

**Digitalisation, Co-production, and Management Control:  
Transforming Management Accounting and Accountability  
in Thailand's Primary Healthcare**

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## ABSTRACT

This thesis investigates how mandated digitalisation transforms budgeting, accountability, and management accounting controls within Thailand's primary healthcare sector. While datafication is promoted globally to enhance public sector efficiency, a significant gap exists between top-down policy mandates and the complex realities of implementation, particularly in the resource-constrained contexts of emerging economies.

Employing an extended six-month ethnographic study based on Actor-Network Theory, this research utilises 50 in-depth interviews, 6 focus groups, and participant observation to explore how digital management accounting practices are translated, negotiated, and adapted by practitioners.

The findings reveal that organisational adaptation is an emergent process influenced by the tension between top-down mandates and bottom-up adaptations. Datafication does not replace legacy systems; instead, it creates complex, hybrid budgeting practices that can intensify resource inequalities. This results in a dynamic mix of formal, data-driven demands and informal, community-based relational practices, often mediated by village health volunteers. Organisational intermediaries, such as hybrid IT specialists, play a crucial role in enabling this adaptation. It requires new professional practices, including the development of a hybrid ethos and significant hidden work to sustain the latest control systems.

This thesis makes three primary contributions to academic debates. First, it offers a sociomaterial perspective that challenges techno-optimistic narratives by demonstrating how digital budgeting reforms can produce hybrid practices that deepen institutional inequalities. Second, it develops the concept of 'multiform accountability' to theorise how formal, data-driven systems become entangled with informal, community-based practices, a process critically mediated by local intermediaries. Finally, it introduces an integrated conceptual

model combining diffusion and translation theories to explain organisational adaptation, emphasising that successful implementation depends on the often hidden, essential work of practitioners and organisational intermediaries. These contributions provide policymakers with valuable insights into effectively implementing digital systems in practice.

*Keywords: Digitalisation, Datafication, Budgeting, Accountability, Public Healthcare, Thailand, Emerging Economies, Organisational Adaptation, Digital Co-production, Multiform Accountability, Hybrid Professional Identity, Hidden Work*

## **DEDICATION**

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## TABLE OF CONTENTS

|   |            |
|---|------------|
| <b>ABSTRACT</b>   | <b>II</b>  |
| <b>DEDICATION</b>   | <b>IV</b>  |
| <b>ACKNOWLEDGEMENT</b>  | <b>V</b>   |
| <b>TABLE OF CONTENTS</b>  | <b>VII</b> |
| <b>LIST OF TABLES</b>   | <b>XI</b>  |
| <b>LIST OF FIGURES</b>  | <b>XII</b> |
| <b>LIST OF ABBREVIATIONS</b>  | <b>XIV</b> |
| <b>CHAPTER ONE: INTRODUCTION</b>  | <b>1</b>   |
| 1.1 THE GENERAL GATHERING STAGE   | 1          |
| 1.2 BACKGROUND LITERATURE AND RESEARCH GAP  | 3          |
| 1.3 RESEARCH OBJECTIVES   | 7          |
| 1.3.1 To investigate how datafication transforms budgeting practices in public sector healthcare              | 7          |
| 1.3.2 To explore how digital co-production transforms accountability in the public sector healthcare          | 9          |
| 1.3.3 To examine how public healthcare organisations adapt to mandated digital management accounting controls | 10         |
| 1.4 CONCEPTUAL FRAMEWORK  | 13         |
| 1.5 RESEARCH CONTEXT  | 15         |
| 1.5.1 Thailand's healthcare system  | 15         |
| 1.5.2 Institutional structure and digitalisation policies   | 18         |
| 1.5.3 Socioeconomic context and research significance   | 21         |
| 1.6 METHODOLOGY   | 23         |
| 1.6.1 Ethnography   | 23         |
| 1.6.2 Site selection  | 24         |
| 1.6.3 Ethical considerations  | 27         |
| 1.6.4 Data collections  | 28         |
| 1.6.5 Data analysis framework   | 39         |
| 1.7 CONTRIBUTION OF THE STUDY   | 42         |
| 1.7.1 Theoretical contributions   | 43         |
| 1.7.2 Empirical contributions   | 44         |
| 1.7.3 Methodological contributions  | 45         |
| 1.8 OUTLINE OF THE THESIS   | 46         |
| 1.9 CHAPTER SUMMARY   | 48         |

