best to meet the requirements of adults with complex care and support needs in the 21st century.

## 3.9 STAKEHOLDERS IN SYSTEMS THINKING APPROACHES

The stakeholder concept originated in the Stanford Research Institute [SRI, California, in 1963 and was developed within the strategic planning literature. Later, the stakeholder concept was extended by key systems thinkers, namely Churchman (1968) and Ackoff (1974).

Churchman, who developed systems theory, proposed that systems are social constructs and need to be considered from different viewpoints. Ackoff, who developed a methodology for analysing stakeholders within systems, asserted that collaboration with stakeholders is fundamental for designing systems and unravelling collective problems (Elias & Cavana, 2011). In line with the interactions and relationships component of systems theory (Figure 6) and the stakeholder concept within management literature, the role of stakeholders in ST approaches emerged as fundamental in the problem ‘structuring’ phase of ST intervention (ibid).

Systems thinkers drew on the management literature to further develop the stakeholder concept and propose that stakeholders operate at different levels (Freeman, 1984). The first level, termed ‘rational’, was divided into two distinct dimensions and pertained to the stakeholder’s interest or stake and to ideas of power. The second level was termed the ‘process’ level and necessitates an understanding of how the organisation directly or indirectly oversees its relationships with its stakeholders and whether this aligns with the rational stakeholder map. At the third ‘transactional’ level, a similar understanding of the interconnections between the organisation and the stakeholder is required to connect the stakeholder map and organisational processes (ibid). The importance of stakeholder participation in ST is continually echoed within literature reporting the application of ST approaches (Tembo *et* al, 2019; Kunze *et al*, 2015; Willis *et al*, 2014).

This was evident in an early research paper by Bosch *et al* (2007) in which a series of case studies demonstrated that knowledge from stakeholders had provided valuable insights on factors that were influencing natural resource management problems. In doing so, the conceptual framework of ST had fostered participatory research methods that enabled stakeholders to express and communicate understandings of their management system. The framework also recognised different levels of connections to other stakeholders and valued their insights and sometimes divergent views on identified problems. In addition, the framework facilitated knowledge sharing to capture tree density data and achieve outcomes that depended on this information, such as data that was collected from stakeholder interviews (ibid). Therefore, by utilising this framework stakeholders can provide knowledge of how systems interact, rather than how the systems perform individually. Likewise, a later research paper by Elias & Cavana (2011) reiterated the participatory role of stakeholders in ST in helping to understand the evolving dynamics within a social context.

Similarly, the importance of involving stakeholders in a systems approach can be seen in system dynamics, where systems modelling methodologies incorporate the views of different stakeholders to support designing balanced and appropriate services. By assimilating concepts generated from stakeholders experiences, the ‘system designers’ can integrate knowledge gained regarding unintended consequences and thereby redesign services to meet the needs of stakeholders and improve the system’s performance (Pourdehnad*et al*, 2018).

## 3.10 SYSTEMS THINKING AND SYSTEM CHANGE

A common goal shared by researchers in literature reporting on the application of ST approaches is the achievement of systems level change (Stroh, 2015). Owing to knowledge gained from narratives of ST theories and tools, research presents themes relating to behaviours or actions at different levels that can serve to build learning systems. This can be accomplished through gaining a greater understanding of both the interrelations that generate complex problems and the interconnections that sustain the phenomena of interest. Where complex relationships within systems produce changes that create new outcomes, intervention can foster new forms of observable effects and simulate both research and participants’ reflective practice. As such, a common focus in the literature is dynamic behaviours that can influence a system.

While the literature does not offer an explicit definition of this term of reference, it is customarily used within a context of actions are defined as *barriers* and *enablers*. Activities or procedures that serve to facilitate or obstruct a change in a system are commonly situated in discussions of factors that influence organisational and operational performance (Moore, 2019; Maruthappu *et al*, 2015; Rouse *et al*, 2012).

In ST approaches, effective leadership is not attributed to one leader who directly manages the system, but rather a holistic approach encourages staff and stakeholders to adopt leadership roles across the system in an attempt to improve a difficult situation through seeking alternative ways of working (De Brun *et al*, 2019). For this reason, strategic leadership intervention considers ‘front-runners’ as part of a complex system that is continually changing and that outcomes are connected to team performance as a whole (ibid). Certainly, empowering citizen participation in the design and delivery of integrated care services through being involved in the policy process can foster goal-directed activity (Nosil *et al*, 2018). As a result, such purposeful intervention will *enable* the citizen and their family to be pro-active in the management of their care

In healthcare systems, ST approaches are frequently presented as having evolved from the systems theory of change and focus on the dynamic interconnections between people, processes and technology, such as, IT systems. Literature frequently describes healthcare systems as fragmented, where efforts to resolve complex issues have often led to unintended consequences (Oliver *et al*, 2019). Hence, consideration of leadership approaches in this setting describes where roles and responsibilities are shared or distributed to address local problems. In keeping with healthcare systems being situated in complexity, the concept of leadership in systems science was extended to ICS in a paper by Timmins (2015). The authors’ proposed that a Complex Adaptive Systems (CAS) approach could provide managers of integrated care organisations with a different way of thinking that could encourage more cohesive health and social care systems. Subsequently, a CAS approach was championed as a mechanism for modernising traditional approaches to operational management in ICSs through the inclusion of stakeholder networks (ibid). Albeit the literature reviewed explicitly informed the application of systems thinking approaches, the World Health Organisation [WHO] offer an alternative framework to examine person-centred multidimensional services in ICSs[[18]](#footnote-18), that incorporates the provision of effective, equitable and high-quality health services (WHO, 2021).

## 3.11 CHAPTER SUMMARY

In setting the scene, the chapter has argued that applying ST approaches can improve organisational design and provide a valuable basis for organisational change. This chapter has introduced ST and its conceptual framework. In addition, consideration has been given to the contributions of pioneering system thinkers, with seminal literature serving as building blocks for positioning health, social care and public services within their dynamic and influential environments. This chapter has also offered an overview of the range of theories that overlap and merge with ST. Chapter 4 explains the processes of the systematic review of the literature that were established by the review protocol. The chapter details each level of inquiry and discusses the synthesis of the literature.

# Chapter 4: The Systematic Review Protocol

## 4.1 INTRODUCTION

This chapter describes the protocol for the systematic review of the literature (Appendix 1). Following an explanation of the preparatory work that guided the development of the review protocol, this chapter describes each stage of the review process. Informed by the protocol, the identification and retrieval of literature that met the criteria for inclusion are detailed in compliance with the PRISMA reporting guidelines. In doing so, its methodological guidance presented an ethical framework to support objective decision-making and eliminate any potential bias at each stage, from the foundational search strategy to the synthesis of included data.

### 4.1.1 Ethics

Although the Company partner has utilised the Vanguard Method to address operational challenges within its ICS, the systematic review included literature reporting on a broader application of ST approaches that could inform the development of integrated care services for adults with complex care and support needs. All the literature retrieved and reviewed was in the public domain and accessible to non-academic individuals and the references were provided in the Knowledge Exchange event organised to inform the Company partner of the review implications and learning points, together with the insights of the ‘end users’ in the context of utilising the review findings to address their identified need.

## 4.2 THE PREPARATORY STAGE

This research was a KESS 2 funded project, hence the parameters of the area of inquiry were devised in collaboration between the primary supervisor and the Company partner. A systematic review had been identified as the appropriate method of enquiry to address the project:

*The Application of Systems Thinking Approaches to the Development of Integrated Care Services for Adults with Complex Care Needs: A Systematic Review*

The protocol was developed collaboratively with the Company partner, specifying the review question, and documenting each stage of the search process to be completed, including the methods employed to identify, retrieve, analyse and synthesise the data. At this early stage, the support of the academic librarian was sought to navigate various databases and consider potentially relevant search terms. The electronic databases ASSIA, CINAHL and ProQuest Social Sciences Premium Collection were recommended by the academic librarian for their suitability to provide a broad range of literature in the areas of health, social care and other public services, such as education.

The initial focus was to construct a well-formulated research question that would address the area of inquiry. The framework provided by SPICE was used to frame the research question, as shown in Figure 1. The acronym stands for Setting (where?), Perspective (for whom?), Intervention (what?), Comparison (compared with what?) and Evaluation (with what result?); its framework offered the structure for formulating a focused question to locate evidence in existing research (Booth, 2016). Therefore, the initial piece of work involved formulating and refining the systematic review question (based on the area of inquiry in the KESS 2 application). The agreed review question was:

*“What transferable lessons are there from using systems thinking approaches**in health, social care and public services to develop leading integrated care services**for adults?”*

Figure 8: Framing the research question

|  |  |
| --- | --- |
| **S** | Public, health or social care services (to include statutory and independent sectors) |
| **P** | All key stakeholder perspectives (Adults over 18 years of age: Staff- including managers and commissioners and People accessing services, as well as family and carers) |
| **I** | Systems Thinking |
| **C** | Any or none (use of ST approaches) |
| **E** | Qualitative, quantitative, and mixed methods |

## 4.3 THE METHODOLOGICAL APPROACH

The methodological approach to undertake a systematic review of literature evidencing the application of ST approaches. The research project tasks were mapped onto a milestone [Gant] chart and time was allocated for each stage of the review process to provide a point of reference throughout the research journey (Appendix 2).

### 4.3.1 The Systematic Review

There are now standardised methods for completing systematic reviews (Moher *et al*, 2015; Booth *et al*, 2016). Fundamentally, the objective of a systematic review is to address a research question (s) through the identification, critical evaluation and integration of the best available evidence (Gough, 2016). This review implemented standardised procedures and conformed to conventional benchmarks to ensure that all the processes were systematic, transparent and replicable, thereby enabling other researchers to replicate the review and update the findings (Presthus & Munkvold, 2016).

### 4.3.2 Search Strategy

A systematic approach was used for the identification of relevant literature, in line with PRISMA guiding principles[[19]](#footnote-19). The three databases were searched on 26.02.19 with the support of the academic librarian to find relevant studies and initial searches were run with key words that captured the area of inquiry (Table 5). The SPICE framework guided the selection of keywords that captured all important elements in the research question. The key elements are highlighted in the review question below:

*“What transferable lessons are there from using* ***systems thinking approaches*** **(Search term cluster 1)** in ***health, social care and public services* (Search term cluster 2)** *to develop* *leading* ***integrated care services*** **(Search term cluster 3)** *for adults?*

Table 5: Search strings

|  |  |
| --- | --- |
| **Search Term Cluster** | **Keywords** |
| 1 | “Systems Thinking” OR “Systems Theor\*” OR “Systems Science” OR “Systemic Interrelation\*” OR “System dynamics” OR “Feedback Loop\*” OR “Causal Loop Diagram\*” OR “Complex Systems Diagram\*” OR “Leverage Point\*” |
| **2** | “Health care” OR “Social care” OR “Public service\*” OR “Public sector\*” OR “Systems governance” OR “Service Development” OR “Service Organisation” OR “Service delivery” |
| **3** | “Integrated care provision\*” OR “Integrated Health” OR “Collaborative care” OR “Coordinated care” OR “Comprehensive care” OR “Seamless care” |

Searches were built by linking terms that represented the same key question component using the ‘OR’ Boolean operator as illustrated above to create a search string (Table 6). The individual searches were then combined using the Boolean operator ‘AND’ and the literature retrieved was evaluated to determine their relevance. The complete search strategy is provided in Table 6. The literature was screened by title first and then by abstract; literature that appeared to be eligible were then selected for full-text screening. Throughout the review process, all the retrievals were managed using RefWorks to store the search retrievals and a PRISMA statement flowchart was prepared to illustrate how the screening process was applied and recorded (Figure 9).

Table 6: Database search strategy

|  |  |
| --- | --- |
| **Search String ID** | **Keywords in Search Term Clusters** |
| S1 | Cluster 1 |
| S2 | Cluster 2 |
| S3 | Cluster 3 |
| S4 | S1 AND S2 |

### 4.3.3 Selecting the Search Parameters

Initial database searches retrieved many research papers that narrated the application of ST through a theoretical lens, but did not report on primary data. However, these papers provided a wealth of information that was used to provide background knowledge and situate ST within the research context. Additionally, other studies presented ST research as a form of methodology to investigate the complexities of healthcare systems.

This standpoint offered a platform for later considerations. It was determined that the terms “systems”; “systems thinking” and “systems governance” had generated many irrelevant retrievals as these terms located papers about health and social care systems as well as ST approaches. To address this, searches using the Web of Knowledge database were removed and the database was replaced with ProQuest Social Sciences Premium Collection. This database located much more relevant literature and subsequently, all searches were re-run and the prepared PRISMA flowchart amended. In contrast, other search terms were omitted as they retrieved low numbers of papers; for example, ‘adult services’. No date restrictions were applied to the searches as a manageable amount of literature was retrieved, so date restrictions were not necessary. The reason behind this decision was that the empirical application of ST in research had evolved and that earlier literature may well provide transferable lessons across service settings.

Consideration was also given to the large number of papers that were excluded at the stage of full text screening. For many of these, the decision not to include the studies was uncomplicated by adhering to the inclusion and exclusion criteria, however, there were several studies that I was unsure about the eligibility of the data reported and required the support of my supervisors to establish this.

### 4.3.4 Inclusion and Exclusion Criteria

As previously reported, no restrictions were placed on publication dates. Included studies were explicitly those that provided empirical evidence to inform the review question. Primary data was determined as data that had been collected by a researcher and had derived from a primary source during the research process; for example, interviews and observations. The inclusion and exclusion of studies was achieved by screening literature against the following criteria, recorded using RefWorks and reported in the PRISMA flowchart (Figure 9).

* **Inclusion** **criteria:**
  + English Language
  + Literature reporting on the application of ST approaches in health, social care and public services
  + Literature reporting primary data
  + Qualitative, quantitative, and mixed methods studies
  + Peer reviewed articles and UK/International Conference and Government papers
* **Exclusion criteria:**
  + Non-English Language
  + Literature not containing any primary data (opinion/theoretical papers)

### 4.3.5 Data Extraction

A data extraction form was created to capture information relevant to the review question, in line with proposed guidelines for systematic reviews (Higgins & Thomas, 2020). The extraction form provided the contextual details of each study. For instance, the study’s theoretical foundation, the practice of ST approaches, the methodology used and outcome measures employed (Appendix 4).

### 4.3.6 Quality Appraisal

The quality of the included studies was assessed using appropriate assessment frameworks. The Critical Appraisal Skills Programme (CASP) qualitative tool was used to assess qualitative research papers and the Mixed Methods Appraisal Tool (MMAT) was used to assess mixed methods papers; no purely quantitative papers met the criteria for inclusion in the review. These appraisal tools comprised checklists of criteria that indicate the overall quality of the reported research evidence and include an assessment of trustworthiness, relevance and validity. An advantage of using standardised appraisal tools is that a level of consistency may be applied during the review of studies, thereby advancing transparency (Hart, 1998). To enable comparisons across all the included studies, a value of 1 was assigned for each criterion considered met; a ½ value for criterion partially met and a 0 value for criterion not met. Thus, the total values assigned reflected the combined number of criteria met, partially met or not met; a higher value indicated research evidence of higher relevance and quality (Higgins and Thomas, 2019).

### 4.3.7 Data Synthesis

Following appraisal, narrative synthesis of the included studies drew on guidelines for systematically interpreting the data to construct themes that framed the transferable lessons for developing integrated care services for adults with complex care and support needs (Ryan, 2013). A narrative synthesis approach to the ‘methodical examination’ and ‘systematic breaking down’ of the included studies was utilised to summarise and describe the findings (Hart, 1998). The narrative approach employed for the synthesis focused on the factors that had influenced the performance of a system when a ST approach had been applied. The effects of applying a ST approach were subsequently evaluated and findings from the complex interventions and outcomes compared and contrasted. Subsequently, the themes were distilled into transferable lessons for applying ST approaches to ICSs. The data synthesis provided a basis for later discussion of the themes and transferable lessons as research-based evidence (Gough, 2016).

## 4.4 CHAPTER SUMMARY

This chapter presented the systematic review protocol and described the methodological processes followed for conducting the systematic review of the literature. The clear description provided of each stage of the review process has aimed to promote transparency and replicability. The preparatory steps detailed in the creation of the review protocol were fundamental to building the appropriate search strategy and retrieving relevant literature. How the parameters of the search were selected has been discussed, as well as how the findings were synthesised and transferable lessons discerned. Chapter 5 informs the findings from the systematic review. Analyses of the included studies are organised to structure discussion of the emergent themes and their significance within the ST approaches.

# Chapter 5: The Systematic Review Findings

## 5.1. INTRODUCTION

This chapter presents the findings from the systematic review. It provides an overview of the characteristics of the included studies and then describes the emergent key themes.

## 5.2 SEARCH RESULTS

The literature search retrieved a total of 1,030 articles, comprising empirical and theoretical applications of ST, secondary research studies and policy papers (Figure 9). After preliminary screening and the removal of 288 duplicate papers, 742 articles were selected for title and abstract screening. Subsequently, a further 716 were rejected when the exclusion criteria were applied, with 26 research papers selected for full text screening. In the final stage of the review, 20 studies met all the criteria for inclusion and were eligible for further analysis. Each stage of the review process was recorded and entered in the PRISMA flow diagram.

## 5.3 OVERVIEW OF STUDY CHARACTERISTICS

A total of 20 papers were included in the review; of these, 17 studies were situated in health services and three in the public education sector, two of these were carried out in school education systems (Dunnion & O’Donovan, 2014; Evans *et al*, 2016) and one in the higher education sector (Cavana *et al*, 2007). The publication dates of the studies spanned twelve years and ranged from 2007 to 2019. Eleven studies derived from a series of international studies published by Taghreed Adam in 2014. The included studies were conducted in the USA (Fowler *et al*, 2019; Gamble *et al*, 2019); Asia (Blanchet *et al*, 2014; Malik *et al*, 2014; Prashanth *et al*, 2014; Sarriot *et al*, 2014; Varghese *et al*, 2014; Zhang, 2014); Australia (Biggs, 2014; Evans *et al*, 2016; Wutzke *et al*, 2017); the UK (Dunnion & O’Donovan, 2014); Africa (Agyepong *et al*, 2014; Gilson *et al*, 2014; Kwamie *et al*, 2014; Mutale *et al*, 2017; Paina *et al*, 2014; Rwashana Semwanga, *et al*, 2014); New Zealand (Cavana *et al*, 2007) and Fuji (Waqa *et al*, 2017). All the studies involved the collection of primary data from stakeholder interviews and observations. Five of the included studies used a mix of qualitative and quantitative research methods (Agyepong *et al*, 2014; Fowler *et al*, 2019; Prashanth *et al*, 2014; Rwashana Semwanga, *et al*, 2014; Wutzke *et al*, 2017) and the remaining fifteen used a qualitative research approach; none of the included papers employed a purely quantitative design to gather primary research data.

Figure 9: PRISMA flow diagram

***Database searches:***

ProQuest Social Science Premium Collection (*n* =435), ASSIA (*n* = 302), CINAHL (*n* =293)

Total combined retrievals = **1, 030**

**Identification**

***Number of duplicates removed:***

***(****n* = 288)

Total papers for title/abstract screening *=* **742**

**Title and Abstract screening:**

Non-English literature (*n* = 17); The application of systems thinking approaches was not in health, social and public services (*n* = 590); Studies that did not contain any primary data (opinion/theoretical papers) (*n* = 109)

**Screening**

**Full text screening:**

Total studies for full text screening (UK: 1; International: 25)

(*n* = **26)**

**Papers excluded:**

Studies that did not provide any primary data, e.g. simulated performance data

(*n*= **6)**

**Eligibility**

**Included literature:**

Studies that met the inclusion criteria

(*n*= **20)**

**Included**

An overarching finding was that although there was a distinction between *hard* and *soft* systems in seminal literature, no explicit reference was made to the discreet systems methods employed in the included studies. Nevertheless, their alignment with these different areas of focus is illustrated in Figure 10. As shown, the majority of methods used are comparable to the SSM and the remaining five papers reported methods that corresponded to a HSM (Agyepong *et al*, 2014; Fowler *et al*, 2019; Prashanth *et al*, 2014; Rwashana Semwanga *et al*, 2014; Wutzke *et al*, 2017). A further finding was that of the 20 eligible papers, only the paper by Biggs *et al* (2014) did not contain any explicit theoretical statements. It was further identified that ST was used as a methodological resource, to provide a pragmatic framework to investigate recognised challenges in operational processes in health systems. Similarly, of note was that only one of the studies was British (Dunnion & O’Donovan, 2014) and the remaining papers were international. All the included papers reported on the ways in which the tools of ST recognised and examined complex problems. As such, this body of evidence offered a basis on which to formulate lessons for the development and delivery of integrated care services for adults with complex care and support needs.

Figure 10: Differentiating the systems methods

## 5.4 ANALYTICAL LENS

Systems Theory was the leading theoretical lens that framed the included studies. A common theme was that the critical perspective of complex systems was presented as a parallel lens to the analytical framework of ST. Although three of the papers did not report an explicit theoretical standpoint (Biggs *et al*, 2014; Blanchet *et al*, 2014; Wutzke *et al*, 2017), all the authors applied concepts of ST to investigate identified phenomena within everyday organisational processes, such as behaviour and performance. One paper reported using the ST approach known as the Vanguard Method (Seddon, 2008) in an education system to identify Failure Demand (Dunnion & O’Donovan, 2014). A complex systems approach was applied in two papers to identify underlying dynamics and facilitate sustainable systems level change (Rwashana Semwanga *et al*, 2014; Fowler *et al*, 2019). The authors of seven of the studies situated in health organisations approached their research from a CAS perspective (Agyepong *et al*, 2014; Gilson *et al*, 2014; Kwamie *et al*, 2014; Malik *et al*, 2014; Sarriot *et al*, 2014; Varghese *et al*, 2014; Zhang *et al*, 2014); of these, two studies used mapping to illustrate and explain processes through a systems lens (Gilson *et al*, 2014; Prashanth *et al*, 2014) and three broadened ideas of mapping using causal diagrams to explain the intersection of processes and interactions that emerged from feedback mechanisms (Agyepong *et al*, 2014; Kwamie *et al*, 2014; Varghese *et al*, 2014).Two of the papers extended this focus by using qualitative system dynamics modelling to view interdependent feedback effects in systems and understand identified problems (Fowler *et al*, 2019; Gamble *et al*, 2019). The analytical elements of the approaches used are illustrated in Figure 11.

Figure 11: Framing the evidence

### 5.4.1 Application of Systems Thinking Approaches

Several of the papers extended the application of ST’s conceptual framework. The interactions of clinicians and key stakeholders were mapped using an approach known as Social Network Analysis, to create a network structure to illustrate the pattern of relationships between them (Malik *et al*, 2014). Similarly, the Sustainability Analysis Process was used as an analytical tool to understand the interactions between people and the system and supplemented the key principles of ST (Blanchet *et al*, 2014). Another approach known as the Sustainability Framework was used to assess systems sustainability and frame whole systems change (Sarriot *et al*, 2014). Analysis of processes in the remaining papers also evidenced combining ST approaches with other theoretical lenses. The complementary methods used were Programme Theory (Prashanth *et al*, 2014) to understand how the studied healthcare interventions worked differently across the rural and urban settings and the programme theory-driven Realist Evaluation lens to identify causal factors and understand their effects (Kwamie *et al*, 2014). A visual summary of the approaches used is provided in Figure 12.

Figure 12: Summary of the systems approaches applied

## 5.5 QUALITY ASSESSMENT

As detailed earlier, appraisal of the quality of the included research papers was completed using appropriate tools. The results of appraising the qualitative studies using the Critical Appraisal Skills Programme (CASP) checklist are detailed in Table 8 and the results of appraising the mixed-methods studies using the Mixed Methods Appraisal Tool (MMAT), version 2018 are detailed in Table 9. Among the qualitative review papers, six studies met all ten quality criteria on the CASP checklist and the remaining nine papers met between six and nine criteria. All the studies reported clear objectives and had an explicit area of inquiry, in line with the title of each paper. Papers that met the majority of the quality criteria obtained a value of 17 and were appraised as higher quality research. Lower quality papers did not clearly report a statement of findings and several did not consider the relationship between the researcher and the participants.