|   |            |
|---|------------|
| <b>CHAPTER TWO: LITERATURE REVIEW</b>   | <b>49</b>  |
| 2.1 INTRODUCTION  | 49         |
| 2.2 THE DIGITAL TURN: RESHAPING BUDGETING, ACCOUNTABILITY AND CONTROL               | 50         |
| 2.2.1 Conceptualising the digital turn: from digitisation to digital transformation | 50         |
| 2.2.2 Big data and datafication: technologies, practices, and implications          | 54         |
| 2.2.3 Datafication and its impact on budgeting practices                            | 58         |
| 2.2.4 Datafication and the transformation of accountability                         | 61         |
| 2.2.5 The evolving landscape of management control through datafication             | 64         |
| 2.3 PUBLIC SECTOR MANAGEMENT ACCOUNTING REFORMS                                     | 68         |
| 2.3.1 New Public Management and its tensions with professionalism                   | 68         |
| 2.3.2 The translation of management accounting reforms in emerging economies        | 69         |
| 2.4 THEORISING TECHNOLOGICAL CHANGE AND ORGANISATIONAL ADAPTION                     | 72         |
| 2.4.1 Actor-Network Theory (ANT)  | 72         |
| 2.4.2 The revision of ANT: reassembling the social                                  | 85         |
| 2.4.3 Sociomateriality: The entanglement of the social and the material             | 88         |
| 2.4.4 Conceptualising co-production in public services                              | 92         |
| 2.4.5 Theorising adaptation: From diffusion pathways to negotiated translations     | 96         |
| 2.5 CHAPTER SUMMARY   | 103        |
| <b>CHAPTER THREE: PAPER ONE</b>   | <b>105</b> |
| ABSTRACT  | 105        |
| 3.1 INTRODUCTION  | 106        |
| 3.2 THEORY AND BACKGROUND LITERATURE  | 110        |
| 3.2.1 Sociomateriality and Actor-Network Theory (ANT)                               | 110        |
| 3.2.2 The transformation of public healthcare budgeting through datafication        | 114        |
| 3.3 RESEARCH CONTEXT AND DATAFICATION INITATIVE                                     | 116        |
| 3.4 RESEARCH METHODS  | 119        |
| 3.4.1 Ethnographic research design and site selection                               | 119        |
| 3.4.2 Data collection process and methods   | 121        |
| 3.4.3 Data analysis process   | 122        |
| 3.5 FINDINGS  | 125        |
| 3.5.1 Evolution of healthcare budgeting practices                                   | 125        |
| 3.5.2 Healthcare delivery transformations   | 127        |
| 3.5.3 Sociomaterial Effects and Implications  | 132        |
| 3.5.4 Transformation Mechanisms in Budgeting  | 137        |

|  |            |
|--|------------|
| 3.6 DISCUSSION   | 144        |
| 3.7 CONCLUSION   | 150        |
| REFERENCES:  | 153        |
| APPENDIX 1:  | 159        |
| APPENDIX 2:  | 162        |
| <b>CHAPTER FOUR: PAPER TWO</b>   | <b>163</b> |
| ABSTRACT   | 163        |
| 4.1 INTRODUCTION   | 164        |
| 4.2 BACKGROUND LITERATURE AND THEORETICAL FRAMEWORK                                | 166        |
| 4.2.1 Digital co-production and the transformation of accountability relationships | 166        |
| 4.2.2 Accountability transformation through digital healthcare networks            | 172        |
| 4.2.3 Actor-network theory   | 178        |
| 4.3 RESEARCH METHODS   | 181        |
| 4.3.1 Ethnographic approach and data collection                                    | 181        |
| 4.3.2 Data analysis process  | 184        |
| 4.4 Overview of the research context   | 188        |
| 4.5 FINDINGS   | 192        |
| 4.5.1 Transformation of accountability through digital co-production               | 192        |
| 4.5.2 Sociocultural context in accountability formalisation                        | 215        |
| 4.6 DISCUSSION   | 226        |
| 4.7 CONCLUSION   | 231        |
| REFERENCES:  | 233        |
| APPENDIX:  | 238        |
| <b>CHAPTER FIVE: PAPER THREE</b>   | <b>240</b> |
| ABSTRACT   | 240        |
| 5.1 INTRODUCTION   | 241        |
| 5.2 THEORETICAL FRAMEWORKS   | 246        |
| 5.2.1 Theoretical approach: from diffusion pathways to negotiated translations     | 246        |
| 5.2.2 Contextualising digital MACs adaptation: Professional and system dynamics    | 265        |
| 5.3 METHODOLOGY  | 276        |
| 5.3.1 Research context   | 276        |
| 5.3.2 Data collection  | 278        |
| 5.3.3 Data analysis  | 281        |
| 5.4 EMPIRICAL GROUNDING  | 285        |
| 5.4.1 Diffusion dynamics: From fragmentation to mandated integration               | 285        |

|   |            |
|---|------------|
| 5.4.2 Translation mechanisms: Actors actively shaping digital MAC implementation    | 290        |
| 5.4.3 Exploring implementation dynamics and adoption patterns of digital MACs       | 296        |
| 5.4.4 Emergent adaptive practices: Local professional responses and identity shifts | 307        |
| <b>5.5 DISCUSSION</b>   | <b>313</b> |
| 5.5.1 The proposed conceptual model of diffusion, translation, and adaptation       | 314        |
| 5.5.2 Theoretical contributions   | 317        |
| <b>5.6 CONCLUSION</b>   | <b>324</b> |
| <b>REFERENCES:</b>  | <b>327</b> |
| <b>APPENDIX:</b>  | <b>332</b> |
| <b>CHAPTER SIX: CONCLUSION</b>  | <b>334</b> |
| 6.1 SUMMARY OF KEY FINDINGS   | 336        |
| 6.2 THEORETICAL CONTRIBUTIONS AND PRACTICAL IMPLICATIONS                            | 338        |
| 6.2.1 Theoretical Contributions   | 338        |
| 6.2.2 Implications for policy and practice  | 341        |
| 6.3 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH                                  | 342        |
| <b>REFERENCES</b>   | <b>345</b> |
| <b>APPENDIX A: ETHICS APPROVAL</b>  | <b>363</b> |
| <b>APPENDIX B: INFORMATION AND CONSENT FORMS</b>                                    | <b>368</b> |
| <b>APPENDIX C: INTERVIEW QUESTIONS</b>  | <b>371</b> |
| <b>APPENDIX D: SUMMARY OF THE INTERVIEW PARTICIPANTS?</b>                           | <b>376</b> |
| <b>APPENDIX E: SUMMARY OF THE OBSERVATIONS</b>                                      | <b>378</b> |
| <b>APPENDIX F: DOCUMENTATIONS COLLECTED</b>   | <b>380</b> |
| <b>APPENDIX G: AWARD AND CERTIFICATES</b>   | <b>381</b> |

## LIST OF TABLES

|   |     |
|---|-----|
| <b>Table 2-1</b> Critical engagements with Latour's ANT .....   | 73  |
| <b>Table 3-1</b> A chronography of policies associated with the digital strategy .....                      | 118 |
| <b>Table 3-2</b> Details of formal data collection.....   | 121 |
| <b>Table 3-3</b> Description of the interview .....   | 162 |
| <b>Table 3-4</b> Description of the focus group.....  | 162 |
| <b>Table 4-1</b> Description of the interview .....   | 183 |
| <b>Table 4-2</b> Description of the focus groups .....  | 183 |
| <b>Table 5-1</b> Contrasting perspectives on digital MAC implementation: Diffusion vs.<br>Translation ..... | 259 |
| <b>Table 5-2</b> Description of the interview .....   | 280 |
| <b>Table 5-3</b> Description of the focus groups .....  | 281 |