Of the mixed methods papers in the review, one study met all fifteen quality criteria on the MMAT and 14 papers met between 10 and 14 criteria of the criteria. The higher quality papers reported appropriate rationale for the research design and findings were adequately supported the presented data, with the integration of the qualitative and quantitative outcomes sufficiently interpreted. In contrast, papers were appraised as weaker when findings and conclusions did not result from robust quantitative research methods. Similarly, one paper did not adequately address the differences between the qualitative and quantitative results and did not provide an explicit statement regarding how non-response bias was compensated statistically, in accordance with the criteria statement (Wutzke *et al*, 2017). Supplementary tables are provided in Appendix 5 for CASP appraisal and in Appendix 6 for MMAT, against their respective checklist.

## 5.6 OUTCOMES

The papers described changes that resulted from using a ST approach. Most of the outcome measures reported were qualitative, with papers reporting shifts in attitudes and capabilities that increased awareness of operational challenges (Biggs *et al*, 2014; Cavana *et al*, 2007; Evans *et al*, 2016; Gilson *et al*, 2014; Kwamie *et al*, 2014; Malik *et al*, 2014; Mutale *et al*, 2017; Prashanth *et al*, 2014; Rwashana Semwanga *et al*, 2014. Papers that used mixed methods reported qualitative and quantitative outcome measures (Dunnion & O’Donovan, 2014; Paina *et al*, 2014; Varghese *et al*, 2014; Waqa *et al*, 2017). The resulting changes in behaviours following the application of ST approaches are summarised in the first column in Table 7 as outcome statements, which align with the whole-system effect reported in the papers. Following narrative synthesis of the papers, the reported outcomes also correspond to the themes identified.

Table 7: Study outcomes

|  |  |  |  |
| --- | --- | --- | --- |
| **Reported Outcome** | **Author, Year** | **Outcome Measures** | **Corresponding Theme** |
| Empowered decision-making | Gilson *et al*, 2014; Kwamie *et al*, 2014 Malik *et al*, 2014 | Observations, interviews, policy documents and literature review | *Leadership* |
| Long-term system-level intervention | Agyepong *et al*, 2014; Blanchet *et al*, 2014 Fowler *et al*, 2019; Gamble *et al*, 2019; Sarriot *et al*, 2014; Wutzke *et al*, 2017 | Workshops, mental models of the system, performance data and mortality rates | *Sustainability* |
| Efficient organisational re-arrangement | Dunnion & O’Donovan, 2014;  Paina *et al*, 2014;  Varghese *et al*, 2014;  Waqa *et al*, 2017 | Literature review, workshops, and interviews | *Governance* |
| Effective system-wide change | Biggs *et al*, 2014; Cavana *et al*, 2007; Evans *et al*, 2016; Mutale *et al*, 2017 | Interviews, literature reviews and intervention outcomes | *Transformation* |

Table 8: Results of CASP qualitative checklist

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, Year | Clear statement of research aims? | Qualitative methodology appropriate? | Research design appropriate to address aims? | Recruitment strategy appropriate to address aims? | Research data collection appropriate? | Researcher- participant relationship considered? | Ethical issues considered? | Data analysis rigorous? | Clear statement of findings? | Is the research valuable? | Total values assigned (Yes/Can’t tell/ No) |
| Biggs *et al* (2014) | Yes | Yes | Can’t tell | Yes | Yes | No | Yes | Yes | Can’t tell | Can’t tell | 7 ½ /10 |
| Blanchet *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Cavana *et al* (2007) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Dunnion & O’Donovan (2012) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Evans *et al* (2016) | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Yes | Yes | Yes | 9 ½ /10 |
| Gamble *et al* (2019) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Gilson *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Can’t tell | 9 /10 |
| Kwamie *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Yes | Yes | Can’t tell | 9/10 |
| Malik *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Mutale *et al* (2017) | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Yes | Yes | Yes | 9 ½ /10 |
| Paina *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Sarriot *et al* (2014) | Yes | Yes | Can’t tell | Yes | Yes | Can’t tell | Can’t tell | Yes | Yes | Can’t tell | 8/10 |
| Varghese *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 10/10 |
| Waqa *et al* (2017) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Yes | Yes | 9 ½ /10 |
| Zhang *et al* (2014) | Yes | Yes | Yes | Can’t tell | Yes | Can’t tell | Can’t tell | Yes | Yes | Can’t tell | 8/10 |

Table 9: Results of Mixed Methods Appraisal Tool (MMAT), version 2018

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, Year | 1. Qualitative category | | | | | 4. Quantitative descriptive category | | | | | 5. Mixed methods category | | | | | Total values assigned  (Yes/Can’t tell/ No) |
| 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 5.1 | 5.2 | 5.3 | 5.4 | 5.5 |
| Agyepong *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | 14/15 |
| Fowler *et al* (2019) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Can’t tell | Yes | Yes | Yes | No | Can’t tell | 11 ½ /15 |
| Prashanth *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | 15/15 |
| Rwashana Semwanga *et al* (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Can’t tell | Yes | Yes | Yes | Yes | Yes | Yes | 14/15 |
| Wutzke *et al* (2017) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Can’t tell | Yes | Can’t tell | Can’t tell | Yes | Can’t tell | Can’t tell | 12 ½ /15 |

## 5.7 NARRATIVE SYNTHESIS

Narrative synthesis of the included literature generated four themes that were connected by an overarching theme of involving all relevant stakeholders in ST approaches. The literature confirms that in ST approaches, involving all stakeholders is fundamental, consistent with systems theory. Although the themes are presented individually, it was evident that stakeholder participation at a local level was crucial to effecting system level change in each theme. Therefore, each theme can represent changes at individual, local and organisational levels of the system.

Figure 13: The identified themes

### 5.7.1 Leadership

The first theme identified in the synthesis was leadership and three papers provided evidence for this theme (Gilson *et al*, 2014; Kwamie *et al*, 2014; Malik *et al*, 2014). The literature in this category suggested that in ST approaches, leaders do not just direct services but rather adopt an active role in developing and designing the system. Equally, the literature suggested that in ST approaches, the ability to think in terms of a diffuse system of leadership that involves all key stakeholders, be that staff or people engaging with the service, is important to accomplish an agreed collective direction and create a system capable of learning. Certainly, the involvement of staff and people engaging with services were asserted to have been beneficial at a delivery level, in order to connect people with healthcare. In one study, intended outcomes of local policies were met because management opportunities for service delivery and improving provider performance were captured by the ST approach applied (Paina *et al*, 2014). Prospects were identified for private practice in a context of private sector growth, which was provided within public sector facilities. In addition, reflections on outcomes in the studies emphasised the valuable role of using ST conceptions and tools to aid understanding and guide decision-making by providing a ‘visual’ framework of causal relationships. Subsequently, the involvement of the research participants had encouraged stakeholders to ‘lead’ the system through creating a learning system by signposting their search for clinical guidance in the absence of formal policy and governance (Paina *et al*, 2014).

Primarily, approaches to leadership focused on the characteristics of functional district health systems and stakeholders were assigned leadership by experience. Equally, the literature suggests that using a ST approach can produce changes in leadership. Investigations of the practice of impromptu ‘information seeking behaviour’ revealed that the ST approach recognised that creating ‘learning systems’ is central to build on existing expertise and confidence in staff (Malik *et al*, 2014: p75). Findings also determined that the system’s departmental focus on the achieving targets had led to there being insufficient support for clinical guidance, rather than empowering patient care through sharing knowledge (ibid).

In a further example, decision-making processes and responsibilities were determined as effective when managerial roles were shared amongst team members at all levels within the system (Gilson *et al*, 2014). It was asserted that system leaders brought vision and strategy as part of a management and leadership initiative, using causal loop diagrams to inform their decision-making about context-dependent interventions, such as achieving ongoing analyses of challenges to foster a positive work environment (Kwamie *et al*, 2014). Data collected during the introduction of a Continuous Quality Improvement scheme evidenced improved achievement of health outcomes following district health management team building workshops to inspire the way of thinking “Only one person can lead, others follow faithfully” (ibid: p7). In this paper, the complementary use of a realist evaluation study design and ST lens mapped the implementation of a Leadership Development Programme to facilitate district manager problem-solving and decision-making, to enable the researcher focus on ‘problem-solving’ within contexts of organisational relationships and interactions.

Ultimately, the reported processes and interventions to improve services were framed by leadership decision-making within the system. The included studies were situated within a context of organisational challenges, such as legal, workforce and financial constraints and discussion points focused on harnessing the perceptions and insights of stakeholders through stakeholder interviews and observational data. For that reason, using the analytical framework of ST can indicate where strategic, organisational decisions are necessary to maintain complex interventions and determine the achievement of long-term goals, such as operationalising continuous quality improvements.

### 5.7.2 Sustainability

The second theme identified was sustainability and six papers in this category contributed data towards this theme (Agyepong *et al*, 2014; Blanchet *et al*, 2014; Fowler *et al*, 2019; Gamble *et al*, 2019; Sarriot *et al*, 2014; Wutzke *et al*, 2019). All the papers presented ST approaches as a strategic resource to facilitate the design and delivery of sustainable services. In particular, the literature suggests that in ST approaches, sustainability is achieved through understanding that complex systems are continually changing and acknowledging that making changes to the system can produce *unintended* as well as *intended* consequences. This was evident in a paper where causal loop and cause tree diagrams[[20]](#footnote-20) were used to recognise influencing behaviours and develop a qualitative explanatory model. Analysis of the research outcomes were subsequently used to build a theoretical paradigm to aid understanding of the complexities of service supply and incentive behaviours (Agyepong *et al*, 2014). The holistic research model was designed to explore barriers to learning within their organisational context and enable the diffusion of healthcare knowledge to foster the development of shared goals for changes (ibid). Findings evidenced that in a systems approach, relationships within systems can be examined and causal factors identified to ascertain places at which intervention can holistically reform a system and create sustainable services.

Identifying the demands and capacities within the system to explain the dynamics that helped or hindered its performance was achieved using mapping techniques in two papers in this theme (Fowler *et al*, 2019; Sarriot *et al*, 2014). For example, data from screening was used to forecast anticipated levels of need and guide preventative measures for failure demand, through identifying leverage points for policy development (Fowler *et al*, 2019). Similarly, concept mapping was used to identify priority actions for chronic disease prevention (Sarriot *et al*, 2014). In a further example, the effectiveness of intervention was reported as lessons learned from a ST perspective on sustainability (Wutzke *et al*, 2019). The perspective of creating a learning system was also evident where a whole systems approach enabled the ST framework to analyse relationships between internal and external factors, such as the political environment of the system (Blanchet *et al*, 2014). Subsequent analysis of how these evolved over time helped to understand the changing nature of relationships between actors and for their capacity to work together collectively, rather than as a system comprised a sum of actors.

Therefore, the literature suggests that by using the tools of ST to understand non-linear processes and communicate dynamic forces that can impact on services, understandings gained can promote decision-making and planning of long-term, sustainable solutions. For example, the authors viewed certain types of stakeholders as “political actors” and thereby empowered to facilitate policy decision-making at a national level, which would diffuse to policy-making for rehabilitation services at an organisational level (Blanchet *et al*, 2014: p2).

The literature also indicated that understanding the changing nature of a system can inform policy and service delivery by involving stakeholders to identify points of leverage and to design services that will stand the test of time. Additionally, by providing data to inform prevention-orientated policies and national strategies, the effectiveness of preventative interventions was able to be evaluated to support building resilient systems (Fowler *et al*, 2019; Wutzke *et al*, 2017). In a further example, including stakeholders increased the accuracy of causal mapping within a complex organisation (Gamble *et al*, 2019). This approach promoted strategic decision-making to address operational challenges to improve future system performance. For example, stakeholder participation facilitated the identification of potential points of leverage to reduce fragmented services within the system. Respectively, this finding proposes that stakeholder participation in ST approaches is transferable to other public sector organisations where the identification of points of leverage may reduce fragmented services (ibid).

### 5.7.3 Governance

Five of the included papers provided a collective understanding that in a ST approach, governance involves analysis of the operational, managerial and strategic levels of systems (Dunnion & O’Donovan, 2014; Paina *et al* 2014; Varghese *et al*, 2014; Waqa *et al* 2017; Zhang *et al*, 2014). The literature suggests that appropriate governance is an integral part of creating an enabling environment that builds systems level capacity. Additionally, the literature proposes that policy development needs to inform local practice and the achievement of local goals, even when decision-making is directed by national government policies.

This argument was evidenced where findings indicated that the administration of policy and procedures by centralised government had facilitated health system development (Zhang *et al*, 2014). A macro dimension for system level governance was provided by describing clear processes that employed ST. Findings also established that continued adaptions to policies could manage change processes effectively, through moving away from a centrally financed health care system to regional management to improve the performance of the workforce and information system. However, it was acknowledged that national policies need to be flexible to adapt to local health system needs. In a further example, the insights of stakeholders were incorporated through participatory workshops to increase awareness of problems and enhance understandings of the influences that hindered policy development and implementation (Waqa *et al* 2017). Data from workshops was used to create CLDs to illustrate four themes of related variables, thus framing where strategic intervention provided effective local governance provided.

Equally, the literature suggests that systems theory encourages front line staff, such as healthcare practitioners, to be proactive in decision-making at a service delivery level by viewing local health services as part of the entire complex, healthcare system. As such, the participation of healthcare providers in the ST approach is consistent with systems theory. The involvement of healthcare providers was also evident in a paper that reported on the coexisting provision of public and private health care by government health providers, in which workers in the public sector supplemented their salaries by simultaneously providing private healthcare (Paina *et al*, 2014). Findings identified that leadership in public and private healthcare providers emerged through a self-directed local management approach to the ‘dual practice’, where services were predominantly regulated by government.

In this way, the quality and management of health service delivery were governed by national policies that stipulated private healthcare practice was only permitted outside government working hours. Reported findings also demonstrated that dual practice had emerged as an important ‘coping mechanism’ to meet the financial needs of healthcare providers as well as an increasing population demand. Therefore, this paper suggests that a systems thinker who is in a front-line position will self-assign governance to develop local management practices, as shown by the innovative and adaptive behaviours demonstrated by the clinicians (Paina *et al*, 2014).

Similarly, the application of the Vanguard Method (Seddon, 2008) evidenced how ST was used to reframe an administration process in an educational setting (Dunnion & O’Donovan, 2014). This was achieved by modernising and restructuring an existing top-down management approach to support managers to adopt a systems viewpoint and establish a student perspective of services required. Following the reported intervention, one outcome was reduction in the use of a ‘command and control’ management approach to govern administrative functions in the higher education system. This finding was associated with improved teaching and student perspectives of services, as evidenced by evaluating outcomes following redesign of enrolment processes. In a further example, CLDs were used in to understand factors that promoted or opposed the uptake of immunisation services (Varghese *et al*, 2014). As a result of visualising competing phenomena such as non-compliance with routine vaccinations and the socio-economic environment, the ST approach supported the focus on identifying drivers for change to facilitate effective regional governance of immunisation services.

### 5.7.4 Transformation

Six papers provided evidence that the application of ST approaches did indeed change the operation of the entire system, consistent with systems theory (Biggs *et al*, 2014; Cavana *et al*, 2007; Evans *et al*, 2016; Mutale *et al*, 2017; Prashanth *et al*, 2014; Rwashana Semwanga *et al*, 2014). Data illustrated the complex change processes undertaken and explained what did or did not happen within settings. All the studies examined organisational dynamics in their specific environments and evaluated system level gains, having identified levers for change. As such, the ST approaches used to investigate the complexity and influence of different contexts presented a framework that can be generalised to broader public systems. For example, illustrating a system’s feedback mechanisms using CLD’s balancing and reinforcing loops can reveal complex interconnections within a system. In addition, collaboration with stakeholders can support identifying places in a system to implement holistic, action-based strategies.

Similarly, the involvement of all relevant stakeholders was also important in applying an ST approach to effect system transformation. In an educational setting, process mapping was used to monitor the effectiveness of intervention to embed an Education for Sustainability (EfS) programme (Evans *et al*, 2016). Inductive analysis of multi-site workshops, telephone and email conversations captured critical data to develop process changes. Findings demonstrated that using a system-wide approach can facilitate capacity building at multiple levels by identifying or anticipating challenges. Using system-wide mapping had the effect of building the system’s capacity at multiple levels through identifying levers for change to facilitate transformation.

A capacity-building programme also involved stakeholders in a paper situated in a complex healthcare setting to assess system-wide transformation (Prashanth *et al*, 2014). In collaboration with managers and senior nursing staff, the research approach included using a *realist perspective* to synthesise the relationship between intervention, context, and outcome measures of performance. This helped to align the intervention with external influences, such as the social structures of the institutional context, which enabled comprehensive analyses of context-dependent factors to identify opportunities and inform future service development and commissioning (ibid).

Whole system transformation was also demonstrated by using CLDs to recognise leverage points in health systems (Biggs *et al*, 2014; Cavana *et al*, 2007). The CLDs illustrated that system level analyses can reveal causal relationships between internal and external stakeholders and indicate ways to reduce variability in identifying leverage points to address recruitment and retention issues (Cavana *et al*, 2007). For example, understanding the experiences of *tradesmen*[[21]](#footnote-21) led to changes at a micro-level. By improving a perceived satisfaction with service life and deselecting recruits that did not demonstrate longer term service, the ST approach effected increased capacity and improved service delivery.

Similarly, the measurement of intended and unintended consequences in a health system using CLDs enabled the positive and negative consequences of a Better Health Outcome through Mentorship and Assessment (BHOMA) to be illustrated (Mutale *et al*, 2017). Analyses of community participation pre and post intervention illustrated that while levels of engagement in rural areas has improved, there was no change in waiting times for initial consultation as a ‘backlog’ had been created by quicker triage and screening. This unintended consequence was recognised as exacerbation of pre-existing workforce challenges.

In the final paper in this theme, CLDs were used in a health system to identify underlying driving forces of healthcare services, such as the effects of population demand and local or national policies that underpin services (Rwashana Semwanga *et al*, 2014). By categorising interview data into demand and supply issues, findings aided the understanding of complex interconnections. This approach recognised several short- and long-term strategies to improve neonatal service delivery and effected a reduction in neonatal mortality.

## 5.8 SYNTHESIS OF TRANSFERABLE LESSONS

Following narrative synthesis of the included papers, data was interpreted to infer potential lessons that could transfer to the Company partner, which are presented as factors that influence the provision and delivery of integrated care services.

### 5.8.1 Transferable Lesson 1: *The importance of system leadership*

The learning offered by papers presented under the leadership theme was that understanding the interactions and behaviour of people and processes is crucial to appreciate the socio-dynamic influences on a system. The practice of leadership is presented as a building block in health systems and the literature highlights the importance of behaviours that promote making strategic decisions to address operational problems and provide services that meet the long term needs of people that use them (Malik *et al*, 2014). Likewise, local leadership is important so that decision-making and leadership are diffuse across the whole system. Leaders bring vision and strategy in partnership with ST tools, to illuminate the problem and act as a platform to address organisational challenges (Senge *et* al, 2015).

In healthcare systems in particular, the literature illustrated that leaders need to create a learning system through using analytical data to facilitate management opportunities. A framework created by Canadian and international health experts describes a Learning Health System (LHS) as comprised: core values; pillars and accelerators; processes and outcomes (Menear *et al*, 2019). Comparable to systems-based approaches, a core value of a LHS is participatory leadership, whereby developing system leadership could facilitate strategic decision-making in health and social care integration. For example, when addressing increased demand for community services. Equally, core values of inclusion and “scientific rigour” transfer the application of ST to assert the importance of system leadership (ibid, p 8 of 13).

In health care systems, the principles of CAS provide a holistic focus on the whole system by recognising that leadership skills emerge and adapt to changes. The CAS lens emphasised the importance of theory-based interventions, in which policies are viewed as a leverage point in a complex system where local health managers supported facility managers to strengthen their primary health services (Gilson *et al*, 2014). A shared concept of strategic leadership in systems science characterises how a CAS approach can provide managers with a different way of thinking that can encourage a more cohesive health and care system. Equally, in viewing a CAS approach as a mechanism for modernising traditional approaches to operational management, this understanding is also potentially transferable to integrated health and social care systems by underlining the importance of fostering unity to promote the attainment of outcomes (Gilson *et al*, 2014). As such, the knowledge offered is that without a shared vision, organisational and citizen needs may not be met.

### 5.8.2 Transferable Lesson 2: *View the integration of health and social care services as an evolving and continuous process*

The literature highlights that the provision of sustainable care services needs to be viewed as a complex practice and that the framework of ST delivers tools to explore causal relationships in practice and examine their influences. Through the use of ST techniques to identify and define complex causalities, the literature recognises that designing sustainable services that will stand the test of time requires the identification of enablers and barriers in order to promote greater understanding of the complexities of multi-agency service provision and facilitate whole systems level sustainability (Kiss *et al*, 2018). Demand for care and support services is a leading driver for focus on the sustainability of service provision (ibid).

Similarly, while the methodological approaches to sustainability in the papers differ, the literature speaks of a shared core goal of sustainable services. The papers emphasise that the inclusion of key stakeholders is fundamental to facilitate a system that is can develop and maintain a shared long-term vision for successful whole system-level intervention. A focus on locality incorporated the ‘voice’ of citizens engaging with services to embed long-term changes in practice and promote the sustainability of community services. Equally, system-wide strengthening will also produce unintended consequences in practice, which may also serve to inform policy and service delivery. Therefore, adopting a ST approach to gain a greater understanding of the individual components within the changing nature of a dynamic system is an integral part of achieving sustainability.

### 5.8.3 Transferable Lesson 3: *All levels of a system can influence policy changes through decision-making*

Collectively, the literature demonstrates that all levels of a system can influence policy change through effective governance. The studies incorporate wider issues of local governance and ST approaches are presented as facilitating effective strategies to achieve more cohesive systems level objectives in the delivery of services. The papers emphasise that operationalising ST requires a bottom-up approach to providing governance, with the citizen central to revealing required changes (Dunnion & O’Donovan, 2014). For integrated care and support systems in particular, the studies draw attention to a need to invest in community management approaches that are adaptive and move away from ‘command and control’ styles of governance (ibid). Equally, principles of local governance are a critical requirement for regulating feedback mechanisms within multi-layered political, economic, social and cultural system contexts to build effective organisational governance (Barbrook-Johnson *et* al, 2020).

Health and social care policy concerns everyone who ‘has a stake’ in the receipt or provision of services, at all levels of the system (Moore, 2019). As discussed in chapter 2, phenomena such as the challenges, competing interests and a ‘poorly’ governed ICS act as impacting factors and are commonplace when national policies are translated to local organisations and community services (ibid). From a systems perspective, effective governance will need to have an accurate understanding of the influencing contexts to encourage a change in whole system behaviour (Barbrook-Johnson *et* al, 2020). Organisational capacity is regularly viewed as a multidimensional concept that is determined by a system’s communications, leadership and management culture. Therefore, developing an integrated system of governance that fosters working in partnership with citizens and regulatory bodies for health and social care systems will advance a system’s capacity for addressing complex issues, through positioning the health and well-being of citizen user as a key driver for developing integrated care services for adults (ibid).

### 5.8.4 Transferable Lesson 4: *A systems thinking conceptual framework promotes transformation through understanding*

By acknowledging the collaborative environment of healthcare systems, the literature illustrates that ST can provide understandings through incorporating the insights and experiences of stakeholders. The literature established ST approaches as a system-wide ‘resource’ to critically analyse non-linear processes and dynamic behaviours to transform the operation of the system (Greenhalgh & Papoutsi, 2018). Evidence demonstrated how the use of ST tools helped to clarify operational challenges and identify where practice and policy intervention can target whole-system transformation. A common focus in the papers was that the ST lens was used to map the influence of context on implementing transformative changes.

In the pursuit of shared visions to improve performance and achieve citizen-led outcomes, working collaboratively with stakeholders at all levels of the system is fundamental for system transformation (Pourdehnad *et* al, 2019). Through building relationships and a common understanding of multi-level issues, such as capacity and ineffective delivery processes, both citizens and system leaders can ‘drive’ the need for change, while ensuring system changes and their impacts are monitored and evaluated (Meyer *et al*, 2012). As such, the core principle of participation in ST approaches can appreciate the complexity in systems through understanding the myriad interconnections and environmental influences between local organisations and their communities (Jacobs & Rouse, 2016).

## 5.9 CHAPTER SUMMARY

This chapter has presented findings from the systematic review. Guided by the review question and protocol, an overview of the characteristics and theoretical foundations of the included studies has been offered and appraisal of their empirical quality described. A qualitative research design was by far the most widely employed research method to explore and evaluate the application of ST approaches. All the included studies situated in health systems were portrayed according to the theory of complexity. This theoretical lens shaped the objectives of the studies and investigations through its focus on exploring the multi-dimensional influences on a system. Papers that reported on the utility of CAS to focus on sustainability typically discussed facilitating system level resilience. Subsequently, existing knowledge was furthered by ST tools to explain, examine and understand the dynamic influences on a system. The observed effects following intervention have also been presented.

All the papers used the tools offered by the ST framework to investigate context dependent phenomena at macro, meso and micro levels of a system and illustrate their complex interconnectedness. Narrative synthesis identified an overarching theme of stakeholder participation to focus on core organisational issues. In agreement with a ST approach, the participation of stakeholders has been reported to have contributed to the success of the ST approaches. Equally, this chapter has discussed four other themes identified as leadership, governance, sustainability and transformation. The reported effectiveness of ST approaches has also been discussed and interpretation of these themes has subsequently offered transferable lessons for the development of integrated care services for adults. Chapter 6 describes a collaborative Knowledge Exchange Event that was organised to present findings from the KESS2 project to the Company partner.

# Chapter 6: The Knowledge Exchange Event

## 6.1 INTRODUCTION

This chapter describes the Knowledge Exchange Event that was held to disseminate findings from the KESS2 project to the Company partner. The Event aimed to support the Company partner’s vision for an improved integrated health and social care system to meet the care and support needs of local citizens. This chapter explains the Event preparation and content. In addition to undertaking the systematic literature review, time was spent with the Company partner as part of the KESS II programme to support their examination of service demand. While the Practice Placement did not involve collecting research data, similarities between the focus of the Practice Based placement and the Vanguard approach to demand analysis are also considered in this chapter.

## 6.2 DISSEMINATING THE EVIDENCE

Following completion of the systematic literature review and the practice-based placement, a *Knowledge Exchange* Event was held to share research findings with the Company partner. The Event was underpinned by the Developing Evidence Enriched Practice (DEEP) approach, which promotes sharing various forms of knowledge, including research, in an accessible way so that participants can engage with it and consider incorporating new knowledge into their own practice (Andrews *et al*, 2015). The participatory approach to the exchange of knowledge has established the value of sharing research knowledge through dialogue and has found that the new shared understandings created through knowledge exchange can be used to develop services to promote improved well-being of citizen users (ibid).

The dissemination of findings in the workshop was supported with key contributions from the thesis supervisors to stimulate critical thinking and reflective discussions. Guided by a series of prompts detailed in the agenda (Appendix 8) and the workshop handout (Appendix 9), the audience engaged in a group discussion and contemporaneous notes were made. In line with the DEEP approach, members of the group were encouraged to discuss points raised to facilitate more focused dialogue on:

* Examples of barriers and enablers to system change in the Company partner
* How the systematic review findings can support practice development

### 6.2.1 Initial Preparations

Preparation for the Event included correspondence with the Company partner to determine a suitable date and venue. Further arrangements included correspondence with the Event agent to reserve a room for a workshop to be held, organise refreshments and discuss IT requirements. The refreshment elements were built into the Event to facilitate networking and promote informal interaction and discussion during the workshop. An Agenda was developed collaboratively to state the purpose and structure of the Event. In order to exchange details of the systematic review, a PowerPoint presentation was prepared to share the findings and the early synthesis of data collected. The PowerPoint slides also provided guidance for the discussion of suggested topics in a group activity following the presentation.

### 6.2.2 Collaborative Workshop

The collaborative approach to the knowledge exchange element of the project addressed the Company partner’s research need and the role of academia in communicating findings from the systematic literature review and reflections on the practice placement. For this reason, the PowerPoint slides were compiled in a document to ‘map’ the content of the presentation for attendees and were distributed at the beginning of the workshop.

### 6.2.3 Presentation

The presentation slides summarised the systematic review process and key points were explained. In addition, the presentation included reflections from placements in the three sites operated by the Company partner which focused on exploring the types of service demands provided by Community District Nurses [DNs]. However, information gathered as part of the Practice Placement does not form part of this thesis and does not have ethical approval for inclusion. As such, details from these placements that were presented in the KEE have been omitted (Slide 9, Appendix 9). The Company partner had employed the Vanguard Method to investigate *failure* and *value* *demand*, using a ST approach to frame the Company partner’s management of operational challenges for community services and differentiate between these types of service pressures. The experiences of the DNs were used as an example during the Knowledge Exchange Event and the challenges faced generated discussion amongst attendees.

In line with the DEEP approach, this enabled the audience to reflect on their experiences of local issues and relate to the information that had been presented. For example, a common challenge reported by the Company partner was the amount of time spent following up referrals to the DNs due to insufficient information provided on the referral form. Consistent with the Vanguard categorisation of *failure* and *value* demands, this type of demand was perceived as ‘failure’ and reported findings from the included papers provided a point of reference to connect to DNs. Reference was made to the use of the Vanguard Method in one of the review papers to address a ‘command and control’ delivery of services in a higher education system (Dunnion & O’Donovan, 2014). This particular paper was selected as it resonated with the Company partner’s current application of the ST approach in their ICS and aimed to support critical discussions in the group activity following the presentation.

## 6.3 WORKSHOP GENERATED INSIGHTS

This section provides an overview of how the Knowledge Exchange Event built on the understandings gained in the systematic review. Following the PowerPoint presentation to explain the review process undertaken and share findings, the subsequent discussion point was to respond to the main need identified by attendees from the Company partner. This section also considers the connections between the practice-based placement and the Vanguard approach to demand analysis.

### 6.3.1 Guided Discussion

Following the presentation, attendees from the Company partner were invited to engage with a group activity. The main need identified during the discussion point was to explore factors that influenced as *Barriers* or *Enablers*. During the Event, the engagement of stakeholders from the Company partner aligned with the DEEP approach and also with the collaborative ethos of this KESS2 project and ST. In recognition of the factors that impacted the Company partner at a local organisational level, the thesis supervisors facilitated more focused dialogue and attendees were encouraged to discuss points raised. Factors reported in the group discussions that created empowering or obstructive environments are detailed in Table 11. In addition, the discussion points have been linked to the themes identified in the narrative review of the papers.

Table 10: Exploring barriers and enablers to system change

|  |  |  |
| --- | --- | --- |
| **Barriers** | **Enablers** | **Corresponding Theme** |
| * Team culture * Not wanting to ask for help * Divergent professional reasoning * Not asking questions needed to develop knowledge, skills and behaviours | * Team culture * Detailed, local knowledge * Flexibility in measures * Discussing cases * Multidisciplinary Team working * Different perspectives | *Leadership* |
| * Complex procedures involved to order items for citizens * Assumption-based practise and not evidence-based, e.g. professional strategies that promote best practice | * Focus on the leading measure- what’s right for the citizen; *What Matters* conversation * Starting on the right foundation [by the citizen] (person-centred input) | *Sustainability* |
| * Feeling a need to obtain permission; low confidence for decision-making/autonomy * Need a guiding framework * Population needs assessment * Finances- focus on finance targets | * Key Performance Indicators (KPIs: a Welsh Government requirement): an activity driver to avoid any negative publicity + Direct To Consumer (DTC) demand measures * Existing feedback surveys * Co-produced care plans | *Governance* |
| * Need full picture; time needed to collate all the data * Additional work, in line with failure demands * Unintended consequences * Managing staff uncertainty * Short time frames | * Understanding the problem * Asking the right questions | *Transformation* |

### 6.3.2 Linking Discussions to Placement Reflective Practice

The presentation also included some reflections on the Practice Based placements, which explored service demands for community DNs. While the placements were not research-orientated, the Company partner was interested in a shared understanding of the demand for DN services. As the Vanguard Method is being applied to explore these, a discussion point during the presentation shared examples of communications received by the DNs. In doing so, attendees concurred that examples given reflected their knowledge of demands on community nursing services. As stated previously, this information does not have ethical permission to be included in discussions of the KEE in this thesis.

## 6.4 CHAPTER SUMMARY

This chapter has described a Knowledge Exchange Event that was held to disseminate findings from the systematic literature review to the Company partner. The organisation and arrangements for the Event has been explained and the preparation of materials detailed. The DEEP approach encouraged shared dialogue and brought together the Company partner’s understandings of successes and challenges within their integrated health and social care system. The Event also incorporated reflecting on their use of the Vanguard approach to analyse demands on DN services. The discussions also provided further information about key issues to consider when implementing ST in ICSs for adults with complex care needs. These insights and how they resonate with the systematic review findings will be discussed further in chapter 7. The following chapter also explores the thematic synthesis of the included papers literature and discusses key findings to inform how the lessons learned can transfer to developing future integrated service provision for adults with complex care needs.

# Chapter 7: Discussion

## 7.1 INTRODUCTION

This chapter discusses the key findings from the systematic review and insights gained from the Knowledge Exchange Event. The theoretical approaches that are utilised in ST literature are further explored to consider the academic value of underpinning research with systems-based theories. The review results highlighted that a ‘thinking in systems’ perspective was harnessed primarily in health systems and that ST was applied to effect whole system change. Essentially, this objective resonated with the Company partner’s application of systems-based intervention. This chapter explores how the lessons learned in health, social care and public services can transfer to integrated health and social care systems for adults with complex care needs and offers learning points derived from these. Exploration of their implications for future policy and practice are also considered.

## 7.2 KEY FINDINGS

This thesis has aimed to undertake a systematic review and report on the application of ST approaches to the development of integrated care services for adults with complex care needs. The literature retrieved has provided a greater appreciation of systems-based approaches. A dominant finding from the systematic literature review indicates that implementing systemic change needs to address the relationship between vision, methods and participant dynamics. As recognised when synthesising findings from the included papers, the themes that emerged were not mutually exclusive and there was a degree of overlap in terms of ‘thematic boundaries’. The themes identified were involving stakeholders; system leadership, governance, sustainability and transformation. These categories align with the conceptual framework of ST and its theoretical underpinnings and provide lessons that also resonate with key policy principles in Wales regarding integration, involvement, prevention and sustainability. For example, a defining example is the goal of ‘A resilient wales’ as proposed in the Well-being of Future Generations (Wales) Act, 2015. Although this ambition refers primarily to ‘economic resilience’, it also refers to the capacity of local services to meet local population needs (Future Generations Commissioner for Wales, 2020). As such, exploring findings and their implications for integrated care organisations considers the environment of the Company partner and its local context.

### 7.2.1 Interpreting Stakeholder Participation

As reported in chapter 6, involving stakeholders emerged as the overarching theme in the review papers. In viewing objectives for “coherence, coordination and partnership” as core goals in terms of forward thinking and ‘learning for sustainability’ (King, 2020), the collective focus on involving stakeholders at all levels of a system was foundational in developing the secondary emergent themes. Nevertheless, this thesis highlights that citizens are positioned in literature as the central stakeholder at a micro level within community-based approaches, thereby advocating the ‘from the bottom up’ context of ST (International Foundation for Integrated Care, 2020).

Similarly, evidence reported in the papers also shows that the purposeful engagement of the participants was critical for the development of research-based intervention programmes. As this is a fundamental tenet in ST approaches, the research methodology used by the authors of the review papers confirms that participation was pivotal in achieving insightful data to inform the outcome measures and lessons for future policy and practice development (Appendix 4).

### 7.2.2 Interpreting System Leadership

While there are discrete definitions of the attributes of an effective leader and conceptions of leadership are commonly grounded in theory, literature emphasises that ideas of leadership behaviours are very much context-specific and orientated to problem solving within ST approaches. A fundamental assumption in the papers is also that the application of ST approaches empowered individuals to assume responsibility for processes and activities. The studies reported leadership behaviours of district health system managers wanting to lead change and develop services and pathways at a meso level (Senge *et al*, 2015). Essentially, the papers call attention to the importance of creating a shared purpose through effective communication and multi-agency working; an environment synonymous with sharing complex information across integrated health and social care systems (Timmins, 2015).

In exploring system leadership, a research paper by Rouse & Jacobs (2012) studied behaviours that were needed to lead health system interventions and identify behaviours that promoted effective communication of shared goals. Consistent with theory-based intervention approaches; reported behaviours align with a category of leadership theories known as *Transformational leadership*, which is commonly situated in an environment that is conducive to ‘meaningful’ performance outcomes (ibid). Furthermore, the authors offer health and social service systems as a key example of a system that requires strong leadership skills and innovative problem-solving behaviours to manage the implementation of predominantly ‘population-driven’ change processes (ibid). Correspondingly, the theme of leadership nods to its partner themes that also emerged from the systematic review.

Table 11: Parallels of system leadership and systems thinking research

|  |  |
| --- | --- |
| **Practices of Leadership** | **Traditions of Systems Thinking** |
| Grounded in theory | Grounded in theory |
| Addressing a problem | Investigating a problem |
| Decision-making | Dynamic understanding of the situated problem: context-dependent decision- making |
| Shared vision and common direction | Sharing visions |
| Setting policies and priorities | Identifying leverage points in a system |
| Participatory action | Participatory contribution |

(Adapted from Reynolds & Holwell, 2010)

### 7.2.3 Interpreting Sustainability

Despite a primary focus on involving citizen users in ST approaches, the included papers also had a focus on the sustainability of community- and district-level services. In examining what was needed in the systems to achieve ideas for sustainable development, investigations purposefully explored whether the system of inquiry was responsive to the needs of citizens. Furthermore, focusing on sustainability in healthcare drew on complex systems theories to position the systems and their capacity to adapt, thereby extending a shared core goal of sustainable services (Kiss *et al*, 2018). As such, the application of ST’s conceptual framework functioned to embed visions for long-term changes in practice from a macro, whole system level.

Papers that reported the development of strategic initiatives were perceived as policy-orientated research literature and provided a focus on methods for initiating long-term structural changes. In particular, the use of systems dynamic modelling presented methodologies that facilitated continuous improvements through identifying leverage points for policy development and intervention (Fowler *et al*, 2019; Gamble *et al*, 2019). For example, stock and flow bar graphs demonstrated real and anticipated trends for demands on service delivery (Fowler *et al*, 2019) and complex causality relationships were illustrated using causal loop diagrams (Gamble *et al*, 2019).

Similarly, the private sector was introduced as an initiator of change in a health system through reporting innovative ‘dual practice’ management of service demands (Agyepong *et al*, 2014). Indeed, modifying service delivery ensured access to privatised healthcare services (ibid). Moreover, demand for health and social care services is acknowledged in literature as being a key motivating factor in the pursuit of sustainable service provision (Scheirer & Dearing, 2011). In terms of learning through interpretation of findings to build lessons, this paper has transferability to public-private partnerships (ibid).

### 7.2.4 Interpreting System Governance

The theme of Governance emerged from considering the practice of making collective decisions at local, organisational and national levels in the included papers (Claver, 2020). Ideas of influential relationships between the political environment of the system and theoretical perspectives on governance informed understandings of complex and dynamic forces directing the systems (ibid). Equally, ideas of *top down* versus *bottom up* styles of governance resonated with discussions of the Vanguard Method’s rejection of a *command and control* approach to management in systems literature.

Discussions of policy development in chapter 2 offered an awareness of external regulating and auditing bodies. Since the devolution of Wales’s administration in 2010, healthcare reform has advanced with the introduction of policies advocating more choice for citizens and greater competition for health and social care service providers (WG, 2018). In particular, contemporary legislations place emphasis on improving and evaluating the planning and delivery of services, through advocating the inclusion of citizens who engage with services (ibid). Nevertheless, in considering Wales’s devolved government and the implementation of policy-based practice; the ST literature highlights that the political context can be a key influencer of system performance.

However, van der Heijden (2020) found in a systematic review of the application of ST in the discipline of regulation and governance, that ST has minimal application in public policy and administration studies. In addition, the author proposes that ‘creative compliance’ is an example of divergence from organisational and centrally-led government priorities (ibid). In doing so, this viewpoint suggests that divergence to governance acted as a catalyst for the emergence of leadership behaviours (ibid). However, it is equally arguable that such actions were generated by goals to meet service demands and were not regulatory-based.

### 7.2.5 Interpreting System Transformation

In seeking to explain context-dependent barriers, the analytical framework of ST applied in the studies was able to demonstrate leverage points where strategic decisions could focus on both the root causes of issues and the ‘symptoms’ (Abercrombie *et al*, 2018). The thematic synthesis highlighted that system reform needs an approach that is holistic and fosters learning in order to adapt. Of the six papers in this category, only the papers by Prashanth *et al* (2014) and Rwashana Semwanga *et al* (2014) explicitly used the term ‘complex’. Likewise, papers in this category demonstrate that system reform needs an approach that is holistic and fosters learning to adapt, reconnecting with ideas of complexity that are unified in the papers.

The literature also incorporated the theory of change to extend transformational approaches to whole system change, commonly referred to as taking a *systemic approach* (Abercrombie *et al*, 2018; Willis *et al*, 2014). The term is frequently used to describe approaches that address issues resulting from complex and multidimensional factors. Nevertheless, the practice of theory of change in a systems context is discussed in the paper by Abercrombie *et al* (2018), from a viewpoint that approaches to change are both reflective and collaborative. Subsequently, achieving system change requires the somewhat ‘unwritten rules’ of learning and adapting, to facilitate processes of change through generating and using knowledge (ibid).

Ideas to inform system transformation also derived from literature focused on maintaining complex interventions and achieving long-term goals. Through using ST approaches to establish causalities, understandings served as an enabler to learn about dynamic complexity and to guiding actions such as implementing policies and programmes for change (Willis *et al*, 2014). In doing so, literature asserts that through gaining understandings of the sources of policy resistance, systems can identify where more effective policies are needed (ibid). However, a paper by Kiss *et al* (2018) cautions that a weakness of policy interventions targeting individual issues, rather than applying a whole system context, is that changes “motivated by economic incentives” usually do not achieve sustainable changes in attitudes or values (ibid, p4).

## 7.3 TRANSLATING KEY LEARNING POINTS

As discussed in chapter 6, the early key findings and potential lessons from the systematic review were disseminated with the Company partner in the Knowledge Exchange Event. The learning points distilled from the literature resonated with shared discussions of the Company partner’s rationale for applying ST to inform future service organisation:

* *Stakeholder Participation* - participation by all stakeholders is essential to establish coherent, coordinated services and to ensure changes were sustainable long-term. The absence of a collaborative approach to the provision of integrated care linked to review findings and discussions of working across silos.
* *System Leadership* – strong leadership skills are crucial to encourage effective communication and collaborative working across the whole system. Creating a shared purpose was central to developing shared understandings that then directed changes to services and pathways. This emphasis in the review literature was recognised in the Knowledge Exchange Event.
* *Integration is Evolving and Continuous* – systems need to adapt and respond to the needs of citizens over time. Integration initiatives must be monitored as making changes to a system can produce *unintended* as well as *intended* consequences, in line with STs conceptual framework.
* *All Levels of a System can Influence Performance* – whilst the political environment surrounding a system is influential, it is often local governance that enables strategic decisions which impact on system performance. However, organisational-driven objectives impede the inclusion of non-managerial individuals.
* *Transformation is achieved through Understanding* - system reform requires a holistic approach that enables people in the system to learn about complex problems and adapt to change. Nonetheless, the realisation of organisational transformation is accountable to barriers such as inadequate collaboration, insufficient budget and time constraints.

## 7.4 PARTICIPATION AS A CORNERSTONE OF SYSTEMS THINKING APPROACHES

As emphasised throughout this thesis, the participation of citizens is a core principle underpinning the application of ST approaches to address complex, real-world issues. The involvement of citizens that engage with services is intrinsic to focusing on system-level issues, beginning at the *micro-level* of a system. Similarly, the review papers provide evidence that participation is crucial in ST approaches and has potential value in influencing policy-making and service delivery. As such, systems theory supports the participation in empirical enquiry and frames how the interconnections with stakeholders are crucial to the system’s success (Carayannis *et al* 2016). Through combining the ‘voice’ and personal perspectives of the citizen user with ST tools, insightful and dynamic explanations can depict complex issues and propose a stakeholder-driven representation of a problem, as portrayed in Figure 15 (Tabrizi and Morgan, 2014). Moreover, this approach to investigating unplanned phenomena is transferable to health and social care organisations to build citizen-led adult services.

In line with the participatory principle of systems theory, involving key stakeholders added an overarching richness to the data collected. Wiberg (2014) proposes that an active partnership between the researcher(s) and people engaging with and providing services is ‘knowledge generating’, whereby participation in the research activities promotes communicating the perceptions of people involved in ‘real world’ situations. Moreover, all of the papers highlighted the ‘methodological importance’ of employing research activities to build a conceptual model and facilitate reflective action through framing stakeholders as a dynamic influence (Siegrist *et al*, 2013).

Equally, the literature draws attention to the importance of collecting data that clarifies complex processes and relationships, through actively engaging with citizens to envision a more effective way of operating at a whole systems level. For example, obtaining participant data yielded valuable insight into the experiences of citizens accessing services (Cavana *et al*, 2007). Similarly, exploring how to increase effective participation through a more methodical and considered approach also increased the accuracy of causal mapping within complex organisations (Gamble *et al*, 2019). As a result, potential points of leverage in a non-profit community health organisation were identified, which in turn had potential to reduce fragmented services and improve collaborative health promotion at service delivery and governance levels.

Likewise, the use of process mapping and analysis in conjunction with stakeholder interviews was used as a core quality improvement strategy in which participants were able to highlight areas central to the effectiveness of the public health initiative for preventing and controlling obesity in Australian Primary Schools (Biggs *et al*, 2014). Their insights included needing clarification of their roles and responsibilities, raising awareness that some schools had failed to be included due to inconsistent monitoring, the identification of barriers to implementation and being mindful of staff time constraints (ibid, 2014). In so doing, the participatory approach considerably increased the researchers understanding of barriers and facilitators in delivering preventative services.

Figure 14: Participation for building research

Adapted from Tabrizi and Morgan (2014)

### 7.4.1 Trust as a Pillar of Partnership Working

A further dynamic presented in the literature that can shape partnership working is that of trust. In the context of partnership working, building and maintaining collaborative relationships requires colleagues and investors whose ‘end-goal’ visions are aligned (de Waal *et al*, 2019). The prominent systems thinker author Donella Meadows was often quoted in literature as asserting that it is people’s *readiness* to learn from one another and to search for the truth, in preference to striving to be correct that is important in affecting change (Meadows & Wright, 2008) While principles of partnership working and inclusivity are embedded in contemporary healthcare legislation, such as an emphasis on collaboration and information sharing in community- and health and social care-based policies, in reality these can be stymied by competing agendas and divergent organisational and government goals (Tabrizi & Morgan, 2014; Moore, 2019).

Many papers reported on the application of ST approaches in situations where communication, trust and transparency were lacking. Subsequently, the barriers to effective partnership working generated strategies including new approaches to leadership (Gilson *et al*, 2014; Malik *et al*, 2014; Kwamie *et al*, 2014) and governance (Dunnion & O’Donovan, 2014; Paina *et al*, 2014; Varghese *et al*, 2014; Waqa *et al*, 2017; Zhang *et al*, 2014). Similarly, a context for presenting the concept of building a trusting organisational culture within an educational setting was through the inclusion of citizen-users (Dunnion & O’Donovan, 2014). Findings suggest that investing in people who engage with services is necessary to implement a system that can continually adapt and meet identified needs. Ideas of trust were also alluded to as being needed to enhance the uptake of immunisation services in a district health system (Varghese *et al*, 2014). The authors present trust as an unspoken dynamic and discuss intervention as a multi-dimensional social construct of a system, through which the involvement of participants and frontline staff can promote understandings of competing factors and identifying drivers for change within the system (ibid).

The compatibility between colleagues is also characterised by effective communication and commitment and is offered as being an essential element of teamwork (Biggs *et al*, 2014). Furthermore, ideas that compatibility play a ‘critical role’ in promoting the cohesive delivery of an intervention programme present trust as a feature of partnership working in social organisations and therefore suggests that trust is a core dynamic of quality improvement strategies. From a broader, social perspective, some of the review papers suggest that trust is an important dimension of communication to foster a knowledge-based system (Kwamie *et al*, 2014; Malik *et al*, 2014). Through reflection of stakeholder relations within organisational practice, trust-based relationships are offered as enabling shared knowledge to inform continuous quality improvements in an intervention programme for district health system managers (Kwamie *et al*, 2014).

Similarly, ideas that “health systems are driven by humans” further supports that trust and respect are considered as crucial attributes in a context of organisational uncertainty and that insufficient support leads to a loss of confidence, perceptions of isolation and ‘missed opportunities’ (Kwamie *et al*, 2014: p75]. Therefore, a majority of the review papers evidenced that a trusting culture can enhance building a system that aligns with shared understanding of local needs (Lazlo, 2012). This interpretation also advocates that having confidence in examining challenges using a broader approach to intervention can promote a paradigm shift within a system, which would be transferable to the context of developing ICSs for adults with complex care needs (LGA, 2017).