## LIST OF FIGURES

|   |     |
|---|-----|
| <b>Figure 1-1</b> Formative fieldnote excerpt on datafication and funding mechanisms.....               | 8   |
| <b>Figure 1-2</b> Formative fieldnote excerpt on the experience of mandated digitalisation .....        | 12  |
| <b>Figure 1-3</b> Conceptual framework of the study .....   | 13  |
| <b>Figure 1-4</b> NHSO Digital Action Plan budgetary trend (2023-2027).....                             | 17  |
| <b>Figure 1-5</b> Thai national health service: Institutional and governance framework .....            | 20  |
| <b>Figure 1-6</b> A primary healthcare structure of a district health office.....                       | 26  |
| <b>Figure 1-7</b> Focus group sessions with patients, assisted by cultural intermediaries.....          | 33  |
| <b>Figure 1-8</b> The shared digital field diary as a reflexive analytical tool .....                   | 38  |
| <b>Figure 1-9</b> Application of MAXQDA's AI assist as a tool for analytical reflexivity.....           | 41  |
| <b>Figure 2-1</b> Five stages in the innovation process in organisations .....                          | 101 |
| <b>Figure 3-1</b> Analytical framework with ANT as the lens.....  | 113 |
| <b>Figure 3-2</b> Summary of initial and revised codes and themes .....                                 | 124 |
| <b>Figure 3-3</b> Thai national health service: Institutional and governance framework .....            | 159 |
| <b>Figure 3-4</b> Paper records in a file cabinet at community hospitals.....                           | 159 |
| <b>Figure 3-5</b> A primary care structure of a district health office .....                            | 160 |
| <b>Figure 3-6</b> An online shared field diary .....  | 160 |
| <b>Figure 3-7</b> The small-sized hospitals (Accountable for fewer than 3,000 patients) .....           | 161 |
| <b>Figure 3-8</b> The Large-sized hospital (Accountable for over 7,000 patients) .....                  | 161 |
| <b>Figure 4-1</b> Summary of Initial and Revised Codes and Themes .....                                 | 188 |
| <b>Figure 4-2</b> Thai national health service: Institutional and governance framework .....            | 190 |
| <b>Figure 4-3</b> The process of accountability transformation through digital co-production.....       | 227 |
| <b>Figure 4-4</b> A Strategic performance dashboard: Data visualisation for healthcare governance ..... | 238 |
| <b>Figure 4-5</b> The LINE Group for sharing pictures of meals, health records, and feedback...         | 238 |

|   |     |
|---|-----|
| <b>Figure 4-6</b> Using graphics to overcome language barriers in communication .....                 | 239 |
| <b>Figure 5-1</b> Thai national health service with IT support of selective district health office .. | 278 |
| <b>Figure 5-2</b> Summary of codes and thematic organisation in developing the conceptual model       |     |
| .....   | 284 |
| <b>Figure 5-3</b> Diffusion and translation processes in organisational innovation.....               | 315 |
| <b>Figure 5-4</b> Sociotechnical transformation of datafication during crisis-accelerated diffusion   |     |
| .....   | 332 |
| <b>Figure 5-5</b> Collaborative problem-solving via remote assistance between IT staffs .....         | 332 |
| <b>Figure 5-6</b> Hidden work – Extended data entry in clinical spaces after hours .....              | 333 |
| <b>Figure 5-7</b> Advanced monitoring equipment with the manual unused.....                           | 333 |