## 7.5 Differentiating Systems Approaches

The systematic review demonstrated that efforts to understand and improve systems continue to be informed by the application of ST approaches. As discussed in the result chapter, reported system analyses incorporate various theoretical lenses to capture complex dynamics. However, most papers remain theoretical and do not draw on empirical evidence. This meant that many papers were excluded from the review because they concerned purely theoretical applications of ST. In exploring this phenomenon, the literature offers that the scientific field of ST has an intrinsic ‘theoretical nature’ which is utilised to systematically examine complex processes in health and public services (Verhoeff *et al*, 2018). In line with this grounding, applying a theoretical lens to examine the characteristics and attributes of a system calls for the conceptual narrative of systems theory and derived conceptual approaches (ibid).

The empirical literature that was retrieved focused on critically analysing system-wide processes and interrelations between components of the system. Consistent with promoting understanding and interpreting complex and dynamic systems, ST’s theoretical underpinnings facilitated the analyses of complex interconnections within its main approaches (Figure 2, chapter 1). The various complex systems approaches reported in the included papers correspond to traditional methods of ST and do not reveal the application of new practises to address identified challenges[[22]](#footnote-22). Equally, the different approaches in the included papers also involved the use of various types of software packages to conduct analyses of system-level performance of community-based services, such as the qualitative system SD approaches (Cavana *et al* 2007; Gamble *et al*, 2019) and SD modelling in the mixed methods paper (Fowler *et al*, 2019).

While the use of computer-based analyses can capture the ‘narrative’ of qualitative research, such as using mapping tools and for completing discourse analysis, there is an argument that computer software can detract from applying traditional researcher-led methodology to analyse and interpret data (Bulloch *et al*, 2017). Similarly, for research that combines qualitative and quantitative research methods, the use of computer packages can exacerbate ‘methodological disagreements’ between integrating the approaches to research (Yardley & Bishop, 2017: p 2 of 25). However, Tashakkori and Teddlie (2010) caution that the rationale for using mixed methods always needs to be guided by the research question, rather than selecting which method should be employed first to analyse the data.

Some researchers have complemented the application of ST approaches through using other methods to focus on specific characteristics of a system; for example, the Sustainability Framework (Sarriot *et al*, 2016) and Sustainability Network Analysis (a ST conceptual lens) were employed to illustrate interconnected components of a network and inform sustainability indicators within the context of health systems (Blanchet *et al*, 2014). Collectively, the research-based evidence of the application of ST approaches enhances its ‘visibility’ as a method to explore complexity, to address problems related to how systems operate and to ultimately address the need of citizen users.

### 7.5.1 Systems Methodologies

While literature commonly present systems analyses of organisational problems using two distinctive ST methodologies, namely hard systems methodologies [HSM] and soft systems methodologies [SSM], both approaches were employed in the review papers to visualise and examine ‘ill-structured’ problems within challenging health, social, economic and political environments (Siegrist *et al*, 2013). Using both methodological lenses enabled researchers to assume a more comprehensive mind-set for the analysis of phenomena in their broader context and enhanced their ability to find meaningful connections and interpret the system’s often constraining behaviours (OECD, 2017). For example, the qualitative nature of SSM offers a *thick* picture for exploring and analysing complex situations and can complement HSM’s somewhat *thin*, yet objective, data by contributing ‘richer’ data to address an area of inquiry (Yardley and Bishop, 2017).

The finding that the “distinction [between hard and soft systems methodologies] is not absolute” is supported by the previous systematic review conducted on the application of ST approaches[[23]](#footnote-23). However, although some papers used a combination of hard and soft systems approaches, the majority of the qualitative research papers used methods that aligned with Peter Checkland’s SSM; exhibiting an orientation towards organisational learning (Checkland, 1981). Drawing on the conceptual framework of ST to contextualise processes and relationships and application of ‘tools of data collection’ to explore non-linear dynamics of a system, the researchers were able to interpret empirical evidence and identify the root cause of problems. For example, analyses of data derived from Behaviour Over Time (BOT) graphs and Capacity-Satisfaction loops[[24]](#footnote-24) identified places in the system where targeted intervention could improve staff retention and capacity (Cavana *et al*, 2007). Similarly, a soft systems-based methodology captured critical context-based data and developed a change process to meet organisational objectives (Evans *et al*, 2016). As such, the utilisation of a systems methodology in the processes of inquiry generated data that aided strategic action, which can benefit ICSs through comprehensive exploration and analyses of the complexities of integrated care provision.

By contrast, other papers that combined the participatory principles of SSM with scientific methods that aligns with a hard systems methodology [HSM] (Checkland, 1981). From a systems perspective, the use of computerised simulation and quantitative techniques to advance data collection and analysis were conducive to gaining a better understanding of the system’s complex dynamics, through exploring context dependent patterns and repetitions (Behl & Ferreira, 2014). Similarly, the use of systems engineering added a methodological dimension to examine feedback relations within the systems and facilitate action-based strategies (Fowler *et al*, 2019; Rwashana Semwanga *et al*, 2014). Analyses of simulated data over time using software packages were completed to create stock-and-flow dynamic models (Fowler *et al*, 2019). Likewise, computer technology was used to frame an identified problem of neonatal mortality in Uganda (Rwashana Semwanga *et al*, 2014). The systems engineering principles of HSM and the methodology of Dynamic Synthesis[[25]](#footnote-25) were incorporated to understand and interpret data derived from examining demand and supply feedback relations within districts in the country’s health system.

The use of computer software for data exploration and analysis also featured in the methodology reported in the mixed methods papers. The application of non-engineering mapping techniques was completed using CLDs and cause tree diagrams to develop a qualitative explanatory model, with quantitative data analysis in Excel and Stata (Agyepong *et al*, 2014). Similarly, another paper combined process mapping was combined with computer analysis of aggregated data derived from assessment of budget utilisation, operational costs and outcome measures of performance (Prashanth *et al*, 2014). Through integrating a hard systems methodology and a systems conceptual lens, employed a web-based software was also employed to synthesise statements of participants and create themes (Wutzke *et al*, 2017). As a result, the review papers were able to use evidence-based learning to identify contextual factors that were impacting primary prevention initiatives and utilise knowledge obtained to facilitate long-term strategic planning, as represented in the theme of sustainability.

Analytical processes that involve evaluating the implementation of courses of action also create a visual feedback loop that illustrates the interrelationships between information, ideas, people and action. In systems where complex problems derive from the dynamics between internal and external relationships, using software engineering modelling as a design methodology for system development (System Dynamics: SD) can be useful in terms of simulating these behaviours to appraise policies and intervention outcomes (Carayannis *et al*, 2016). However, as a systems methodology, an arguable weakness of approaching a problem using SD as a tool for decision-making is that phenomena being analysed are often context specific and are not derived from the context in which they materialise (ibid).

However, SD modelling was used to illustrate how prevention initiatives addressed a national homeless problem and identified a leverage point in the system (Fowler *et al*, 2019). Although the use of SD as a tool can acknowledge the complexities of a system within one model, an arguable methodological weakness is that this challenging task requires the collaboration of the system’s stakeholders to capture these, rather than a single computer-generated model (Yardley & Bishop, 2017). Nevertheless, the SD approach enabled capacities and constraints to be identified to inform policy changes and address service demands and promoted sustainable solutions (ibid, 2019). This has transferable value to an ICS; for example, data used to forecast anticipated levels of need can be used to guide preventative measures for *failure demand,* through identifying leverage points for policy development and thereby facilitate more coordinated and sustainable service delivery.

By contrast, a qualitative SD research methodology was used to examine data derived from a case study and retrospective analyses of policy documents and interviews in a rural health system in China (Zhang *et al*, 2014). In moving away from a centrally-led health care system to improve the performance of its workforce and information system, the approach facilitated system-wide policy changes through identifying levers for change, such as policy resistance and maladaptation. Similarly, this is transferable to ICSs within decentralised governance, in which centrally-led policies need to be adapted to a local, organisational policy environment.

Crucially, the research studies presented ST approaches as a positive and systematic methodology for knowledge generation. The literature presents an idea that in a ‘problem situation’, obtaining different viewpoints or perspectives facilitates an understanding of social factors that can directly influence an organisation’s success (Royal Academy of Engineering, 2017). Equally, a vision for building and maintaining knowledge through communication processes was highlighted as a systems methodology in an earlier paper by Gao *et al* (2002), in which the management of knowledge is asserted as being a determinant of an organisation’s “survival and growth in knowledge” (ibid, p6).

The ability to collect and utilise knowledge is also discussed in literature examining the application of analytical methods to effect policy making and intervention. From a systems perspective, utilising technological methods can further promote the development of services through communicating a system’s functioning at a whole system level (Zablith *et* al, 2016). For example, employing other ST approaches that are also underpinned by theory, such as CST can stimulate an interactive exchange of knowledge through technological communications of the effectiveness of policy-based interventions and actions (ibid). Tools such as feedback or CLDs and analyses of data over time, can capture information which can support and guide learning processes within the system, from frontline staff and citizen-users at a local (micro) level, to managerial and governance levels at regional (meso) and national (macro) levels of a system (Vohra Behl & Ferreira, 2014).Such levels of analyses are of particular relevance to integrated health and social care systems, in which all levels of the system are able to contribute to understanding.

Nevertheless, whether the research methodologies align with soft or hard systems approaches, both methodologies are evidenced as functioning well in contexts of complexity. As presented in the review papers, a fundamental rationale for using systems analytical tools and problem-solving methods is that knowledge is built on different levels of organisational data. Accordingly, the systems methodological framework served as a strategic methodological resource for empirical inquiry in order to implement holistic, action-based strategies in response to visualised organisational dynamics (Vohra Behl & Ferreira, 2014; Zablith, Faraj & Azad, 2016).

### 7.5.2 Working in Silos

A common ‘problem situation’ portrayed in the literature was ‘organisational silos’ (Oliver *et al*, 2019; BPiB, 2013). While the systems in the research papers comprise multi-stakeholders and external agents, none of the papers used the term organisational silos when discussing operational challenges. However, papers categorised in the theme of leadership provide a reference point for the concept of hierarchical silos in healthcare systems at an organisational level, where communication difficulties and emergent fragmentation of service delivery generated an opportunity to develop strategies to overcome operational barriers and blockages (Gilson *et al*, 2014; Kwamie *et al*, 2014; Malik *et al*, 2014).

Issues such as competing agendas and interests, often in line with divergent organisational and government goals, can further impact on operational integration (BPiB, 2013; Kuluski *et al*, 2017). A failure to exchange information and subsequent breakdown in communication may also echo organisational silos. The acquisition of knowledge within a health system is suggested to be a ‘building block’ for a cohesive organisation, along with service delivery and the health workforce (Malik *et al*, 2014). The authors’ discussion of these components lay emphasis on these being fundamental indicators of health systems performance mechanisms and that they do not occur in isolation for system effectiveness. As such, this understanding corresponds to an earlier strategy document produced by the WHO proposes that the efficiency of all of a system’s components will contribute to successful measures of the citizen user’s well-being (WHO, 2012).

The monitoring of a system’s effectiveness can be further explored to consider how well a system is functioning from an integrated care perspective. In Wales in particular, a silo mentality can be identified as a somewhat negative indicator in terms of its influence on a systems functioning. For example, communication barriers between teams may occur due to geographical silos, where services provided by ICSs are more difficult to coordinate as a result of citizens accessing community services living in extremely rural populations (BPiB, 2013). Likewise, areas of Wales have poor technology networks due to their rurality and this factor can exacerbate geographical silos.

The literature also acknowledges that a common challenge of providing community services is the alignment of the workforce in working toward shared essentially citizen-led, goals (ibid). For example, Alves & Meneses (2018) discuss the occurrence of silo attitudes in healthcare services in a national and global business conference paper and propose that a ‘silo mentality’ is a common consequence of the organisational structure in decentralised systems (ibid). Literature discussing attitudes on hierarchy in organisations and conceptions of power, from a ‘chain of command’ perspective, nods to the narrative theme of governance. Positions specifically present a dichotomy of *top-down* versus *bottom up* roles of authority and, in line with the principle of inclusion; reference is commonly made to systems requiring a bottom up approach to any modifications, in order to promote skilful intervention within a system (International Foundation for Integrated Care, 2020).

Literature also recognises that working relationships are influenced by the hierarchical configuration of silos that arise from organisational level processes, such as the administration of policies and procedures (Alves & Meneses, 2018). Likewise, research-based evidence establishes that team collaboration within systems is a core factor that is regularly impacted by the reorganisation of services. As such, organisational silos are also discussed as being generated by changes to the delivery of services, through which efforts to improve or transform a system have been impacted by ineffectively sharing data. Accordingly, a common challenge in integrated systems is that the computer networks in health and social care systems are not compatible and consequently create operational challenges.

Information collected from the perspective of citizen-user, such as the ‘user satisfaction’ government survey, commonly cite dissatisfaction with services to be due to experiences of inadequate communication between different systems (WG, 2019b). As such, technology can be viewed as offering a ‘collaboration tool’ which facilitates the transfer of essential information and discourages silo working (Greenhalgh & Papoutsi, 2018). Advances in technology, such as investing in the use of video conferences and calls to communicate information, can offer a valuable ‘bridge’ for sharing data and reducing any disconnect (Waal *et al*, 2019). Furthermore, the papers suggest that effectively sharing information and knowledge can facilitate joint working and reduce silo effects within systems.

Similarly, circumstances of ‘disconnect’ between integrated workforces can be perceived as aligning with the theme of authority relationships presented in literature, where silo effects in organisations impact on clarity of roles (Gilson *et al*, 2014; Malik *et al*, 2014; Paina *et al*, 2014). In the same way, the review papers acknowledge an organisation’s ingenuity for modifying stakeholder responsibilities to communicate identified service needs. The papers ‘set the tone’ from a position of leading a system by offering that working independently does not necessarily link to a ‘silo mentality’, rather that it demonstrates the emergence of a ‘system thinker’; in agreement with the application of a ST approach.

### 7.5.3 Systems Thinking and Ageing Populations

In addressing the area of inquiry for this research project, chapters one and two have discussed issues that health, social care and public services in Wales currently contend with due an increasing elderly population whom have complex and chronic care and support needs (ONS, 2019). This demographic has relevance for integrated health and social services systems, from the perspective of providing population-driven services for citizens with complex care and support needs. Operational issues generated as a result of multi-agency partnerships, highlights a need for holistic approaches that can examine and explain problem situations to inform policy and practice within ICSs (Rouse & Jacobs, 2012).

Likewise, the demographic trend of an ageing population is pertinent to integrated care services in Wales. In line with chronic care and support needs, demand for health and social services is influenced by issues generated by long-term intervention(s) across multiple dimensions of ‘frailty’ and disability, such as physical, cognitive, social and psychological (Woo, 2017). Through incorporating medical as well as social factors in services, challenges identified can catalyse policy incentives for preventative initiatives (McPake & Mahal, 2017). In promoting what Woo (2017) terms as ‘*intrinsic capacity*’, policy development can significantly shape integrated care services for ageing populations. In Wales, consideration of such components aligns with the guiding principles of the Well-being of Future Generations (Wales) Act (2015). As stated earlier, the seven principles are:

* A prosperous Wales
* A resilient Wales
* A healthier Wales
* A more equal Wales
* A Wales of cohesive communities
* A Wales of vibrant culture and thriving Welsh language
* A globally responsible Wales

In looking to ST to recognise the complexities and dynamics of integrated care provision, whole system integration can be viewed as a core dimension for ageing populations (Grey, 2020). In appreciating that integrated systems are multilevel in terms of service delivery, addressing citizens continued care and support needs through approaches that emphasise inclusivity is highlighted in systems literature as being fundamental in community-based approaches. As a result of implementing a ‘from the ground up’ standpoint, systems-based approaches can employ preventative actions through citizen-informed planning of health and social care needs (ibid).

Likewise, early and ongoing identification of multi-agency requirements brings together systems approaches and planning demographic-driven services to focus on addressing the health and social care needs of an ageing population (Phillips and Morgan, 2014). In doing so, reviewing, and evaluating the attainment of outcomes can inform policy development concerning financial arrangements (ibid). For example, understanding the outcomes of implementing preventative and early intervention chronic disease management initiatives could incentivise policy making for and commissioning of these services (ibid).

From an empirical perspective, research also has an important role in advancing knowledge of the application of ST approaches. Coulter *et al* (2015) completed a systematic review of collaborative interventions (between citizens and clinicians) to assess personalised care planning in the management of adults with chronic health conditions. Comparable to ST approaches, studies reported on the inclusion of the citizen-user[s] to jointly agree goals and plan actions (ibid). Reported outcomes included changes in perceptions of empowerment. These outcomes were apparent when intervention was all-inclusive and incorporated in regular care, like the holistic framework of ST (ibid).

## 7.6 THE ROLE OF THEORY

According to the conceptual framework of ST, system investigations require holistic research approaches that can appreciate complex challenges from a ‘whole system’ perspective (Carey *et al*, 2015). While the principal theoretical lens used to frame the review papers was Systems Theory, the ST approaches also drew on related theoretical branches, such as Complex Systems and Complex Adaptive Systems [CAS]. Similarly, literature discussing theoretical paradigms in other disciplines, such as operational research (OR) of professional practice, draw on theoretical assumptions of complexity to investigate the nonlinearity of organisations and multi-agency systems (Ulrich, 2012).

Theory-based research can advance empirical inquiry of multi-layered phenomena. This was evident in the systematic review. In line with the theoretical underpinnings of ST approaches, research underpinned by this theory provided new knowledge which enhanced understandings of complex systems (Greenhalgh & Papoutsi, 2018; Wiberg, 2014).

## 7.7 IMPLICATIONS FOR INTEGRATED CARE ORGANISATIONS: TRANSLATING LESSONS LEARNED

Collectively, the themes reported in chapter 5 indicate transferable lessons for ICSs for adults with complex care needs. In developing how the lessons synthesised can transfer to integrated health and social care systems, discussions incorporate a policy perspective to explore the underlying significance of the review papers. Consideration is given to research-based knowledge and comparisons made regarding the transference of policy-orientated ideas that correspond to each theme. In doing so, ideas are offered for how findings from the systematic review can be utilised to underpin future service organisation and delivery models. As such, exploring findings also incorporates/reflects the Company partner’s focus on the management of demands for district nursing services.

### 7.7.1 The Importance of Practicing System Leadership

As discussed in previous chapters, the included papers frame the importance of system leadership within a context of purposeful behaviours. Findings represent actions that mobilise power through ‘professional autonomy’, rather than organisational-led goals (Harnett, 2017). While the phrase ‘leading from the front’ may be a somewhat straightforward expression, making decisions that are purposeful and meaningful is a foundational capacity of a system leader (Timmins, 2015). As such, inspiring staff and managers to put forward innovative strategies to address local or system-wide issues can be viewed as paramount for developing the provision of services that meet the evolving needs of people with complex care and support needs (Senge, Hamilton and Kania, 2015).

Certainly, the included papers presented a relationship between meaningful decision-making and system-wide improvement. Equally, the emergence of system leadership as a strategic response to complex situations are shared characteristics in the review papers and in broader literature. The practice of system leadership is attributed to establishing new ideas and new ways of working, which resonates with discussions of involving stakeholders and citizens that engage with services; utilising their ‘voice’ to collectively focus on care and support issues that are important to them and the long-term feasibility of multi-agency services (Senge, Hamilton and Kania, 2015). In terms of an individual’s capacity to adapt to a system’s environment, their actions symbolises the influence of context for driving decision-making behaviours. As such, recognising and cultivating ‘autonomous’ individuals to pursue an organisational vision is crucial for developing integrated care services, albeit not always a shared understanding (Harnett, 2017).

The sharing out of ‘power’ to citizens engaging with services through participating in a collaborative course of action was key to the successful application of The Vanguard Method intervention (Dunnion & O’Donovan, 2014). Equally, the inclusion of stakeholders can shape building delivery models that incorporate their vision for delivering services of high value. For example, involving the citizen can inform the planning of evolving, complex care and support services provided by integrated health and social care systems. Findings demonstrated that stakeholders have a fundamental role in leading operational change within complex systems (Gilson *et al*, 2014). In particular, the role of local area managers is described as fundamental to provide leadership and foster self-organisation and commitment to the implementation of programmes for change. System leadership is consequently recognised as a collaborative process where shared discussions and leadership responsibilities serve as a mechanism to generate valuable, new knowledge and inform practice (ibid).

#### 7.7.1.2 Practicing system leadership for policy development

While centrally-led policy development certainly shapes the political environment of health, social care and public services systems, the papers highlight the need for flexibility; the need for policies to provide a roadmap for adaptive ways of working in order to meet the needs of local populations. Systems that provide integrated services to populations with complex and long-term care and support needs are positioned within a multi-layered policy environment (Timmins, 2015). Such as in integrated systems, where primary care services filter down to lower levels of a system comprising services that rely on practice-based commissioning and pooled budgets (Ham & Oldham, 2017). Subsequently, a focus on leadership in complex systems can drive decision-making and facilitate integration through policy-led practice (Harnett, 2017).

Collectively, the papers provide research-based evidence of improved outcomes as a result of practicing system leadership. A key finding was that the emphasis on local leadership in the papers highlights that the purpose of policies is to inform operational procedures and help employees understand their roles and responsibilities within the organisation (Gilson *et al*, 2014; Kwamie *et al*, 2014; Malik *et al*, 2014). Equally, the papers present the argument that without a framework and ‘common language’ to direct practice, leadership decision-making is an emergent strategic behaviour (Harnett, 2017).

Similarly, discussions of outcomes provide a focus on evaluating the practice of system leadership. Reported improvements in service delivery as a result of leadership behaviours can serve to inform service organisation and policy implementation, through validating strategic decision-making by appraising the service delivery process (Schelbe *et al*, 2018). Ultimately, the practice of system leadership is critical for policy development in integrated health and social care systems. Furthermore, local leadership is fundamental for evaluating intervention outcomes of multi-agency, community-based services in order to influence future local policy implementation (Harnett, 2017).

#### 7.7.1.3 Ideas of co-production and collective leadership

An increasing emphasis in healthcare research is placed on co-production and system leadership. In line with ST, working in partnership is a core principle of these initiatives (Bovaird *et al¸* 2014; Parkin, 2019). Although none of the included papers were located in integrated health and social care systems, it was striking that none of the papers made explicit reference to collaborative partnerships or system leadership. In describing these roles, the skills and values required to *co-create* ‘the end game [by] working across systems’ are offered as subliminal, whereby the actions of a system leader inform service improvement (Timmins, 2015:p18).

From a perspective of implementing co-production, the literature places emphasis on reviewing a system’s achievement of local and national objectives through reporting on using the skills, knowledge and views of stakeholders and the citizen user (Phillips & Morgan, 2014). In developing more equal partnerships between professionals, people who use services, their family and carers, co-production can support community-based intervention to achieve citizen outcomes and improve service delivery (Care Council for Wales, 2014; Tembo *et al*, 2019). In addition, the undertaking of co-produced models of practice is an optimal approach for the commissioning of research in healthcare systems (Tembo *et* al, 2019). In particular, the co-production of integrated services for older citizens with long-term complex care needs has shaped policy-decisions through incorporating citizens in a shared decision-making process to focus on designing local services that meet local needs (Phillips & Morgan, 2014). Equally, the active involvement of stakeholders resonates with ST’s tenet of cultivating participatory approaches to design systems and inform policy making (Tembo *et* al, 2019).

Likewise, ideas of authority in health and social care are frequently referenced from a position of top-down, manager-led services in discussions of decision-making and service delivery (Care Council for Wales, 2014). However, examples of co-production are growing in health research with regard to partnership opportunities between the researcher and the citizen(s). Subsequently, collaborations between the researcher and the citizen users to co-design local services and promote collective leadership skills based on a concept of ‘mutuality’ (ibid).

Leadership behaviours reported in a review paper represented ideas of shared decision-making through the collective understandings of staff (Gilson *et al*, 2014). Within the context of the health system, a ‘leadership of sense-making’ was required to promote collaborative relationships and overcome organisational barriers to cultivate a positive organisational culture to effect change. Similarly, investigation of actions in the pursuit of knowledge allude to barriers to learning that are imposed by a target-led management approach to service delivery (Malik *et al*, 2014). Therefore, ideas of collective leadership concur with a focus on sharing a vision in order to direct actions that are purposeful and effect meaningful organisational change (Claver, 2020).

As such, review papers located in the theme of leadership nod to what Fillingham and Weir (2014) propose are representative of an ‘unlearning’ of traditional leadership styles; in terms of viewing organisational relationships as a shared process of collective leadership (ibid). Working across integrated systems calls for a ‘dual focus’ systems leadership in order to cultivate “learning, reflecting and connecting” leadership behaviours (ibid, p23). In breaking away from conventional organisational leadership, where behaviours are often target-driven and manager-orientated, collective leadership focuses on meeting the emerging and changing needs of complex, adaptive health and social care systems (Rouse & Jacobs, 2012).

#### 7.7.1.4 Co-production in Wales

In Wales, integrated services have a statutory obligation to embed partnership arrangements and promote the active involvement of people in the planning and delivery of public services (ibid). *Co-production* is a core principle of the Social Services and Well-being (Wales) Act 2014. This is evident in practices introduced to promote the Act, such as personalised budgets and ensuring citizen users have a choice in their care (Care Council for Wales, 2014).

### 7.7.2 View Integrated Health and Social Care Services as an Evolving and Continuous Process

The above lesson interpreted from narrative synthesis of the included studies informs that literature recognises that “integration takes time to achieve” and that integrating health and social care services is an evolving and continuous process (Ham & Oldham, 2009: p7). Although none of the included papers were positioned in integrated systems, their reported findings offer valuable knowledge that can support planning and designing service organisation and delivery models. The synthesised themes provide a conceptual thread that captures the continual development of integrated care systems, which are represented by the emergent dynamic behaviours. Similarly, study outcomes contribute to understandings of how research informs efforts to appreciate the complexities of systems.

Organisations can ‘benchmark’ the quality of services provided by collecting data to monitor operational effectiveness, to verify influences that impact on outcomes[[26]](#footnote-26). In conducting such a process of Continuous Quality Improvement (CQI), operational and management issues can be identified in order to gather practice-based knowledge that can be used to facilitate whole system improvement (ibid). However, while applying an approach to help achieve best practice can improve performance and outcome data, an emphasis on learning is essential to transfer knowledge and insight gained about changes that need to be made to practice (O’ Neill *et al*, 2011). Therefore, creating and fostering a working environment that is represented by shared aspirations to learn and advance service delivery and outcomes (National Institute for Health Research [NIHR], 2018).

Like the CQI approach, the conceptual framework and tools of ST can signpost where strategies are needed to target ‘problem areas’ (O’ Neill *et al*, 2011). Comparable to systems ideas of interconnected processes and feedback systems that continually change and adapt, organisations need also to be informed of influences and challenges that can impact on a quality improvement process (Hill *et al*, 2020). Equally, the ST term *unintended consequences* encapsulate where attempts by organisations to manage complications and bring about change are ineffective and generate unplanned outcomes.

To achieve organisational change, both approaches utilise insights and experiences of people to inform discrete dimensions of inquiry. In drawing on understandings and reflections of practice, models can provide a visual a framework to signpost and structure intervention methods. Similar to the recognised conceptual approaches and tools of ST, literature reporting service improvements and redesign regularly cites a tool known as the Plan-Do-Study-Act (PDSA) model. The PDSA quality improvement tool is comprised four stages of ‘problem solving’ dimensions and uses feedback from internal and external citizen-users to identify areas for attention (Coury *et al,* 2017). Similarly, the Vanguard Check-Plan-Do Model is comprised three stages aiming to carry out change and improve a process (Seddon, 2008). The similarities of feedback processes within their cycles of application are illustrated in Figure 14.

Figure 15: Comparison of the PDSA Model with the Vanguard Method

Adapted from Vaux *et al* (2012)

#### 7.7.2.1Policydevelopment for an evolving integrated care

From a policy perspective, integrated care systems can be viewed as a political ‘response’ to managing the complex financial burdens of services provided by the NHS and social services (Hughes, 2017). As discussed in chapter 5, a key learning from the papers was that service provision highlighted a focus on sustainability. In exploring findings and their implications for integrated care organisations from the review papers, consideration extends to broader dynamisms that can determine the success of integrating health and social care systems. Contributing factors such as social and economic drivers continue to mobilise the need for a more cohesive approach to policy development (Ham & Oldham, 2009; BPiB, 2013). Likewise, identifying the citizen population’s care and support needs and their available resources can facilitate developing a care model built on providing services that align with the core needs to be met (Hughes, 2017).

As discussed in chapter 2, there is no consensus for which care model to use to inform integrated service delivery (WHO, 2016). In line with providing multi-agency services to citizens with complex care and support needs, policy needs are shared within integrated systems and local adaptation must incorporate central goals required by national legislation (Harnett, 2017). For example, when modifying the policy context of primary legislation and government documents in order to provide community-based health and social care services for older populations (Woo, 2017; Hughes, 2017).

Similarly, from the perspective of monitoring operational effectiveness and citizen outcomes in improvement processes such as CQI, collecting data can serve to inform policy-making and implementation and also as an incentive for financial resourcing and commissioning (Ham & Oldham, 2009; Harnett, 2017). Equally, the papers highlighted that through public engagement, the insight provided by system stakeholders is invaluable for informing a collective vision for sustainable programmes of intervention.

### 7.7.3 Involving all Levels of a System to Underpin Future Service Organisation

“Underpinning a culture of safety are good leadership *at all levels*, strong governance within the service and a culture of openness and transparency” (Care Quality Commission, 2017).

From a systems perspective, the involvement of people within the research approaches is a core principle in all of the literature and upholds the foundation stone of systems theory. In exploring how this lesson can transfer to integrated health and social care systems, a key learning point from the literature is that the roles of the citizen-user, front-line staff, clinical leaders and management staff role are re-purposed to align with the current focus on well-being. As collaborative approaches to decision-making are crucial for building systems that recognise local contexts and barriers, a commitment to collecting, sharing and learning from information is vital to develop personalised health and social care services (Joseph Rowntree Fund [JRF], 2015).

The literature demonstrated the importance of employing a structured approach to implementing change processes. This was achieved through collecting information and using outputs to capture context-specific data, supported by a goal to understand what is relevant and needed within partnership working (JRF, 2015). Measuring outcomes to re-assess and evaluate the effectiveness of intervention is also established as being central to monitor needs and personalise services accessed. Such a continuous process of meeting the ‘complex and evolving staffing needs’ of citizen-centred services, requires that local systems benefit from utilising skills and dialogue to inform local plans (NHS, 2020: p6).

These learning points will be of transferable value to ICSs, in which a focus on planning services that align with local needs is essential from an organisational level to a community, citizen level (JRF, 2015). This level has particular significance for health and care services for aging populations, for example, as the provision of services needs to be able to adapt in line with changes in service requirements (Charles *et al*, 2018). With a focus on locality, multidisciplinary teams within ICSs need to be working collaboratively across health and social care to respond to local challenges and opportunities (NHS, 2020).

#### 7.7.3.1Policy development for underpinning future service organisation

The literature also illustrated that the policy context has a significant influence on ways of working and so shapes the design of services. A continuing learning point is that the planning of future service organisation and delivery models needs to encompass flexibility, so that practice which is influenced by meeting national targets can adapt to meet local delivery needs (Charles *et al*, 2018). Similarly, developing models of care need to involve the citizen-user, from the initial assessment stage through to the commissioning and delivery of services (Care Council for Wales, 2017). As such, commissioning and providing care and support services across sectors are presented as needing to incorporate developing the workforce and services that meet the long-term care and support services required (NHS, 2020).

Likewise, policy making needs to facilitate developing the workforce and services to build the capacity of primary care and community services. Of equal emphasis is that policy development needs to be a continuous process informed by transparent local knowledge; in this context, transparent is used to denote the process of planning and commissioning local health and social care services that can adapt to reflect emergent citizen-user needs, such as the provision of specialist services (Care Council for Wales, 2017). With a focus on achieving citizen-led outcomes, policies need a clear vision of shared goals to address the role and responsibilities of the citizen[s] that need care and support and the input of their family and advocates (Hallsworth and Rutter, 2011).

### 7.7.4 Promoting Transformation through Understanding

The learning from the final lesson continues to be informed by the overarching theme of stakeholder participation. The literature highlights that the purposeful role of applying the ST approaches is to reveal the complexities of an organisational issue and frame the problem. The literature demonstrates how the citizen-user, their family and advocates and staff provide an explicit understanding of the feedback relationships within a system and how this can inform planning for implementing transformational changes to achieve whole system change. Equally, ST’s scientific methodology can inform strategic planning and service development through identifying the characteristics of processes that need redesigning to strengthen future service organisation. For example, a quality improvement strategy was applied in an educational setting in one of the review papers to increase successful implementation of a public health programme (Biggs *et al*, 2014).

The transformation of complex organisations will be of particular interest to ICSs, in light of the processes of reform that health and social care services have undergone in their collaboration. Subsequent efforts to improve services can benefit from drawing on knowledge derived from an ‘organisational narrative’ (Harnett, 2017: p218). Harnessing this resource can help locate dynamic relationships in a system and indicate where transformative actions are needed, such as redesigning operational processes. In the literature, success is measured against local and citizen-led outcomes, rather than achieving centralised objectives. As such, research outcomes are evidence-based and so represent local populations. For example, *mortality* is a prevalent outcome in healthcare and a reduction in its occurrence was the focus of research positioned in neonatal services (Rwashana Semwanga *et al*, 2014). This outcome was a measure of success and was achieved through understanding the dynamics of service delivery.

#### 7.7.4.1 Systems thinking and change

Investigating the complex network structures of health, social care and public systems, enables research to interpret and explain dynamic cause and effect relationships, while viewing processes that generate problem(s) as emergent and learning as a continuous practice (Willis *et al*, 2014). Understandings of conceptual approaches to implement change through a ST lens have contributed to knowledge transfer between research, policy and practice; as communicated within policy-orientated research that is funded by the Government or voluntary organisations, such as the King’s Fund (Ribesse *et al*, 2015). In assimilating systems conceptual and methodological tools, literature highlights that approaches to whole systems change are systematic, innovative and can indeed shape efforts to achieve transformative impact through completing regular assessment and appraisal to understand the dynamics of the system (Willis *et al*, 2014; Rouse & Jacobs, 2012).

As previously discussed, there are a variety of approaches that highlight the interconnectedness of contextual factors in theorising the complexity of health and social service systems. A critical focus of systems literature is the importance of strategic decision-making within change processes to support problem-solving and effect well-planned change (Jacobs *et al*, 2013). In viewing health and social systems as complex systems from the outset, systems theory conceptualises that these are not linear, cause-effect relationships but are instead continuously adapt to change, directed by the interfaces between systems components (Ribesse *et al*, 2015). For this reason, the theoretical underpinnings of complex adaptive systems generally inform transformational intervention within complex environments (Rouse & Jacobs, 2012).

In using ST’s theoretical principles of connectivity to underpin change processes, its conceptual framework can ‘navigate’ interrelated dynamics through illustrating their relationships (Best & Holmes, 2010). The emphasis on involving citizen-users provides a local context to situate a problem and contribute to identifying what elements need addressing (Grey, 2020). Likewise, the analytical tools of ST can elucidate areas of whole system concern (Greenhalgh & Papoutsi, 2018). However, literature cautions that because of these characteristics, ‘solutions’ to problems in complex adaptive systems are frequently emergent and as such, are susceptible to being policy resistant at an organisational level (Best & Holmes, 2010).

In applying ST to effect change and improve policy and practice, emphasis is placed on reflective practice as a source of knowledge exchange and learning (Best & Holmes, 2010). As detailed in Table 13, transformational change processes through a ST lens are systematic. Asking critical questions such as what is the problem(s) that needs addressing; who has local knowledge to direct and inform decision-making and what can be learned, can guide such reflective practice (Green *et al*, 2009; May, 2011). Equally, communicating the change process with everyone involved will foster developing partnerships and cultivating stakeholder networks for the transfer of knowledge and further reflection (May, 2011).

Table 12: Change through a systems thinking lens

|  |  |  |
| --- | --- | --- |
| Objective: | Thinking in Systems Question: | Systems thinking: |
| *Identification* | * What problem needs addressing? * Who can inform us to address the right problem? | * Need local context and knowledge to situate the problem: involve all stakeholders/citizens in focus groups/ interviews/ questionnaires |
| *Analysis* | * What tools can we use to seek explanation and establish causalities? | * Map networks and processes * Investigate causal relationships; feedback loops to explore cause and effect relationships |
| *Measurement* | * What tools can we use? | * Should we focus on a timeframe for the problem? |
| *Outcomes* | * What can we measure? * What do we need to monitor? | * Do our shared visions align? * Evaluate and review |
| *Knowledge Transfer* | * What can we learn to improve policy and practice? * What works well and why? | * Evidence-informed intervention strategies for policy and practice * Develop partnerships and cultivate stakeholder networks |

Adapted from May, R (2011)

#### 7.7.4.2 Transformation policy implications

Understanding complex organisations serves as a key policy driver for public health and social care policy interventions (Borgermans & Devroey, 2017). Transference of the lesson [learned] for promoting transformation through understanding can focus on different levels of integrated care services; at the individual, community and organisational levels. For ICSs, changes to practice can inform policy decision-making to underpin future service organisation and delivery (Charles *et al*, 2018). Translating practice into policy can create opportunities for intervention in several domains, such as those illustrated in Figure 16.

Figure 16: Translating practice into policy

Adapted from Charles *et al* (2018)

## 7.8 Insights from the Knowledge Exchange Event

Discussions in the Knowledge Exchange Event provided new insights into the complexities of providing integrated care services. While the ST approaches reported in the review papers were perceived as methodical and undemanding, when the Company partner audience were engaged in dialogue during the Event, it was evident that the application of ST by a ‘non-expert’ was a more challenging process. In line with the *barriers* and *enablers* discussed and reported in Table 11, the practice of ST in an ICS presented as being purposeful from an operational perspective. For example, while the research papers focused discussions on the methodological application of ST and the research outputs from using systems tools, a more pragmatic outlook was observed in the discussion point. This was represented by the audience exploring the impact of organisational challenges on operational processes within the ICS, rather than focusing on the outcomes of their integrated health and social care services. Therefore, through examining the impact of internal and external influences, the focus on understanding what was happening and why aligns with the ‘thinking in systems’ standpoint of ST.

## 7.9 Unexpected Findings in the Included Papers

Following analyses of the included papers, consideration is now given to characteristics that were not a focus in the research outputs. From a perspective of health and social care systems, literature addressing the area of inquiry often present arguments of dynamic influences that can impact an organisation’s functioning, drawing parallels with theory-driven standpoints. In exploring the application of ST approaches in the fields of health, social care and public services, preceding chapters have discussed common focuses in systems-based approaches to situate research within ST.

In considering understandings from the literature retrieved, several observations can be made with regard to the collective characteristics. First and foremost is the overarching dominance of international-based research, with only one British paper meeting criteria for inclusion for the systematic review (Dunnion & O’Donovan, 2014). This observation can be broadened to include the finding that most of the studies were in developing countries. Research literature commonly categorise the country in which the research is conducted as being *developed* or *developing* for analytical purposes; communicating social, economic and political measures as determinants of health (Khokhar & Serajuddin, 2015). While this categorisation is often made in terms of its clinical relevance to problems in healthcare systems, papers that were positioned in developed countries did not incorporate this distinction in discussions.

Applying a systems focus to appreciate the influences of a system’s environment and boundaries, studies that are positioned in public services can be viewed as having an intrinsically political environment (Claver, 2020). As such, the classification of countries within research is also representative of the changing policy and practice context for organisations, in particular health and social care systems (Harnett, 2016). Reforms of health and social care services have included changes in how organisations are financed and can purchase services needed to meet local population demand. Similarly, in considering the influence of local and national policies on organisational growth, only two of the papers discussed influences [of local and national policy] in the systems of inquiry (Waqa *et al*, 2017; Zhang *et al*, 2014). Therefore, the literature offers that the political environment of less developed countries as a determinant of the system’s success, due to a stricter administration (Radua, 2015).

Another surprising finding was that while arguments of operational dynamics and facilitating organisational relationships often discuss working toward shared goals, none of the included papers made explicit reference to silo behaviours to contextualise the research and broaden discussions of barriers to effective functioning, such as fragmentation of services. However, this idea did indeed resonate with discussions of *dual practice*, through which practice in both public and private sectors was merged as a result of leadership behaviour (Paina *et al*, 2014).

## 7.10 **CHAPTER SUMMARY**

This chapter has explored the thematic synthesis in the light of the wider literature. Literature that satisfied the review question has been appraised and discussions informed by their contribution to answering the review question[[27]](#footnote-27). Findings from the systematic review did provide transferable lessons and these have been considered on a broader level with regard to developing future integrated service provision for adults with complex care needs. In doing so, the themes identified in the systematic review have been further explored to advance understandings of how lessons learned can transfer to policy making and inform practice. The categories of stakeholder involvement, system leadership, governance, sustainability and transformation have also been interpreted to consider the importance of inquiry-guided research in health and social care systems and public services. Chapter 8 provides reflections on my learning experiences throughout the research process. The chapter also describes how personal and academic development have assisted in advancing the research project.

# Chapter 8: Reflections

## 8.1 INTRODUCTION

This chapter reflects on what I have learned whilst undertaking this KESS2 funded research project. It draws on Kolb’s (1984) experiential learning cycle depicted below when reflecting on personal and academic learning experiences. Consideration is first given to the systematic review process accomplished in the early phase of research and which forms the primary focus of this thesis. Following this, reflections are offered on the Knowledge Exchange Event organised. This chapter closes with reflections on the final stage of the project and considers the tasks of writing up this thesis and providing a report to the Company partner.

Figure 17: Kolb’s learning cycle

. Adapted from Kolb’s (1984) Experiential learning cycle

## 8.2 REFLECTIONS ON THE SYSTEMATIC LITERATURE REVIEW

Foremost, I found completing the database searches in the initial stage of the systematic review a very lengthy process as I had not accomplished a systematic review previously. While a large amount of the literature retrieved were excluded in the identification and screening stages of the systematic review, understandings from the literature support why the conceptual framework of ST offers a methodological resource in research. Although informed by a protocol, I required much guidance in the early stages of the review process from my thesis supervisors and the university’s librarian to confirm that the literature search was adequate to identify the literature needed to answer the review question. This was particularly difficult at times as some literature appeared to pass criteria for inclusion but did not support reported findings and conclusions with objective data. In this phase of the research, I recognised that the process of building knowledge through active experience is aligned with Kolb’s (1984) concept of Concrete Experience (Figure 15).

Similarly, critically evaluating the papers that met the criteria for inclusion in the review and appraising their overall quality using the Critical Appraisal Skills Programme (CASP) qualitative appraisal tool and the Mixed Methods Appraisal Tool (MMAT) was also difficult initially. This was because I questioned whether, as a student researcher, my measure of the research methods used against the checklists of criteria indicated their quality accurately. However, with support from my thesis supervisors and opportunities to ‘cross-reference’ appraisals completed, I was able to perform this task more confidently and independently.

In planning and completing the narrative synthesis, relevant literature was sourced to gain knowledge on this approach and interpretation of research-based evidence. Whilst I have previous experience of completing a narrative review of literature, the systematic process required for narrative synthesis was somewhat challenging. However, this task became much easier once I had interpreted the emergent themes and I was confident that my literature-based research skills were developing.

## 8.3 REFLECTIONS ON THE KNOWLEDGE EXCHANGE EVENT

Dissemination of the systematic review findings to the Company partner was a key element of this research that presented opportunities for academic experiences and personal growth. I found the Knowledge Exchange Event extremely valuable, from both an academic and a personal learning perspective. In keeping with being underpinned by the DEEP approach, the guided discussion was a positive element of the Event as I did not have previous experience of facilitating these exchanges. Equally, skilled facilitation in the use of evidence in service and workforce development was fundamentally important and attendees engaged fully in discussions of findings and sharing insights into experiences of their ICS.

The presentation slides summarised the systematic review process and key points were explained.I was mindful that communicating the process to a practitioner audience required adapting scientific terminology and phrasing to engage with attendees. However, after organising and preparing the Event, I was disappointed that only a small number of stakeholders attended (*n*=6). In reflecting on my learning from organising and presenting this component of the project, I can identify with Kolb’s (1984) concept of Abstract Conceptualisation to consider the convergence of practice and research (Figure 15).

Shared dialogue developed in light of the Company partner’s focus on enablers and barriers to integrated care and discussions responded to emerging ideas and contexts, as discussions of *barriers* and *enablers* in their ICS resonated with themes identified from the review findings. This was of particular importance in developing the findings as I was able to use their experiences of organisational challenges as a point of reference when interpreting implications of findings on policy and practice. However, time constraints limited the opportunity to consider how the research findings can support practice development and this element of the Event. Nevertheless, the discussion points raised did indeed resonate with understandings from the literature review, the focus on complex, dynamic relationships within systems in particular.

## 8.4 REFLECTIONS ON WRITING UP THE THESIS AND REPORT

Reflecting on the process of writing up this research project and the opportunities for personal and professional development has called for a critical ‘lens’. As this project has been informed by a protocol, the initial planning of the thesis structure was fairly straight forward. However, arranging the order of the chapters so that the different components of the research project are reported in a logical progression has been a continuous process of applying what I have learned from my thesis supervisors, the guidance provided in the literature and redrafting. In using Kolb’s (1984) conceptual framework to situate the learning process for this stage of the project, the process of learning aligns with Kolb’s (1984) concept of Active Experimentation (Figure 15).

Likewise, my academic writing skills have also needed to be developed with support from my thesis supervisors. Initial chapter drafts required a simpler writing style to promote clarity of voice and to ensure my ideas were expressed clearly and concisely. From this perspective, grammatical revisions and changing my terminology has been an evolving process. Amending chapters and redrafting sections in a different ‘style’ of writing has involved much academic effort. This was particularly challenging as the thesis topic is a complex area of inquiry. Additionally, I decided to abbreviate the term *systems thinking* as it was used recurrently within different contexts within the chapters; for example, when discussing the systematic review and when discussing ‘systems’ in the context of an organisation. I also needed to double-check that chapter contents included data that addresses the area of inquiry. Subsequently, I believe that my learning experiences have developed my skills as a researcher, improving my abilities to distinguish between primary and secondary research literature and my skills in reporting findings to a non-expert audience.

Moving on, a concise account of the systematic review is to be written for the partner company following submission of this thesis. As it is necessary that this final piece of work is reduced to an executive summary, I anticipate that consolidating the narrative evidence will also be important, albeit challenging, in developing my academic skills. I envisage that this concluding task will be a similarly challenging, yet rewarding, learning experience.

A final reflection is undoubtedly that the process of completing the thesis for this Masters by Research has also been a learning curve in terms of my personal development. This concluding element of the project has been somewhat challenging from a personal perspective as, having previously completed post graduate studies, I considered that I had developed skills that would facilitate this process. To reiterate, I have been extremely grateful for support received from my supervisors and their ‘pearls of wisdom’ have been invaluable in guiding me to critically analyse my writing and encourage increasing levels of self-confidence.

## 8.5 CHAPTER SUMMARY

This chapter has provided reflections on what I have learned during the research process. Considerations have been given to personal and academic learning experiences and Kolb’s (1984) experiential learning cycle has been used as a point of reference. This chapter has reflected on the various elements of the KESS2 funded research project, from the initial task of undertaking the systematic review to the concluding tasks of writing up the thesis and the report for the Company partner. Through describing my experiences within the learning contexts of the research project, reflections also offer how these have supported developing findings as well as my skills during the research process. The final chapter in this thesis recaps the review question and objectives and provides a conclusion that addresses these. It also presents recommendations for policy, research and practice.

# Chapter 9: Conclusions

## 9.1 INTRODUCTION

The primary objective for this thesis was to undertake a systematic review of the application of ST approaches in health, social care and public services. This final chapter appraises the achievement of the research aims and objectives. In doing so, the limitations of the research project are identified. This chapter also brings together the review findings to offer recommendations for developing leading integrated care services for adults and future policy, research and practice.

## 9.2 CONTRIBUTION TO THE FIELD

In framing the contribution that this thesis provides, it is necessary to reconsider what has been learned from undertaking the systematic review of the application of system thinking approaches. As discussed in chapter one, there is an evolving body of research in the practice of systems science. Previous research is not substantial and exploration in the form of a thematic series of the application of ST in health, extended knowledge through reviewing its application in low- and middle-income countries (Taghreed, 2014). In addition, although finding other systematic reviews of the application of ST was not a focus of this research, the database searches did retrieve three other systematic reviews (Carey *et al*, 2015; Coulter *et al*, 2015; van der Heijden, 2020). Therefore this thesis will contribute to this research inquiry in light of emerging interest.