## LIST OF ABBREVIATIONS

| <b>ABBREVIATION</b> | <b>MEANING</b>   |
|---------------------|--|
| <b>ACCA</b>         | Association of Chartered Certified Accountants   |
| <b>ADB</b>          | Asian Development Bank   |
| <b>AI</b>           | Artificial Intelligence  |
| <b>ANT</b>          | Actor-Network Theory   |
| <b>BAFA-AFEE</b>    | British Accounting and Finance Association - Accounting and Finance in Emerging Economies Special Interest Group |
| <b>CAQDAS</b>       | Computer-Assisted Qualitative Data Analysis  |
| <b>CSI</b>          | Centre de Sociologie de l’Innovation   |
| <b>DoI</b>          | Diffusion of Innovation  |
| <b>EE</b>           | Emerging Economy   |
| <b>EEs</b>          | Emerging Economies   |
| <b>EPR</b>          | <i>Electronic Patient Records</i>  |
| <b>ESG</b>          | Environmental, Social, and Governance  |
| <b>GP</b>           | General Practitioner   |
| <b>HDC</b>          | Health Data Centre [Dashboard]   |
| <b>ICTs</b>         | Information and Communication Technologies   |
| <b>IMA</b>          | Institute of Management Accountants  |
| <b>JHCIS</b>        | Java Health Centre Information System  |
| <b>MA</b>           | Management Accounting  |
| <b>MACs</b>         | Management Accounting Controls   |
| <b>ML</b>           | Machine Learning   |
| <b>NCD</b>          | Non-Communicable Disease   |
| <b>NHS</b>          | National Health Service [UK)   |
| <b>NHSO</b>         | National Health Security Office [Thailand]   |
| <b>NPM</b>          | New Public Management  |
| <b>OAG</b>          | Office of the Auditor General  |
| <b>OPP</b>          | Obligatory Passage Points  |
| <b>PAM</b>          | Public Administration and Management   |
| <b>PLCIS</b>        | <i>Patient-Level Information &amp; Costing Systems</i>   |

|             |                                    |
|-------------|------------------------------------|
| <b>QDAS</b> | Qualitative Data Analysis Software |
| <b>SLR</b>  | Service Line Reporting             |
| <b>SoT</b>  | Sociology of Translation           |
| <b>STS</b>  | Science and Technology Studies     |
| <b>THB</b>  | Thai[land] Baht [Currency]         |
| <b>UCS</b>  | Universal Coverage Scheme          |
| <b>UHC</b>  | Universal Healthcare Coverage      |
| <b>UN</b>   | United Nations                     |
| <b>WHO</b>  | World Health Organization          |

## CHAPTER ONE: INTRODUCTION

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### 1.1 THE GENERAL GATHERING STAGE

During the COVID-19 vaccine rollout, a narrative of inequality emerged. From social media to major news outlets, reports appeared of so-called ‘VIP queues’ in provinces across the country, where it was believed that the well-connected could bypass the system, leaving ordinary citizens waiting and worsening a crisis of public trust.

—Adapted from news reports (Hfocus, 2021b; Prachatai, 2021)

This public story of inequality was exemplified by the ‘companion queue’ at Bang Sue Grand Station in Bangkok, the capital of Thailand. During a period when vaccines were in short supply and managed through a formal digital booking system, a well-meaning rule allowed elderly citizens to bring one companion for assistance. However, this rule was widely misunderstood on-site to mean that the companion also received a vaccination, creating an unofficial parallel track. It is reported that this loophole was exploited, with allegations that companion slots were secured through personal connections or informal payments, enabling thousands to bypass the digital priority queue (Hfocus, 2021).

These events highlight a key tension in the public sector reform, intensified by the urgent push for digitalisation during the pandemic. On one side, there is the top-down mandate for digitalisation, promoted as a tool of modern management accounting to ensure transparent and efficient allocation of public resources. On the other side, the complex reality of implementation presents challenges, where the promise of digital efficiency conflicts with real-world demands, infrastructural limitations, and the enduring influence of informal, relationship-based systems (Alawattage *et al.*, 2017). The frictions resulting from this clash served as the starting point for this thesis.