While findings have identified areas in which systems science can advance intervention in public services, themes from analysis of the review papers have generated discussions from a perspective of developing systems research in public health. Although many academic papers have added to understandings of ST approaches, this protocol-driven thesis provides new knowledge by systematically searching and reviewing the application of systems-based approaches in health, social care and public services. Analysis of the review papers has provided theoretical understandings to develop understandings of the complex processes involved in investigating systems. In exploring and explaining the intricacy of interconnected components in a system, the literature has highlighted the fundamental role of systems theory and how its theoretical branches guide the application of systems-based approaches to investigate and interpret an identified problem in empirical research. This thesis provides descriptive insights to the practice of ST and offers lessons learned that can transfer to develop future service organisation and delivery models for adults; demands for DN services in the Company partner in particular.

## 9.2.1 Recommendations for Policy, Research and Practice

The following recommendations draw on the findings from the systematic review and insights gained at the knowledge exchange event:

* ***Shared visions*** – The insights and experiences of the citizen-user, front-line staff, clinical leaders and management are crucial to understand complex systems and shape services to achieve organisational change.
* ***Co-production*** - Collaborative approaches to decision-making are essential to build systems that recognise local challenges and opportunities.
* ***Adaptability*** - While centrally led policies shape the political environment of health, social care and public services systems, there is also a need for local level policies that implement the system in a way that meets the needs of local populations.
* ***Evaluation*** – Policy and practice success is best measured against local and citizen-led outcomes, rather than centralised objectives.

## 9.3 STRENGTHS AND LIMITATIONS

The primary objective for this thesis was to undertake a systematic review of the application of ST approaches in health, social care and public services. This research project set out to investigate the systems-based literature and synthesise transferable lessons that can inform future integrated service organisation and delivery models for adults with complex care needs. While myriad literature discusses ST as an established perspective from a theoretical, narrative standpoint, informative contributions from the key system thinkers are not current. Subsequently, a key challenge was the limited resource of contemporary literature on which to draw. Nevertheless, this shortcoming was seen as a valuable learning opportunity to broaden my searches for related literature. In considering the wider literature base, research papers that discussed areas of focus in chapter 7 provided information that was essential to facilitate interpreting the findings from the review papers and develop focal ideas.

Equally, while the search findings are representative of literature that met criteria for inclusion, the specific use of specific databases for the search strategy may have reduced the range of literature to inform the area of inquiry. Therefore, the inclusion of grey literature could have generated a broader literature base to review; albeit the volume retrieved may have been too great for a single researcher to analyse fully. As previously mentioned, guidance from the University’s subject librarian was instrumental to begin the systematic review of the databases.

## 9.4 RESEARCH IMPLICATIONS

This thesis reiterates previous identified assertions that further research is needed (Green, 2006; Carey *et al*, 2015). Inspired by the application of ST approaches, further research would build on the core areas of participation and investigation of dynamic themes. For example, research with a focus on stakeholders as agents of change could evidence the practice of co-production in collaborative systems as a strategy for commissioning services. While advancement of the application of ST approaches was validated by Taghreed’s (2014) series of research papers, the wider literature did not establish ST as a conventional resource in research or practice to investigate the complexities of integrated health and social care systems.

Further evidence-based knowledge will contribute to exploring the application of systems-based methodologies in health and social care and public services more extensively. Equally, research that incorporates a focus on outcomes will also contribute to knowledge of ST’s efficacy as a [reputable/recognised/proven] resource/methodology. In addition, while ideas of co-production were identified in the wider literature and raised in the discussion of *barriers* and *enablers* in the Knowledge Exchange Event, I was surprised that this was not incorporated in the included research papers that reported intervention in community services for health systems. As such, this reflection could provide an area of inquiry for further focus.

I was able to transfer understandings to enhance my interpretation of the review papers as most of the examples from the discussion points resonated with the review papers and authenticated the emergent themes[[28]](#footnote-28). In addition, while ideas of co-production was a common focus in the wider literature and raised in the discussion of Barriers and Enablers, I was surprised that this was not incorporated in the included research papers that reported intervention in community services for health systems. As such, this reflection could provide an area of inquiry for further focus.

Investigating outcomes has not been part of the narrative synthesis in this systematic review. Evidence synthesis that addresses research questions related to the implementation of systems-based interventions could inform policy and practice through using tools such as outcome mapping to evaluate their effectiveness and provide new knowledge. Equally, evidence synthesis of outcomes for theory-based approaches, such as ST, could promote the use of these approaches in practice. For example, Theory of Change could be used to measure the impact of ST approaches on public services.

## 9.5 CONCLUSION

While there is an evolving body of research into the application of ST approaches in public services, its full application into investigations of organisational problems to provide meaningful learning opportunities remains emergent. Certainly, literature established the prominence of theoretical foundations to underpin research-based evidence and provide new knowledge. Therefore, a key assumption is that theoretical frameworks served as a template to guide research or programmes of intervention when concepts of complexity were central to exploring phenomena of concern. Likewise, the systematic review has demonstrated the explanatory power of ST approaches for focusing analyses to capture the intricacies of service organisation. Indeed, ideas of systems science have served as a platform to promote capacity building and innovative strategic behaviours. Thereby, ST can function as a scientific [systems] learning strategy to inform policy and practice.

Interpretation of intervention reported that addressed operational problems, has established that ST approaches fostered transformative changes. Similarly, the leadership behaviours that emerged from divergence to established governance mechanisms resulted in transformative changes to promote system sustainability. As such, the thematic categories presented in this thesis are inter-linking without distinct boundaries. In recognising this interconnection, interpretations have also established that the overarching theme of involving stakeholders fostered transparency within ST intervention approaches, through the involvement of the research participants.

In conclusion, the application of transferable lessons will require a re-framing of intervention approaches to fully appreciate the multi-level complexities of a system. Approaches that can monitor and evaluate outcomes of interventions as a core research objective are paramount, to progress the transfer of knowledge for thinking in systems. While literature asserts that unintended consequences are a systems phenomenon, research pursues exploration and understanding rather than searching for solutions. In aligning research with practice, a final thought is that more work is to be done to build on what is already known about using ST approaches in health, social care and public services to continue to develop leading integrated care services for adults with complex care needs.

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# APPENDIX 1: The Systematic Review Protocol

**Background**

Advancements in modern health and social care practices seek to shape the delivery of timely and effective person-centred care services to support individuals with complex needs, explicitly following the 2014 Social Services and Wellbeing Act (Wales),such as partnership arrangements between Health and Social services and the local authority’s duty to meet care and support needs of an adult (Social Care Wales, 2014). In line with the implementation of unified systems, successful provision of appropriate services has been impeded by the influences of traditional operational methods (Billings and Davis, 2016). Moreover, reforms in national and local health and social care organisations have increased the complexity of integral services involved to meet one or more needs of people who use services (Booth *et al*, 2016). However, variances in policy intentions and practice have generated a lack of compliance in meeting the unified services’ fundamental objectives, such as improving partnership working through using models of joint working to organise integrated services (Butler *et al.,* 2016). Essentially, modern organisations need to revise established one-dimensional visions and divergent objectives in order to provide sustainable integrated care.

Consistent with this necessity, the conception of integration may be viewed as central to systems theory; similarly, the application of *System Thinking Approaches* are championed as being of value to address complex problems (Kodner & Spreeuwenberg 2002; Reid *et al*, 2005; Billings & Davis, 2016). The ideology of systems thinking approaches to improve organisational design and change is not a new construct. Myriad literature discussing the utilisation of systems thinking in city logistics (Kunze *et al*, 2016); higher education (Siegrist *et al*, 2013); systems engineering (Arnold & Wade, 2015) and sustainable energy (Snyder & Snyder, 2008) have been published. Evolved from the systemic theory of change, systems thinking approaches are discussed in contemporary healthcare research at national and international levels; indeed with a particular focus on their utility at a service delivery level, drawing on incorporating systems tools to identify and address operational dilemmas (Kunze *et al*, 2016;Arnold & Wade, 2015; Allen, W 2019). Nevertheless, the diffusion of the foundational principles to integrated health and social care provision remains a somewhat narrow area of pragmatic research (Trochin *et al*, 2006; Billings and Davis, 2016).

**Objectives**

Ultimately, the objective for this research is two-fold. Initially, a single researcher will conduct a *systematic review* of published evidence on Systems Thinking Approachesto examine the effectiveness of its framework and methodsforunderstanding the dynamics of collaborative organisations; informed by a review protocol to minimize bias and enhance transparency and reproducibility. Subsequently, data synthesis of the literature review will aim to identity the diffusion of systems thinking approaches explicitly to integrated health and social care services.

Subsequent to the research inquiry, a *knowledge exchange workshop* will proceed to disseminate the research findings to key stakeholders (strategic and operational staff; individuals in receipt of services and family carers), underpinned by the framework for ‘Developing Evidence Enriched Practice’ (Andrews *et al* 2015). Thus, the participatory element of stakeholder involvement will supplement and extend the research findings in order to appraise the potential diffusion to inform policy and practice for developing services for adults with complex needs.

The preliminary research question is:

* + What transferable lessons are there from using systems thinking approaches in health, social care and public services to develop leading integrated care services for adults?
* **Search Strategy for Identification of Studies**
* The review question will be formulated by mapping the parameters of the research area of inquiry onto the SPICE framework:

|  |  |
| --- | --- |
| **S** | Public, health or social care Services (to include statutory & independent sectors) |
| **P** | All key stakeholder perspectives (Adults >18 yrs of age: Staff- managers, commissioners, etc & People accessing services + family & carers) |
| **I** | Systems Thinking |
| **C** | Any or none (use of systems thinking & other integration management approaches) |
| **E** | Qualitative, quantitative & mixed methods |

* Keywords will be used to define the research inquiry:
  + diffus\*
  + transfer\*
  + Integrated health and social care (Synonyms: Collaborative care; Integrated care provision; Integrated health; Coordinated care; Comprehensive care; Seamless care)
  + Key stakeholder perspectives
  + Public services (Services in the Public Sector)
  + Health care
  + Social care
  + Systems governance (e.g. auditing)
  + Service development
  + Service organisation and delivery
  + Systems Thinking (As systems thinking is a perspective, searches will comprise related terms; such as Systems Theory, Systems Science, Systemic Interrelations, System dynamics, Feedback Loops, Causal Loop Diagram\*, Complex Systems Diagram\*, Leverage Point\*)
* Search Term Clusters will be mapped against the review question:
  + “Systems Thinking” OR “Systems Theory\*” OR “Systems Science” OR “Systemic Interrelation\*” OR “System dynamics” OR “Feedback Loop\*” OR Causal Loop Diagram\* OR “Complex Systems Diagram\*” OR “Leverage Point\*”
  + “Health care” OR “Social care” OR “Public service” OR “Public Sector\*” OR “Systems governance” OR “Service Development” OR “Service Organisation” OR “Service delivery”
  + “Integrated care provision\*” OR “Integrated Health” OR “collaborative care” OR “coordinated care” OR “comprehensive care” OR “Seamless care”
* In line with the SPICE framework to identify potential studies, eligibility will be determined using the following eligibility specifications:
* **Inclusion** **Criteria:**
  + - English language Literature
    - Literature published reporting on the application of Systems Thinking Approaches in health, social care and public services & other integration management approaches
    - Any primary data to evidence if systems thinking approaches improved service delivery/ organisational effectiveness
    - Qualitative, quantitative studies and mixed methods studies
    - Peer reviewed articles
    - Conference/Government papers
* **Exclusion Criteria:**
  + - Non-English language literature
    - Literature that does not report on the application of Systems Thinking Approaches in health, social and public services & other integration management approaches (e.g. in the business sector)
    - Literature that does not contain any primary data (opinion/theoretical papers)
* **Method of Review**
* Studies will be selected by a single researcher [with guidance/support from supervisors]
* Searches will be conducted of ASSIA; CINAHL and ProQuest Social Sciences Premium Collection Electronic databases
* Selection will comprise (i) title sift (ii) abstract sift and (iii) full-text sift
* Studies that do not derive from keywords contained in the combined search string will not be selected
* Studies that do not satisfy all of the inclusion criterion or meet the exclusion criterion will not be selected
* Reasons for the exclusion of any studies will be recorded (for transparency, Booth *et al*, 2016)
* This information will be reported with the PRISMA statement-flow diagram
* **Assessment of methodological quality:**
  + **CASP** (***Critical Appraisal Skills Programme):*** evaluation tool/checklist will be used for appraisal of qualitative papers
  + **MMAT** (***Mixed Methods Appraisal Tool***): evaluation tool/checklist will be used for appraisal of papers that use a mix of qualitative and quantitative research methods
* **Data Extraction:**
  + Characteristics of the includes papers will be used to compile a Summary Table of pre-defined features and provide evidence to address the area of inquiry
* **Data Synthesis**
  + Data derived from the eligible papers will be synthesised using a narrative approach to identify emergent themes
  + The underlying significance of the studies will be interpreted from combining the extracted data and identified themes to highlight relationships or connected ideas
  + The research-based data will be used to provide core evidence to address the area of inquiry
  + Synthesised data will be used to inform the review question

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| --- | --- | --- |
| **Task** | **Method** | **Timescale** |
| Literature Search | Search for and select studies for developing the research | 2 Months |
| Using the research question and keywords | 1 Month |
| Study Selection | Studies selected for inclusion based on pre-defined criteria | 1-2 Months |
| Data Extraction | Create a summary table of study characteristics if *n* = <25 | 1 Month |
| If *n* = >25, upload a pdf version of the literature into NVivo to enable coding | 2 Months |
| Data Synthesis | Narrative interpretation of identified themes, using Tables/Figures to illustrate ideas | 2 Months |
| Writing up Review | PRISMA flowchart to illustrate the research process | 6 Months |

# APPENDIX 2: Gantt Chart

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| --- | --- | --- | --- |
| **PROJECT TITLE** | *The Application Of Systems Thinking Approaches To The Development Of Integrated Care Services For Adults With Complex Care Needs: A Systematic Review* | **PROJECT ID** | KESS2 MRes Research Project |
| **RESEARCHER** | Sarah Fry | **SUPERVISORS** | Dr Diane Seddon & Dr Gill Toms |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Month:** | | **Dec-18** | | **Jan-19** | | **Feb-19** | | **Mar-19** | | **Apr-19** | | **May-19** | | **Jun-19** | | **Jul-19** | | | **Aug-19** | | **Sep-19** | | | **Oct-19** | | **Nov-19** | | **Dec-19** | | |
| **Start & Finish; W/C:** | | **03** | **17** | **07** | **21** | **04** | **18** | **04** | **18** | **01** | **15** | **06** | **20** | **03** | **17** | **01** | **15** | **29** | **06** | **19** | **02** | **16** | **30** | **07** | **21** | **04** | **18** | **02** | **16** | **30** |
| *Protocol development* | Learning about systems thinking |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Learning about the systematic review process |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Collaboratively developing the review question (SPICE) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Drafting and completing the protocol |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Literature search* | Search for & select studies for developing the research |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Liaising with the librarian re the search strategy & to select databases |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Define Inclusion and Exclusion Criteria |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Search for & select studies for inclusion based on pre-defined criteria |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Follow-up cited references |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Literature synthesis* | Assessment of methodological quality (CASP & MMAT) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Extract data (coding?) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Data analysis/appraisal |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Analysis of Key Themes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Knowledge mobilisation* | Project meetings to collaboratively develop research question |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KESS2 Quarterly Reports |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Draft Report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Knowledge & Exchange Workshop (DEEP) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Final Report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Theses write-up* | Drafting Chapters |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Drafting/Organising Contents |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Compiling References/Bibliography |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Drafting/Organising Appendices |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Partner Company Report* | Drafting Chapters & organising contents |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Supervision meetings* | Review of Project undertakings |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Placement days with local authority* | Attending Gwynedd Local Authority Meetings |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Demand Management Input |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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# APPENDIX 4: Summary Characteristics of Included Studies

| **Authors & Date** | **Country** | **Location of study** | **Demographic** | **Service type** | **Methodology** | **Quality Score** | **Systems Thinking Tools/Approach** | **Theoretical Lens** | **Main outcome measures** | **Findings** | **Lessons for future policy & practice development** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Agyepong *et al* (2014) | Ghana | Urban & Rural regions | Ghana’s adult working population | Public health services | Mixed methods research approach:  *Qualitative*- literature reviews, [non-standardised] interviews, observations, prescription analysis  *Quantitative*- data analysis in Excel and Stata | MMAT:  High quality (14/15) | Causal Loop diagrams  Cause Tree diagrams (used to develop a qualitative explanatory model) | Systems thinking & conceptions: Complex Adaptive Systems (CAS) | Provider payments related to supply of/Ghana Diagnostic Related Groupings payment/ management information system data of providers & schemes for health services | Provider payment methods are non linear | Authors: System reform needed to holistically operationalise provider payment methods.  Me: Systems thinking conceptions + framework enabled greater understanding of the complexities of service supply & incentives behaviours |
| Biggs *et al* (2014) | NSW Australia | Urban | @ 900,000 children aged 5 to 14 years | Public health services | Qualitative research approach:  Thematic analysis (selective coding)  Stakeholder Interviews (non-directive + standardised) | CASP: Medium quality (7/10) | Process Mapping  Feedback loops | Not reported | School staff satisfaction; assessing outputs; standardised ongoing program evaluation; | Process mapping + analysis reduced variability in program implementation | Authors: Systems thinking tools targeted improving program delivery & the sharing of information with stakeholders.  Me: systems thinking conceptual framework enabled the identification of leverage points in collaborative health promotion at service delivery & governance levels |
| Blanchet *et al* (2014) | Nepal & Somaliland | Urban & rural | Nepal: 56 actors  Somaliland: 22 actors | Public health services | Multi-method qualitative research approach:  Stakeholder network analysis  Sustainability analysis process (SAP)  [non-standardised] Interviews + observations | CASP: High quality (10/10) | Process Mapping/systems thinking framework  Re system level analyses | Sustainability network analysis (a systems thinking conceptual lens) | Stakeholder network analysis  Sustainability analysis process (SAP) | Social network analysis enabled the diffusion of information between actors to be mapped; however, there was little evidence that the information collated using systems thinking was utilised and of its capacity to resolve identified problems | Authors: Adopting a systems thinking approach involves understanding the individual components of a system & the position of actors within the changing nature of the system.Me: a systems thinking approach enabled both internal + external contextual factors & relationships to be analysed |
| Cavana *et al* (2007) | New Zealand | Urban | Army Electronic Trade Group | Public services | Multi-method research, employing a qualitative system dynamics (SD) approach:  Group model building workshops | CASP: High quality (10/10) | Causal loop diagrams (CLDs)  Stock & Flow diagram | Systems thinking & conceptions (SD) | Data derived from Behaviour over time (BOT) graphs & analyses of Capacity-Satisfaction loops | The CLDs illustrated that improving capacity can be achieved by either increasing tradesman levels and/or reducing the trade release rate (by improving satisfaction with service life and deselecting recruits that do not demonstrate longer term service) | Authors: group model building methods developed shared mental models of the system, enabling the identification of leverage points within it  Me: incorporating internal & external stakeholder participation generates valuable insight into perceived treatment/citizen experiences |
| Dunnion & O’Donovan (2012) | London, UK | Urban | Higher Education environment | Public services | Qualitative research approach | CASP: High quality (10/10) | The Vanguard Method | Systems thinking | Tabulated pre + post intervention findings | Improved performance post intervention | Authors:  Systems thinking conceptions restrain ‘command & control’ approaches to management  Me: Operationalising systems thinking requires a bottom-up approach, with the service user/citizen central to reveal necessary changes to continually adapt |
| Evans *et al* (2016) | Queensland Australia | Urban | Project team, comprised three leaders + a manager & one participant from each of the eight teacher education institutions | Public services | Multi-method qualitative research approach:  Multi-site case studies to integrate a systems model for embedding education for sustainability (EfS)  Inductive analysis of workshops, teleconferences, phone and email conversations | CASP: High quality (9/10) | Process mapping | Systems thinking & conceptions | Primary data analysis & interpretation: field notes and minutes from workshops and monthly meetings; text-based exercises, such as systems mapping; notes from the action research process at each institution; formative & summative comments and reports by the external project evaluator & a focus group interview | Each case study captured critical context-based data to develop the change process required for embedding the EfS at multiple levels, thus using a system-wide approach facilitated capacity building at multiple levels within a system | Authors: Integrating process changes is an evolving undertaking, influenced by the institutional context; greater understanding is achieved through systems thinking.  Me: Stakeholders/front-line staff are essential sources of information/insight to unpack problems in complex organisations, in order to identify levers for change to support sustainable changes in evolving processes |
| Fowler *et al* (2019) | United States | Urban | US National Homeless Population | Public health services | Mixed methods research approach:  *Qualitative*- Complex Systems approach  *Quantitative*- Simulated ‘Stock-and-Flow’ system dynamics modelling; bar charts & linear graphs | MMAT: Medium quality (11/15) | BOT graphs | Systems science & conceptions (SD; complex systems) | Analyses of simulated bar graphs plotting US national data over time (employing a SD model) to produce real and anticipated trends | SD modelling illustrated how prevention initiatives provided a leverage point in the system | Authors: The complex systems approach identified capacities & constraints for sustainable solutions, that can be operationalised through policy changes  Me: Data from screening to forecast anticipated levels of need can guide preventative measures for *failure demand* through identifying leverage points for policy development; situated within low, moderate & high levels of [citizen] need/demand on service delivery, leading to more coordinated & sustainable service delivery |
| Gamble *et al* (2019) | United States (US) | Urban | Non-profit Community Health Organisations (staff & executives) | Public health services | Multi-method qualitative research approach:  Clinical enquiry case study  Survey  SD workshops | CASP : High quality (10/10) | (Participatory SD) Causal-mapping method (CLD) | SD lens | Analysis of non-profit critical performance variables (CPVs) | SD modelling revealed assumptions, choices & the complexities and identified possible strategic opportunities to improve operational performance | Authors: Case study methodology is generalisable to other [non-profits] for greater understanding of their CPVs, promoting strategic decision making to address operational challenges; scholarship can inform complex organisations regarding interdependent relationships  Me: Transferrable methodology to public sector for advancing research in complex non-profit (& other) health care providers systems, where stakeholder participation increased the accuracy of causal mapping within complex organisations through identifying possible points of leverage to reduce fragmented services |
| Gilson *et al* (2014) | Cape Town, South Africa | Urban | Health managers & researchers | Public health services | Multi-method qualitative research approach:  Observations  Stakeholder interviews  Realist Evaluation  Reflective analysis of data | CASP: Medium quality (8/10) | Systems mapping | Systems thinking & conceptions (CAS) | Systematic analysis of a range of data generated from the District Innovation and Action Learning for Health Systems Development (DIAHLS) project, including transcription, interviews, observations and notes of 22 interviews with district and sub-district managers, researcher field notes, transcripts & notes | Collective understandings from staff may act as a barrier to centrally-led initiatives intended to strengthen an organisation; the role local area managers is vital to provide leadership and support the development of shared goals for changes | Authors: Front-line staff have a key role to effect organisational change within complex systems, enhanced by strong leadership to support their implementation of programmes for change & shared discussions to encourage involvement, collaboration, self-organisation & commitment.  Me: the influence of stakeholders is fundamental to effect operational change & ensuing policy implementation |
| Kwamie *et al* (2014) | Ghana | Rural | 5 District teams (comprised 4 to 7 members) + 1 facilitation team managers | Public health services | Qualitative realist evaluation approach, comprising:  Case study design  Observations  Interviews | CASP: Medium quality (8/10) | Causal Loop diagrams  Causal Tree diagram | Systems thinking & conceptions (CAS) | Analysis of data (audio-recorded interviews & observational field notes) using Atlas.ti©software to systematically arrange medium-term outcomes | Implementation of the Leadership Development Programme did not fully embrace reflection of organisational practice, critically the analysis of client-provider relationships, or for thinking systemically | Authors: The utility of systems thinking can support manager decision-making & continuous quality improvements, through ongoing analyses of challenges & encouraging a positive work climate in order to attain results, albeit acknowledged that financial resources can be a health system constraints.  Me: Facilitation of change involves the collaboration of managers & frontline staff in health systems to analyse complications, support training needs & implement remedial actions to address context-dependent problems, essentially to achieve shared goals |
| Malik *et al* (2014) | Pakistan | Urban | 41 males & 7 female physicians | Public health services | Multi-method qualitative approach:  Social network analysis (Semi-structured questionnaire)  *Qualitative*- Stakeholder interviews  Mapping of existing information systems  Sociography (using CINET software) | CASP: High quality (9/10) | Systems mapping | Systems thinking & conceptions | Qualitative findings from in-depth interviews; a thematic analysis of emergent categories | The challenges of creating learning systems that support continuous improvement included insufficient support for clinical guidance, resulting from departmental focus on targets; access to current health literature/research; a functional referral system; competency of physicians and available health care resources collectively impede an environment that empowers patient care | Authors: The building blocks of health systems (service delivery; health workforce; information; medical products, vaccines & technologies; finance; leadership & governance) do not operate in isolation for system effectiveness.  Me: The diffusion of information from primary to secondary & tertiary levels of healthcare relies/requires expert support to improve collaborative performance indicators, rather than encouraging silo working |
| Mutale *et al* (2017) | Zambia, Africa | Peri-urban & Rural | FGD: Men & women aged 18 & above residing in area for at least 8 months, comprised 8-10 participants; Interviews: *Health facility level*- managers and community representatives & chairperson of Neighbourhood health committees (NHCs) + Traditional birth attendants (TBAs); *District level*- Clinical care specialists, Implementation team & community workers rained as clinical supporters | Public health services | Qualitative research approach:  In-depth interviews of NHCs + TBAs  Focus group discussions (FGD)  Transcribed data thematically coded using NVivo version 10 | CASP: High quality (9/10) | Causal loop diagrams | Systems thinking & conceptions | Pre & post Better Health Outcome through Mentorship and Assessment (BHOMA) measurement of intended and unintended consequences | Community participation was better in rural regions; evidence of unintended consequences, e.g. No change in waiting times for initial consultation as ‘backlog’ created by speedier triage & screening due to no change in staffing levels/capacity; descriptive analysis highlighted views of different stakeholders re the effects of the BHOMA intervention; systems thinking critically analysed contextual feedback relationships | Authors: Acknowledgement that system-wide strengthening will also produce unintended consequences in practice, but may serve to inform policy & operisation; community workers were key drivers of the intervention  Me: System-wide outcomes need monitoring proactively over time, rather than short-term, enabling anticipation of +ive & -ive consequences of an intervention/exacerbation of pre-existing challenges, eg. Training for staff substitution Additionally, such methodology research is transferrable to bilingual context; baseline outcomes provide data for further research |
| Paina *et al* (2014) | Kampala, Uganda | Urban (a developing country) | Doctors, nurses & health managers (recommended) within five public health facilities & policy stakeholders, including individuals from professional councils, relevant government ministries, private not-for-profit medical bureaus, private sector hospital administration & the local district health office | [Public & private] Health services | Multi-method qualitative research approach:  Multiple case-study design  Purposeful selection  Stakeholder interviews | CASP: High quality (10/10) | Causal Loop diagrams | Systems thinking & conceptions (complex systems) | Coding & analysis of primary data (policy documents and transcribed stakeholder interviews:23 health; 13 policy) using Atlas.ti©software | Interviews with policy stakeholders revealed that dual practice and its management was heavily compromised by informal government restrictions & the absence of a formal policy on dual practice in the selected public health facilities | Authors: dual practice management opportunities grow quickly in a context of private sector growth, available within public sector facilities.  Me: in the absence of formal policy & governance, dual practice management adopts an ad-hoc approach to service delivery & provider performance, which [negatively] impacts on government health workforce resources |
| Prashanth *et al* (2014) | Tumkur, India | Urban | District health management team of *talukas* (political + administrative sub-units of the district), comprised: bock programme managers and senior nursing staff | Public health services | Mixed methods research approach, employing realist evaluation:  *Qualitative* -  Case study design  Observations  Interviews (both transcribed + entered into NVivo)  *Quantitative*- data from  budget utilisation  provision of 24/7 PHC services  coverage costs of institutional delivery  delivery by caesarean section  completion of three antenatal care visits + immunisation | MMAT: High quality (15/15) | Process mapping | Programme theory  Systems thinking & conceptions (complex adaptive systems) | Aggregated data derived from assessment of input, process and outcome measures of performance | Capacity building is dependent on understanding the interactions between individual, institutional and environmental factors and identifying | Authors: A realist perspective synthesised the relationship between intervention, context & outcome, thereby assessing system-wide change in complex settings; capacity building programmes need to identify opportunities for leverage  Me: This research approach enabled comprehensive analyses of phenomena of interest that are situated in a complex adaptive system; positive & negative feedback loops identified context-dependent outcomes generated by underlying entities or [social] structures (causality) |
| Rwashana Semwanga *et al* (2014) | Kampala, Uganda | Urban (a developing country) | Neonatal services, comprising @141 mothers in total from each of the villages of Ruaga & Kawempe | [Public & private] Health services | Mixed methods research approach, employing the dynamic synthesis methodology:  *Qualitative*-  literature reviews  policy analysis  stakeholder interviews  *Case-study design* (empirical investigation)-  Random sampling to identify mothers in antenatal clinics  *Quantitative*-  simulation models  SPSS | MMAT: Medium quality (13/15) | Causal Loop diagrams (CLDs) | Systems thinking & conceptions  (complex systems) | Analysis of primary data, comprised:  274 included interviews (Ruaga: 85 from health facilities; 56 from home & Kawempe: 88 health facilities; 51 home)  [8 interviews excluded due to missing data] | Interview data were categorised into demand & supply issues & offered several short- & long-term strategies to reduce neonatal mortality  (Demand: 44% of mothers had pre-conception health conditions, failure to attend ante-natal appointments, provision of transport to the health centre for deliveries, provision of postnatal care, attitudes + beliefs & sources of information available to the mothers; Supply: quality of health service + hygiene, health workers motivation, availability of supplies + equipment, record keeping, policy enforcement & supervision); findings from the field studies | Authors: Systems thinking tools aid the understanding of complex interconnections within a system; use of CLDs revealed the feedback mechanisms (balancing & reinforcing loops) & in identifying leverages for change, validated by collaboration with stakeholders.  Me: systems thinking tools facilitated considered intervention in the system in order to implement holistic, action-based strategies in response to identified dynamics of the healthcare services |
| Sarriot *et al* (2014) | Northern Bangladesh | Urban | 600 mothers of children 0-23 months | Public health services | The Sustainability Framework Method:  Stakeholder engagement | CASP: Low quality (6/10) | Systems mapping | Systems thinking & conceptions  (CAS), employing the Sustainability Framework | Health outcomes measures:  Knowledge, Practice & Coverage surveys [population-based] (KPCs) + Health Institution Capacity Assessment Process [internal/employee participatory (HICAP) | Mid-term achievements vs risks for long-term sustainability: end of project findings evidenced stable values for maternal and child health outcomes; longer-term, outcomes evidenced notable deficits in basic capacity, strategic guidance, governance and health indicators, despite weaknesses in Human Resources management + national–level involvement | Authors: Joint visioning, planning & implementation of evidence-based evaluations of interventions inform social & health actors for sustainable health achievements.  Me: Theoretical collaboration of systems thinking & the sustainability framework empowered employees within a complex system to engage in interventions to develop viable services utilising both internal & external stakeholders |
| Varghese *et al* (2014) | Kerala, India | Urban | Immunisation services in the districts of Alappuzha (90.2% coverage) & Kozhikode (65% coverage) | Public health services | *Qualitative research approach*:  Content analysis  Snowballing sampling method | CASP: High quality (10/10) | Causal Loop diagrams | Systems thinking & conceptions (CAS) | Literature & document review (District Level Household & Facility Survey); 17 in-depth interviews; 5 focus group discussions (7-10 participants per group), comprised mothers of children < 5 years & health workers); 6 key informant interviews with experts; 7  participant + 7 non-participant observations of immunisation services | The CLDs illustrated the contributory factors that promoted/opposed uptake of the immunisation services + also the crucial roles of routine, societal interactions as levers for change | Authors: Adopting a CAS lens assisted identifying drivers for change & unintended consequences, in acknowledgement of polices + improvement strategies.  Me : This study presents transferrable analytical approaches to health systems problems in the context of complex systems dynamics; employing systems thinking tools & conceptions to understand competing phenomena promoted focused intervention |
| Waqa *et al* (2017) | Fuji | Suburban | 9 participants from the Ministry of Health & Medical Services + 9 participants from the Ministry of Agriculture | Public health services | A multi-method qualitative research approach  Sampling: purposive and convenience sampling approach  Research design: case studies of 18 participants using group model building (GMB)  Data collection: GMB data using a system dynamics approach | CASP:  Medium quality (8/10) | Causal Loop diagrams | Systems thinking & conceptions (system dynamics approach) | Analyses of data from four sessions spread across three 180- minute GMB workshops |  | Authors: Primarily, that the CLDs illustrated four themes of related variables, thus framing a dynamic problem; plus, evidence-based data served to advocate change at a policy level  Me: Systems thinking tools served to empower collective interventions, from a macro (government) level, through to meso (strategic health interventions/local governance) level & micro (frontline staff & public relations) |
| Wutzke *et al* (2017) | Australia | Urban | 58-78 year olds | Public health services | Mixed methods research approach (using Concept System software):  *Qualitative*: Web-based stakeholder participation  *Quantitative*: Web-based analyses of concept mapping methods | MMAT: Medium quality (10/15) | Concept mapping | Systems thinking & conceptions | Analyses comprised  demographics of participants & the sorting + rating of 95 statements; data was extracted using web-based software for cluster analysis | 131 statements were synthesised to a set of 95 statements; derived themes produced 12 clusters for action | Authors: study methodology & systems thinking lens promoted evidence-based learning from global best-practice & domestic successes + failures; extending primary prevention to long-term strategic planning  Me: sustainable services. |
| Zhang *et al* (2014) | China | Rural | 4 key informants in China’s rural health system, including the former minister, the rural health bureau director, the NCMS office director & the former Shan’xi province Director of Health Bureau | Public health services | Qualitative research approach:  Case study design  A retrospective review | CASP:  Medium quality (7/10) | Systems thinking framework | CAS | Data derived from analyses of policy documents and interviews | Identification of three main forced transitions within the health system, determined by national development agenda | Author: The methodology enabled greater understanding of the health care system within a complex setting, to maintain system resilience & identify levers for change, such as policy resistance & maladaptation  Me: Organisational re-arrangement/system-wide policy changes requires a shifting from top-down to bottom-up governance, in order to move away from a centrally-led health care system to improve the performance of the workforce & information system |

# APPENDIX 5: Supplementary CASP Quality Appraisal Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Biggs *et al (2014): CASP*** | | | |
| A | 1. Clear statement of research aims? | Yes | Lines 5-9 of the **Abstract**, p199 |
| A | 1. Qualitative methodology appropriate? | Yes | Discussed in the **Method** section, p22-201 |
| A | 1. Appropriate design to address the research aims? | Can’t tell | Discussed in the sixth paragraph, p200; however, no explicit use of theory (e.g. Grounded) as developing a conceptual map is discussed |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Lines 14-22 of the **Abstract**, p199 & **Stakeholder Interview** section |
| A | 1. Was data collected to address the research issue? | Yes | Discussed in the second paragraph, p201; data coded until saturated |
| A | 1. Consideration given to the researcher & participants’ relationship? | No | Only reference is to having two researchers code the interviews independently |
| B | 1. Consideration given to any ethical issues? | Yes | **Stakeholder interview** section; study has gone through an ethics committee |
| B | 1. Sufficiently rigorous data analysis? | Yes | Discussed in the **data analysis** p201 & **Judging Success** sections, p206 |
| B | 1. Clear statement of findings? | Can’t tell | Mentioned in lines 18-27 of the **Abstract**, p199; last paragraph of the **Conclusion**, p206; however, may serve as a baseline despite no raw data in process map |
| C | 1. How valuable is the research? | Is of medium value | Lines 4-10 of the **Judging Success** section, p206; probably depends on outcome of the implementation process map in the next study |
| **Appraisal total: Medium quality (7 ½ /10)** | | | |
| **Blanchet *et al (2014)*: CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | **Methods** section of the Abstract, p143 |
| A | 1. Qualitative methodology appropriate? | Yes | In the **Methodology** section, p144 |
| A | 1. Appropriate design to address the research aims? | Yes | As above |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Discussed in the **Stakeholder network analysis** section, p145 & In-depth interviews and observations, p145-146 |
| A | 1. Was data collected to address the research issue? | Yes | Discussed in the **In-depth interviews and observations** section, p145 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | Resolving ‘blocks’ in future research is in the **Discussion** section, p151 |
| B | 1. Consideration given to any ethical issues? | Yes | Second paragraph of the **Sustainability analysis process** section, p145 |
| B | 1. Sufficiently rigorous data analysis? | Yes | As provided in the **Results** sections, p146-151 & illustrated in Figures 1-4 |
| B | 1. Clear statement of findings? | Yes | First two paragraphs in the **Discussion** section |
| C | 1. How valuable is the research? | Yes, is of high value | May serve as a reference point for further research applying social network analysis to explore sustainability |
| **Appraisal total: High quality (10/10)** | | | |
| **Cavana *et al* (2007): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | Given in the **Abstract** |
| A | 1. Qualitative methodology appropriate? | Yes | In the **Methodological Approach** section, p204 |
| A | 1. Appropriate design to address the research aims? | Yes | Outlined in the **Abstract** |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Described in the **Introduction**, p202 |
| A | 1. Was data collected to address the research issue? | Yes | Data presented in Figures 1, p203 -9, p213 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | In the **Conclusions** section, p214-215; In the **Acknowledgements** section, p215-6 |
| B | 1. Consideration given to any ethical issues? | Yes | In the **Postscript- Implementation** section, p215 |
| B | 1. Sufficiently rigorous data analysis? | Yes | Analyses reported p208-214 |
| B | 1. Clear statement of findings? | Yes | First paragraph of the **Conclusions** section, p214 |
| C | 1. How valuable is the research? | Yes, is of high value | Pertinent exploration of staffing issues; a growing challenge in health, social & public services |
| **Appraisal total: High quality (10/10)** | | | |
| **Dunnion *et al* (2012): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | Detailed in the **Abstract**, p23 |
| A | 1. Qualitative methodology appropriate? | Yes | Again, details in **Abstract**, p23 |
| A | 1. Appropriate design to address the research aims? | Yes | Detailed p27-31 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Detailed p29-31 |
| A | 1. Was data collected to address the research issue? | Yes | Second paragraph, p28 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | In **Conclusions** drawn discussion, summarising pre- and post-intervention p35-37 |
| B | 1. Consideration given to any ethical issues? | Yes | Consideration is given to results of a National Student Survey, p36 |
| B | 1. Sufficiently rigorous data analysis? | Yes | As detailed in **Results** Table, p35 |
| B | 1. Clear statement of findings? | Yes | As above & discussed p35-37 |
| C | 1. How valuable is the research? | Yes, is of high value | Focus on Demand Failure is transferrable to other public services, utilising its principles |
| **Appraisal total: High quality (10/10)** | | | |
| **Evans *et al* (2016): CASP** | | | |
| A | Clear statement of research aims? | Yes | Detailed in **Abstract**, p65 |
| A | Qualitative methodology appropriate? | Yes | Provided in the **Research Approach**, **Methods** and **Processes section**, p68-71 |
| A | Appropriate design to address the research aims? | Yes | Second & third paragraphs, p69 |
| A | Appropriate recruitment strategy to the aims? | Yes | Second paragraph,p73 |
| A | Was data collected to address the research issue? | Yes | Tabulated in Table 1, p69 & discussed p70 |
| A | Consideration given to the researcher & participants’ relationship? | Yes | Discussions regarding **Embedding Education for Sustainability**, P72-74 |
| B | Consideration given to any ethical issues? | Can’t Tell | No explicit reference made to any ethical issues |
| B | Sufficiently rigorous data analysis? | Yes | **Lessons Learned** section, p71-74 |
| B | Clear statement of findings? | Yes | Lines 16-19 of **Abstract**, p65 |
| C | How valuable is the research? | Yes, of high value | Transferrable methods framework to capture critical context-based data |
| **Appraisal total: High quality (9 ½ /10)** | | | |
| **Gamble *et al* (2019): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In **Abstract**, p616 |
| A | 1. Qualitative methodology appropriate? | Yes | As detailed in **Abstract**, p616 |
| A | 1. Appropriate design to address the research aims? | Yes | Discussed in **Literature Informing the Study** section, p618 & further in the Method section, p619-620 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | The **Case Study inquiry** is discussed on p619 |
| A | 1. Was data collected to address the research issue? | Yes | Described on p620 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | In the **Limitations** section, p628-629 |
| B | 1. Consideration given to any ethical issues? | Yes | First paragraph p626; permission to publish study obtained from CEO, p629 |
| B | 1. Sufficiently rigorous data analysis? | Yes | **Implications for Scholarship** and **Implications for Practice** are given in the **Discussion** section, p626 |
| B | 1. Clear statement of findings? | Yes | Summarised in **Abstract**, p616 & in the **Conclusion**, p629 |
| C | 1. How valuable is the research? | Comments: | Transferrable methodology to studies in the public sector |
| **Appraisal total: High quality (10/10)** | | | |
| **Gilson *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In **Background** section of **Abstract**, p52 |
| A | 1. Qualitative methodology appropriate? | Yes | Summarised in **Methods** section of **Abstract**, p52; however, unknown if interviews are standardised |
| A | 1. Appropriate design to address the research aims? | Yes | First two paragraphs of **Methods** section, p53 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Details derived from 2010 DIALHS project study approach, p53 |
| A | 1. Was data collected to address the research issue? | Yes | Data from the DIALHS project (discussed p53-55) |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | First paragraph, p55 |
| B | 1. Consideration given to any ethical issues? | Yes | Ethical clearance reported first paragraph, p55 |
| B | 1. Sufficiently rigorous data analysis? | Yes | Illustrated in Fig 1, p54 & Fig 2, p57 |
| B | 1. Clear statement of findings? | Can’t tell | No explicit statement, but adequate discussion of evidence p55-p61 |
| C | 1. How valuable is the research? | Comments:  Not sure | Although exploratory, study presents some valuable information regarding Leadership in a complex adaptive system |
| **Appraisal total: Medium quality (9/10)** | | | |
| **Kwamie *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In the **Background** section of the **Abstract** |
| A | 1. Qualitative methodology appropriate? | Yes | Described in the **Methods** section of the **Abstract** |
| A | 1. Appropriate design to address the research aims? | Yes | Discussed in the **Study design: realist evaluation** section, p43-44 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Discussed in the **Document review** section & the **Participant observation** section, p45 |
| A | 1. Was data collected to address the research issue? | Yes | As above, plus Semi-structured interviews conducted, all p45 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | Discussed in the **Participant perceptions of the LDP**, p46 |
| B | 1. Consideration given to any ethical issues? | Can’t tell | No explicit statement, although issues raised are reported in the **Discussion** section, p48-p49 |
| B | 1. Sufficiently rigorous data analysis? | Yes | Analyses illustrated in Figs 1, p48 & 3, p49; although a reported limitation is that the study is based on only one context for LDP implementation, p49 |
| B | 1. Clear statement of findings? | Yes | Summarised in the **Results** section of the Abstract, p40 |
| C | 1. How valuable is the research? | Comments:  Can’t tell | Although the study focus draws on quality improvement intervention, its applicability only in the LDP context is discussed |
| **Appraisal total: Medium quality (9 /10)** | | | |
| **Malik *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | **Background** section in the **Abstract**, p65 |
| A | 1. Qualitative methodology appropriate? | Yes | Summarised in the **Methods** section of the **Abstract**, p65 |
| A | 1. Appropriate design to address the research aims? | Yes | Details given in the **Methods** section of the study, p66-67 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Details given in the **Methods** section of the study, p67-68 |
| A | 1. Was data collected to address the research issue? | Yes | Details reported in the **Methods** section of the study, p67-68 |
| A | 1. Consideration given to the researcher & participants’ relationship | Yes | Attention to this criterion is given in the third paragraph of the second column, p67 |
| B | 1. Consideration given to any ethical issues? | Yes | Implications of the study are considered in the **Discussion** sections, p74-75 |
| B | 1. Sufficiently rigorous data analysis? | Yes | Presented in Table 1, p70; Table 2, p 71; Table 3, p72; Fig 1, p68; Fig 2, p69; Fig 3, p70 and Fig 4, p71 |
| B | 1. Clear statement of findings? | Yes | Summarised in the **Results** section of the Abstract, p65 |
| C | 1. How valuable is the research? | Comments:  Yes, of high value | Discussions of the study findings pertain to Pakistan’s provincial health departments only, although the principles may extend to other devolved health systems |
| **Appraisal total: High quality (10/10)** | | | |
| **Mutale *et al* (2017): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | Summarised in the **Rationale, aims and objectives** section of the **Abstract**, p439 |
| A | 1. Qualitative methodology appropriate? | Yes | Summarised in the **Methods** section of the **Abstract**, p439 and detailed in the third paragraph in the second column, p440 |
| A | 1. Appropriate design to address the research aims? | Yes | Study design reported in the **Methods** sections, p440-441 (comprised: **BHOMA study design, The district strategy and The health facility strategy**) |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Reported in the **Target groups** section and the **Sampling and sample size** section, p441 |
| A | 1. Was data collected to address the research issue? | Yes | Detailed in the **Data collection process** section, p441 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | Study incorporated the effects of the BHOMA project (challenges with the filing system during the and clinic supporters’ working hours, p444) |
| B | 1. Consideration given to any ethical issues? | Can’t tell | Although no explicit statement is reported, the BHOMA project’s professionals are acknowledged in its implementation, p451 |
| B | 1. Sufficiently rigorous data analysis? | Yes | Reported in the **Data analysis** section, p441 and illustrated in Model 1, p442; Model 2, p446; Table 1, p444; Table 2, p449 & Fig 1, p447 |
| B | 1. Clear statement of findings? | Yes | Summarised in the **Results** section of the Abstract, p439 |
| C | 1. How valuable is the research? | Comments:  Yes, of high value | The value of conducting protocol-driven research is expressed in the Introduction, p440 & asserted again in the Conclusion, p451 |
| **Appraisal total: High quality (9 ½ /10)** | | | |
| **Paina *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | Rationale given in the **Background** section of the **Abstract**, p77 |
| A | 1. Qualitative methodology appropriate? | Yes | Summarised of the **Abstract**, p77 & expanded on in the **Methods** section of the paper, p78 |
| A | 1. Appropriate design to address the research aims? | Yes | Reported in the **Research design** section, p78 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Reported in the **Research design** section, p78 |
| A | 1. Was data collected to address the research issue? | Yes | Reported in the **Data collection instruments and field work section**, p79 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | Reported in the **Discussion** section, p88 and in the second paragraph of the **Causal loop development** section, p79 |
| B | 1. Consideration given to any ethical issues? | Yes | Reported in the **Data analysis** section, p79 |
| B | 1. Sufficiently rigorous data analysis? | Yes | Reported in the Ethical approvals section, p79 |
| B | 1. Clear statement of findings? | Yes | Summarised in the **Results** section of the **Abstract**, p77 and expanded on in the **Discussion** section, p88 |
| C | 1. How valuable is the research? | Comments: | Is of high value to other dual practice health systems and is also transferrable in a context where limited health workforce is challenged by increasing population demand |
| **Appraisal total: High quality (10/10)** | | | |
| **Sarriot *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In the last paragraph of **A systems understanding of sustainability** section, p155 |
| A | 1. Qualitative methodology appropriate? | Yes | The Sustainability Framework method was chosen, incorporated through a complex adaptive systems lens |
| A | 1. Appropriate design to address the research aims? | Not sure | It is based on participatory and iterative steps, designed for intervention design, **methods** section, p157; however, although a systems understanding is introduced positively on p155, a statement made (second paragraph, p162), diminishes the suitability of using the sustainability framework |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Reported in the **Urban health in Bangladesh** section, p155-157 |
| A | 1. Was data collected to address the research issue? | Yes | Assessment of health outcomes through KPC surveys, pre + post project and a Health Institution Capacity Assessment Process (HICAP), conducted in 2004, 2007 & 2009 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Not sure | No explicit discussion of this criteria, although the researcher reports that a crucial step was “the development of a common vision by all stakeholders”, p162 |
| B | 1. Consideration given to any ethical issues? | Not sure | No explicit discussion of this criteria, although it could be assumed that the participants in the Concern project were informed of any potential ethical issues |
| B | 1. Sufficiently rigorous data analysis? | Yes | Data analyses presented in Table 1, p156;Fig 1, p157; Table 2, p160 and in the **Results and discussion** section, p160-163 led to conclusions drawn that address the research’s focus |
| B | 1. Clear statement of findings? | Yes | Overall findings from the 2009 post-project are reported, p160; sustainability evaluations are given in paragraphs, p160-161 |
| C | 1. How valuable is the research? | Comments:  Can’t tell | The sustainability framework provided a conceptual map, adopting a systems-orientated planning approach; however, it is unclear how transferrable this methodology is for other health systems due to the narrative of this research paper |
| **Appraisal total: Low quality (8/10)** | | | |
| **Varghese *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In the **Background** section of the **Abstract**, p105 |
| A | 1. Qualitative methodology appropriate? | Yes | Summarised in the **Methods** section of the **Abstract**, p105 |
| A | 1. Appropriate design to address the research aims? | Yes | Reported in the first two paragraphs of the **Methods** section, p107 |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Reported in the third & fourth paragraphs of the **Methods** section, p107 |
| A | 1. Was data collected to address the research issue? | Yes | Reported in the fifth & sixth paragraphs of the **Methods** section, p107; the second & third paragraphs, p108 |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | Considered in the **Phase 1: Acceptability** & **Phase 2: Opposition** sections, p109-110 |
| B | 1. Consideration given to any ethical issues? | Yes | Consideration given to debates, p111; a reported death in 2006, p111; intervention success, as well as the official response to decreasing immunisation coverage |
| B | 1. Sufficiently rigorous data analysis? | Yes | Use of a CAS lens to analyse data, employing systems thinking CLD tool to illustrate relationships |
| B | 1. Clear statement of findings? | Yes | Reported in the Discussions section, p113 and re-asserted in the **Conclusion** section, p115 |
| C | 1. How valuable is the research? | Comments:  Highly valuable | Study has transferrable methodology to all complex interventions |
| **Appraisal total: High quality (10/10)** | | | |
| **Waqa *et al* (2017): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In the **Background** section of the **Abstract** |
| A | 1. Qualitative methodology appropriate? | Yes | Approach introduced in the **Background** section |
| A | 1. Appropriate design to address the research aims? | Yes | Study used group model building (GMB), reported in the **Research design** part of the **Methods** section |
| A | 1. Appropriate recruitment strategy to the aims? | Yes | Reported in the  **Recruitment** part of the **Methods** section |
| A | 1. Was data collected to address the research issue? | Yes | Reported in the **Data collection** part of the **Methods** section |
| A | 1. Consideration given to the researcher & participants’ relationship? | Yes | Reported in the **Engagement with stakeholders** part of the **Results** section |
| B | 1. Consideration given to any ethical issues? | Yes | Reported in the **Delays** part of the **Results** section; **Ethical approval and consent to participate** obtained, p7 of 8 |
| B | 1. Sufficiently rigorous data analysis? | Not sure | CLD illustrates relations in Fig 1, p5 of 8; however, analyses are primarily narrative within sub-headings throughout |
| B | 1. Clear statement of findings? | Yes | Summarised in the **Results** section of the **Abstract** |
| C | 1. How valuable is the research? | Comments:  Highly valuable | Potential value for broadened applicability to the Policymaking process in other public services |
| **Appraisal total: Medium quality (9 ½ /10)** | | | |
| **Zhang *et al* (2014): CASP** | | | |
| A | 1. Clear statement of research aims? | Yes | In the **Background** section of the **Abstract**, 134 |
| A | 1. Qualitative methodology appropriate? | Yes | Rationale reported in the **Methods** section, p136 |
| A | 1. Appropriate design to address the research aims? | Yes | Summarised in the **Methods** section of the **Abstract** |
| A | 1. Appropriate recruitment strategy to the aims? | Not sure | This study is a retrospective review of policy documents & interviews |
| A | 1. Was data collected to address the research issue? | Yes | Policy documents & interviews pertaining to rural China’s health system; analyses enabled the research question to be addressed |
| A | 1. Consideration given to the researcher & participants’ relationship? | Not sure | The case study explores the evolution of schemes for rural finance in China; no explicit consideration is narrated |
| B | 1. Consideration given to any ethical issues? | Not sure | Insights for China’s rural health system are discussed, but study is primarily literature-based |
| B | 1. Sufficiently rigorous data analysis? | Yes | Comprehensive discussions of findings, pages 136-140 |
| B | 1. Clear statement of findings? | Yes | Summarised in the **Results** section of the **Abstract**, p134 |
| C | 1. How valuable is the research? | Comments:  Can’t tell | Whilst the paper is not rich with primary data, the study identifies valuable, transferrable lessons for other health systems |
| **Appraisal total: Medium quality (8/10)** | | | |