This vantage point prompts several important questions supporting this thesis. It examines how top-down digital mandates are interpreted and negotiated on the front lines, where informal, relationship-based systems continue to operate. It then considers how accountability is redefined for service users and providers when formal, data-driven systems coexist with these influential informal practices. Finally, it explores how public sector organisations adapt to mandated digital transformation, particularly in resource-constrained settings with urgent needs. To understand these complex dynamics, this study leverages the researcher's unique position. As a lecturer at a public university with close family ties to the public healthcare system - including relatives in senior management, pharmaceutical data system development, and community nursing - I was afforded a rare opportunity to access and comprehend these interconnected systems from multiple perspectives.

These questions shaped my doctoral research, prompting me to consider how a single personal experience transformed into a complex web of interconnected issues. This reflection revealed three distinct yet linked themes at the heart of Thailand's healthcare digitalisation: changes in budgeting practices, the redefinition of accountability, and the dynamics of organisational adaptation. To examine the practical tensions and lived experiences embedded in these questions, it was clear that a traditional method would be insufficient. As a result, this study adopts a '3-Paper PhD' format, with each paper utilising an ethnographic methodology.

The rest of this chapter is organised as follows: Section 1.2 reviews the background research and identifies the research gaps. Section 1.3 outlines the research objectives guiding this thesis, followed by Section 1.4, which introduces the conceptual framework. Section 1.5 presents the research context of Thailand's primary healthcare system, while Section 1.6 explains the ethnographic methodology used in this study. Section 1.7 highlights the key contributions.

Section 1.8 provides an overview of the thesis structure. Finally, Section 1.9 summarises this chapter.

## **1.2 BACKGROUND LITERATURE AND RESEARCH GAP**

The global public sector is experiencing a major digital transformation, a trend that has sped up over the past decade (Argento et al., 2025; Mergel, 2016). This move towards digitalisation is often viewed as a way to enhance efficiency, transparency, and accountability in government functions (Agostino et al., 2021; Mergel et al., 2019). However, the realisation of these reforms in the public sector - where core goals of equity and public value are vital - remains largely unexplored in research, especially regarding how digital tools are incorporated into and change established institutional practices (Agostino et al., 2022a; Agostino et al., 2022b; Grossi et al., 2023). These tensions are particularly evident in public healthcare, where the move to datafication directly conflicts with the complex, person-centred realities of service delivery.

These modern challenges should be understood within the wider managerial framework that has influenced the public sector for many years. For a long time, New Public Management (NPM) reforms have encouraged the use of private sector management accounting techniques to enhance performance and fiscal efficiency (Broadbent and Guthrie, 1992, 2008; Prowle, 2021; Hood, 1991, 1995). Digital tools have become essential for implementing these principles, aiming to boost efficiency and accountability through data.

In this context, organisational adaptation is understood not as a linear execution of top-down commands, but as an emergent process - one that is deeply social, contested, and continuously negotiated by actors on the ground (Orlikowski, 1996; Quattrone and Hopper, 2001). Rather than a simple replacement of legacy systems, this adaptation arises from the friction between rigid digital mandates and the complex realities of daily practice, often resulting in hybrid

configurations (Kurunmäki, 2004; Miller et al., 2008). As explored in the subsequent chapters of this thesis, this process involves diverse actors - from IT specialists to village health volunteers - who actively translate digital protocols to fit local needs (Callon, 1986; Latour, 2005). Furthermore, this phenomenon is not unique to healthcare; it reflects broader digitalisation challenges across the public sector, particularly in local government administration and public financial management (Alawattage and Azure, 2021; Lino *et al.*, 2022), where reforms frequently encounter resource constraints and distinct professional subcultures (Agostino *et al.*, 2022b). Understanding these dynamics is crucial for grasping how public sector organisations in emerging economies actually evolve under the pressure of datafication.