# APPENDIX 6: Supplementary MMAT Quality Appraisal Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Agyepong *et al (2014)*: MMAT** | | | |
| **Section/Category** | **Quality criteria** | **Response** | **Comments** |
| 1. Qualitative | 1.1 Research approach appropriate? | Yes | First paragraph of the **Methods** section, p123 |
| 1. Qualitative | 1.2 Adequate data collection methods? | Yes | Second paragraph of the **Methods** section, p123 |
| 1. Qualitative | 1.3 Findings adequately derived from the data? | Yes | First paragraph of the **Findings & Discussion** section, p125 |
| 1. Qualitative | 1.4 Interpretation substantiated by data? | Yes | Remaining paragraphs of the **Findings & Discussion** section, p125 |
| 1. Qualitative | 1.5 Coherence between collection, analysis & interpretation of data sources? | Yes | First paragraph of the **Pulling it all together** section, p128, as illustrated in the CLD, p130 |
| 4. Quantitative  descriptive | 4.1 Relevant sampling strategy? | Yes | First paragraph of the **Sampling** section, p123 |
| 4. Quantitative descriptive | 4.2 Target population sample representative? | Yes | Second paragraph of the **Sampling** section, p123 |
| 4. Quantitative descriptive | 4.3 Measurements appropriate? | Yes | Last paragraph of the **Sampling** section, p123 |
| 4. Quantitative descriptive | 4.4 Risk of non-response bias low? | No | “Data was not available….”**Validity, quality assurance &** **limitations** section: line 9, p125; lines 1&2, p126 |
| 4. Quantitative descriptive | 4.5 Appropriate statistical analysis? | Yes | Synthesis of data as presented in Table 1 & described in the **Data analysis** section, p125 |
| 5. Mixed methods | 5.1 Adequate rationale for the research design? | Yes | First two paragraphs in the **Methods** section, p123 |
| 5. Mixed methods | 5.2 Study components effectively integrated? | Yes | Paragraphs 6 & 7 of the **Pulling it all together** section, p130 |
| 5. Mixed methods | 5.3 Integration of the qualitative & quantitative outputs adequately interpreted? | Yes | Discussed in the **Findings & Discussion** section, p125 |
| 5. Mixed methods | 5.4 Qualitative & quantitative divergences and inconsistencies adequately addressed? | Yes | Discussed in the **Findings & Discussion** section, p125 |
| 5. Mixed methods | 5.5 Do each of the research methods adhere to the tradition of their quality criteria? | Yes | Qualitative component: 5/5  Quantitative component: 4/5  Mixed methods: 5/5 |
| **Appraisal total: High quality (14/15)** | | | |

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| --- | --- | --- | --- |
| **Fowler *et al* (2019): MMAT** | | | |
| 1. Qualitative | 1.1 Research approach appropriate? | Yes | Detailed in section 2.3, p468-470 |
| 1. Qualitative | 1.2 Adequate data collection methods? | Yes | As presented in Fig 1, p469 & Fig 4, p474 |
| 1. Qualitative | 1.3 Findings adequately derived from the data? | Yes | Illustrated in Fig 6, p477 & discussed in section 4.2, p77 |
| 1. Qualitative | 1.4 Interpretation substantiated by data? | Yes | In last paragraph in section 4.3, p478 |
| 1. Qualitative | 1.5 Coherence between collection, analysis & interpretation of data sources? | Yes | In section 4.4, p479 & in **Summary** section, p480 |
| 4. Quantitative | 4.1 Relevant sampling strategy? | Yes | Rationale for the rigorous study conveyed in section 1.2, p466 & 2.2, p467 |
| 4. Quantitative | 4.2 Target population sample representative? | Yes | US national data is presented in Figs 2 & 3, p473 |
| 4. Quantitative | 4.3 Measurements appropriate? | Yes | As above; standardised data is reflective of homelessness measures |
| 4. Quantitative | 4.4 Risk of non-response bias low? | Can’t tell | No explicit mention of non-respondents & statistical compensation for this |
| 4. Quantitative | 4.5 Appropriate statistical analysis? | Can’t tell | Results simulate real & anticipated levels of homeless need |
| 5. Mixed methods | 5.1 Adequate rationale for the research design? | Yes | Detailed in Abstract, p465 |
| 5. Mixed methods | 5.2 Study components effectively integrated? | Yes | Detailed in section 4.3, p478 |
| 5. Mixed methods | 5.3 Integration of the qualitative & quantitative outputs adequately interpreted? | Yes | As presented in Fig 6, p477 & Fig 7, p479 |
| 5. Mixed methods | 5.4 Qualitative & quantitative divergences and inconsistencies adequately addressed? | No | No explicit divergences are reported, however consideration is given to the implications for response to Homelessness, section 4.4, p479-480 |
| 5. Mixed methods | 5.5 Do each of the research methods adhere to the tradition of their quality criteria? | Can’t tell | Qualitative component: 5/5  Quantitative component: 3/5  Mixed methods: 3 ½ |
| **Appraisal total: Low quality (11 ½ /15)** | | | |

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| --- | --- | --- | --- |
| **Prashanth *et al* (2014): MMAT** | | | |
| 1. Qualitative | 1.1 Research approach appropriate? | Yes | **Background** section of **Abstract**, but unclear how it contributes to the case study analysis (?for triangulation) |
| 1. Qualitative | 1.2 Adequate data collection methods? | Yes | **Methods** section of **Abstrac**t |
| 1. Qualitative | 1.3 Findings adequately derived from the data? | Yes | Within the **Discussion** section, p34-37 |
| 1. Qualitative | 1.4 Interpretation substantiated by data? | Yes | Figures 8 & 9 and quotes provided to back up statements |
| 1. Qualitative | 1.5 Coherence between collection, analysis & interpretation of data sources? | Yes | Clear links between data sources, collection, analysis & interpretation presented in Table 1, p28; as discussed in the **Realist evaluation & systems thinking** section, p37 |
| 4. Quantitative | 4.1 Relevant sampling strategy? | Yes | **Case Selection** section, p25 |
| 4. Quantitative | 4.2 Target population sample representative? | Yes | Within the **Discussion** sections, p34-37; first paragraph of the **Data Collection** section,p25 (sampling described) |
| 4. Quantitative | 4.3 Measurements appropriate? | Yes | **Results** section of **Abstract**, p21; explained and justified |
| 4. Quantitative | 4.4 Risk of non-response bias low? | Yes | Second paragraph of **Limitations** section, p37; primarily uses routine data |
| 4. Quantitative | 4.5 Appropriate statistical analysis? | Yes | Lines 1-5 of the **Limitations** section, p37; descriptive statistics used |
| 5. Mixed methods | 5.1 Adequate rationale for the research design? | Yes | **Introduction** paragraph, p22 |
| 5. Mixed methods | 5.2 Study components effectively integrated? | Yes | Discussed in the **Analysis** section, p26 |
| 5. Mixed methods | 5.3 Integration of the qualitative & quantitative outputs adequately interpreted? | Yes | Discussed in the **Explaining change: contribution of the intervention** section, p34 |
| 5. Mixed methods | 5.4 Qualitative & quantitative divergences and inconsistencies adequately addressed? | Yes | Lines 1-5 of the **Limitations** section, p37; however, unclear if there are divergences between the two types of data |
| 5. Mixed methods | 5.5 Do each of the research methods adhere to the tradition of their quality criteria? | Yes | Qualitative component: 5/5 Quantitative component: 5/5  Mixed methods: 5/5 |
| **Appraisal total:** **High quality (15/15)** | | | |
| **Rwashana Semwanga *et al* (2014): MMAT** | | | |
| 1. Qualitative | 1.1 Research approach appropriate? | Yes | Summarised in the **Methods** section of the **Abstract**, p21 |
| 1. Qualitative | 1.2 Adequate data collection methods? | Yes | Reported in the **Data collection** section, p25-26 |
| 1. Qualitative | 1.3 Findings adequately derived from the data? | Yes | Reported in the **Outcomes** part of the **Results** section, p26 & presented in Fig 6, p31 |
| 1. Qualitative | 1.4 Interpretation substantiated by data? | Yes | Presented in Table 1, p28 & reported in the **Outcomes** part of the **Results** section, p 32-34 |
| 1. Qualitative | 1.5 Coherence between collection, analysis & interpretation of data sources? | Yes | Reported in the **Outcomes** part of the **Results** section, p 32-34 |
| 4. Quantitative | 4.1 Relevant sampling strategy? | Yes | Purposive selection used, p25 |
| 4. Quantitative | 4.2 Target population sample representative? | Yes | Reported in the **Case selection** and **Data collection** parts of the **Methods** section, p25 |
| 4. Quantitative | 4.3 Measurements appropriate? | Not sure | Variables are not clearly defined as guided by programme theory |
| 4. Quantitative | 4.4 Risk of non-response bias low? | Not sure | Reported possibility of confirmation bias of study outliers, **Limitations** section, p37 |
| 4. Quantitative | 4.5 Appropriate statistical analysis? | Yes | Reported in the **Analysis** section, p26 |
| 5. Mixed methods | 5.1 Adequate rationale for the research design? | Yes | Justified in the **Outcomes** part of the **Results** section, p26, p31-34 |
| 5. Mixed methods | 5.2 Study components effectively integrated? | Yes | Reported in the **Outcomes** part of the **Results** section, p26, p31-34 |
| 5. Mixed methods | 5.3 Integration of the qualitative & quantitative outputs adequately interpreted? | Yes | Reported in the **Discussion** section, p34-37 |
| 5. Mixed methods | 5.4 Qualitative & quantitative divergences and inconsistencies adequately addressed? | Yes | As the Realist Evaluation perspective used provided an explanatory theory to address system-wide differences |
| 5. Mixed methods | 5.5 Do each of the research methods adhere to the tradition of their quality criteria? | Yes | Qualitative component: 5/5  Quantitative component: 4/5  Mixed methods: 5/5 |
| **Appraisal total: Medium quality (14/15)** | | | |

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| --- | --- | --- | --- |
| **Wutzke *et al* (2017): MMAT** | | | |
| 1. Qualitative | 1.1 Research approach appropriate? | Yes | Rationale for the research approach is introduced in the **Background** section of the paper |
| 1. Qualitative | 1.2 Adequate data collection methods? | Yes | Reported in the **Data collection** part of the **Methods** section, p3 of 13 |
| 1. Qualitative | 1.3 Findings adequately derived from the data? | Yes | Tabulated participant demographics presented in Table 1 and in-depth analysis of statements are presented in Table 2 |
| 1. Qualitative | 1.4 Interpretation substantiated by data? | Yes | Thematic synthesis of findings are presented in Figures 1 & 2 |
| 1. Qualitative | 1.5 Coherence between collection, analysis & interpretation of data sources? | Yes | Links/merger of data sources is illustrated in Fig 3 reported in the **Discussion** section, pages 11 & 12 of 13 |
| 4. Quantitative | 4.1 Relevant sampling strategy? | Yes | Reported in the **Participant selection** part of the **Methods** section, p3 of 13 |
| 4. Quantitative | 4.2 Target population sample representative? | Yes | Summarised in the **Methods** section of the **Abstract** |
| 4. Quantitative | 4.3 Measurements appropriate? | Yes | Variations are discussed on p8 of 13 |
| 4. Quantitative | 4.4 Risk of non-response bias low? | Not sure | Box 1 presents participant numbers in the **Results** section; however, no explicit discussion of the total counts for non-response (bias), apart from a mention in the last paragraph, p11 of 13 |
| 4. Quantitative | 4.5 Appropriate statistical analysis? | Yes | Reported software analysis in the **Analysis** section, p3 of 13 |
| 5. Mixed methods | 5.1 Adequate rationale for the research design? | Not sure | Introduced concisely in the **Abstract**, but expanded on within the paper |
| 5. Mixed methods | 5.2 Study components effectively integrated? | Not sure | Comprehensive tabulated presentation of Statement analysis & interpretation, but only narrative synthesis of the study components |
| 5. Mixed methods | 5.3 Integration of the qualitative & quantitative outputs adequately interpreted? | Yes | In-depth narrative synthesis of the study components |
| 5. Mixed methods | 5.4 Qualitative & quantitative divergences and inconsistencies adequately addressed? | Not sure | No explicit explanation of divergences; reported identification of evidenced-based strategies |
| 5. Mixed methods | 5.5 Do each of the research methods adhere to the tradition of their quality criteria? | Comments:  Can’t tell | Qualitative component: 5/5  Quantitative component: 4 ½ /5  Mixed methods: 3/5 |
| **Appraisal total: Low quality (12 ½ /15)** | | | |

# APPENDIX 7: Excluded System Dynamics Papers

**Reason for Exclusion: [Cautionary] Exclusion due to methodological issues, i.e. the simulated performance data was not derived from primary data:**

1. Bianchi, C., Bivona, E., Cognata, A., Ferrara, P., Landi, T and Ricci, P (2010) Applying System Dynamics to Foster Organisational Change, Accountability and Performance in the Public Sector: A case-based Italian perspective. *Systems Research and Behavioural Science*;**27**: 395-420. DOI: 10.1002/sres.1042
2. Calancie, L., Anderson, S., Branscomb, J., Apostolico, A.A & Lich, K.H (2018) Using Behaviour Over Time Graphs to Spur Systems Thinking Among Public Health Practitioners. *Preventing Chronic Disease*; **15**: 170254. Available: <https://doi.org/10.5888/pcd15.170254>
3. Hronek, C & Bleich, M.R (2002) “The Less-Than-Perfect Medication System”: A Systems Approach to Improvement. *Journal of Nursing Care Quality*; **16**(4):17-22. DOI: [10.1097/00001786-200207000-00004](https://doi.org/10.1097/00001786-200207000-00004)
4. Cepoiu-Martin, M & Bischak, D.P. (2018) Policy choices in dementia care-An exploratory analysis of the Alberta continuing care system (ACCS) using system dynamics. *Journal of Evaluation in Clinical Practice*; **24**:278-284. Available: <https://doi.org/10.1111/jep.12790>

# APPENDIX 8: Agenda Gweithdy Cyfnewid Gwybodaeth/ Knowledge Exchange Workshop Agenda

|  |  |
| --- | --- |
| **Dyddiad**: 21.11.2019 | **Date**: 21.11.2019 |
| **Amser: 10am – 1:00pm** | **Time: 10am – 1:00pm** |
| **Lleoliad**: Stwdio 2, Galeri, Caernarfon | **Location**: Studio 2, Galeri, Caernarfon |

***Today’s event is an opportunity for the KESS2 Research Project to be presented and for a collaborate discussion of how findings can support practice development.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 10.00am | | Te/Coffi wrth gyrraedd | Tea/Coffee on arrival | |
| 10.15am | | Croeso | Welcome | |
| 10.20am | | Cyflwyniad y Prosiect Ymchwil | Presentation of Research Project | |
| 10.50am | | Egwyl cysur | Comfort break | |
| 11.00am | | Trafod mewn grwpiau: Pwnc un | Group discussions: Topic one | |
| 11.30am | | Rhowch adborth | Feedback | |
| 11.40am | | Trafod mewn grwpiau: Pwnc dau | Group discussions: Topic two | |
| 12.10pm | | Rhowch adborth | Feedback | |
| 12.20pm | | Unrhyw gwestiynau pellach | Any further questions | |
| 12.30pm | | Cinio i darfod | Lunch to finish | |
| ***Diolch yn fawr*** | | |  |
| APPENDIX 9: Knowledge Exchange Event Presentation Handout  |  |  |  | | --- | --- | --- | | **Slide 1** |  |  | | **Slide 2** |  |  | | **Slide 3** |  |  | | **Slide 4** |  |  | | **Slide 5** |  |  | | **Slide 6** |  |  | | **Slide 7** |  |  | | **Slide 8** |  |  | | **Slide 9** |  | PRACTICE PLACEMENT SLIDE (Removed due to confidentiality) | | **Slide 10** |  |  | | **Slide 11** |  |  | | **Slide 12** |  | Another discussion point (Removed due to confidentiality) | | **Slide 13** |  |  | | **Slide 14** |  |  | | **Slide 15** |  |  | | | | | |  |

1. KESS2 is a pan-Wales higher-level research initiative, supported by the European Social Funds through the Welsh Government. Projects are undertaken collaboratively with companies and organisations and involve all universities in Wales; led by Bangor University. [↑](#footnote-ref-1)
2. The Vanguard Method and systems thinking: Available: <https://vanguard-method.net/the-vanguard-method-and-systems-thinking/> [↑](#footnote-ref-2)
3. The Vanguard Method and systems thinking: Available: https://vanguard-method.net/the-vanguard-method-and-systems-thinking/ [↑](#footnote-ref-3)
4. http://www.legislation.gov.uk/ukpga/1990/19/contents [↑](#footnote-ref-4)
5. <http://www.wales.nhs.uk/sustainablesocialservicesforwalesaframeworkforaction/> [↑](#footnote-ref-5)
6. Available: <http://www.legislation.gov.uk/ukpga/2012/7/contents/enacted> [↑](#footnote-ref-6)
7. Available on the Carers Wales ‘*Track the Act’* website: <https://www.carersuk.org/search/track-the-act> [↑](#footnote-ref-7)
8. <http://www.legislation.gov.uk/ukpga/2014/23/contents/enacted> [↑](#footnote-ref-8)
9. <http://www.legislation.gov.uk/anaw/2015/2/section/19/enacted> [↑](#footnote-ref-9)
10. <https://www.scie.org.uk/integrated-care> [↑](#footnote-ref-10)
11. <https://www.ndti.org.uk/> [↑](#footnote-ref-11)
12. A Framework for Delivering Integrated Health and Social Care for Older Citizens with Complex Needs. Available: http://www.wales.nhs.uk/sitesplus/documents/866/2.5%20Appendix%20A%20%20Final%20Statement%20of%20Intent.pdf [↑](#footnote-ref-12)
13. <http://www.legislation.gov.uk/ukpga/1993/38/contents> [↑](#footnote-ref-13)
14. This ST approach is discussed further in 3.4 [↑](#footnote-ref-14)
15. The concept of *emergent* property is pivotal in ST and is used to describe unexpected behaviours that result

    from interactions between the components in complex systems (Nikolaev & Fortin, 2020) [↑](#footnote-ref-15)
16. Sourced: <https://thesystemsthinker.com/author/jay-w-forrester/> [↑](#footnote-ref-16)
17. The Initiative on the Study and Implementation of Systems: A transdisciplinary initiative to explore the application of systems thinking approaches, developed by the Tobacco Control Research Branch of the National Cancer Institute at the National Institutes of Health [↑](#footnote-ref-17)
18. Available: https://apps.who.int/gb/ebwha/pdf\_files/WHA69/A69\_39-en.pdf?ua=1&ua=1 [↑](#footnote-ref-18)
19. Available:[**http://www.systematicreviewsjournal.com/4/1/1**](http://www.systematicreviewsjournal.com/4/1/1) [↑](#footnote-ref-19)
20. An analytical tool to represent cause and effect relationships; equivalent to causal tree diagrams [↑](#footnote-ref-20)
21. This term is used in the paper to represent army recruits [↑](#footnote-ref-21)
22. Figure 12, chapter 6: Complex systems approaches; Complex Adaptive Systems (CAS); System Dynamics; Vanguard Method [↑](#footnote-ref-22)
23. Carey *et al*, 2015; p6 [↑](#footnote-ref-23)
24. Similar to Complex Loop Diagrams, a systems methodology to identify problems and points of leverage [↑](#footnote-ref-24)
25. A scientific research design that integrates theoretical concepts, exploration and analysis and builds a functional research process using qualitative and quantitative techniques. [↑](#footnote-ref-25)
26. <https://www.nhsbenchmarking.nhs.uk/news/the-integrated-care-system-ics-benchmarker-is-now-live> [↑](#footnote-ref-26)
27. *“What transferable lessons are there from using systems thinking approaches**in health, social care and public services to develop leading integrated care services**for adults?”* [↑](#footnote-ref-27)
28. Chapter 6; Table 9 [↑](#footnote-ref-28)