However, academic research on these changes has mainly focused on Western institutional contexts, leaving a notable theoretical gap (see e.g., Goddard, 2010; Scapens and Bromwich, 2001). This epistemic bias does not adequately represent the complex realities of emerging economies, where implementing such reforms is heavily shaped by unique institutional structures, resource constraints, and sociocultural dynamics (Alawattage *et al.*, 2017; van Helden and Uddin, 2016). This is especially evident in vital processes, such as public healthcare budgeting, where an emphasis on data-driven efficiency often conflicts with practical challenges related to resource allocation and institutional inequalities (Adhikari *et al.*, 2023; van Helden *et al.*, 2021). For instance, comprehensive reviews of accounting research in major emerging economies like Indonesia highlight distinctive contextual factors, such as a relatively weak accounting profession and the widespread influence of informal institutional mechanisms like entrenched political connections, which fundamentally shape governance and accountability in ways not fully captured by Western models (Kristanto and Cao, 2025). It is

precisely this disconnection between global reform templates and local realities that this thesis seeks to investigate.

At the core of this modern shift is the strategy of datafication - the process of transforming organisational activities and social relationships into measurable data to support evidence-based decision-making (Redden, 2018). This goes beyond a simple technological upgrade; it represents a broad sociomaterial shift that fundamentally changes management accounting, professional identities, and accountability relationships (Moll and Yigitbasioglu, 2019).

Although such initiatives are often promoted with techno-optimistic claims, significant academic debate reveals a more complex and contested reality. Critical research shows that, far from being a neutral tool, datafication frequently produces paradoxical effects, particularly in the public sector (Agostino *et al.*, 2022b). These may include reinforcing existing inequalities, encouraging new resistance patterns, and increasing administrative burdens that undermine the very efficiency the reforms aim to achieve (Clarke, 2016; Quattrone, 2016).

Beyond internal processes like budgeting, this digital transformation is also reshaping the interface between the state and its citizens. The emergence of digital co-production is fundamentally reconfiguring public service delivery, shifting citizens from passive recipients to active collaborators (Nabatchi *et al.*, 2017; Osborne *et al.*, 2016). This transition has profound implications for accountability, transforming it from traditional hierarchical frameworks into complex arrangements where formal institutional requirements intertwine with informal, community-based practices (Roberts, 1991; Roberts and Scapens, 1985). These emerging tensions between formal and informal systems were greatly accelerated and exposed by the global shock of the COVID-19 pandemic.

The COVID-19 pandemic acted as a vital catalyst for public sector digitalisation, prompting rapid, top-down technological adoption while revealing existing tensions between centralised policy directives and local implementation realities (Agostino *et al.*, 2021; Ahn and Wickramasinghe, 2021). Healthcare systems worldwide faced unprecedented pressures to digitise operations with limited consultation, leading to significant challenges during implementation, especially in resource-constrained environments (Bastida *et al.*, 2022; Leoni *et al.*, 2021). This global crisis context underpins this thesis, and Thailand offers an appropriate setting for examining these transformative processes.

The nation's healthcare system demonstrated remarkable resilience during the pandemic, achieving 102 consecutive days without local transmission between May and September 2020 - an accomplishment reached by only a few countries worldwide (Forbes, 2020; UN, 2020). This success was widely attributed to Thailand's unique combination of a strong public health infrastructure, extensive community networks comprising over 1.5 million village health volunteers, and innovative data-driven applications within primary care units (WHO, 2020, 2022).

Despite this achievement and recognising the mostly Western-centric literature identified earlier, significant gaps still exist in understanding the complex effects of rapid digital change. This thesis addresses these theoretical and empirical gaps through three interconnected investigations.

- First, it investigates how the mandated translation of digitalisation-related policies is implemented. It goes beyond basic implementation studies to analyse the sociomaterial formation of hybrid budgeting systems and the unintended institutional effects that result from this process (as described in Paper 1).

- Second, it examines how governance is transformed when digitalisation facilitates community co-production. It fills a gap in the literature by theorising the rise of multiform accountability, which is negotiated among diverse human and non-human actors in non-Western, networked settings (as presented in Paper 2).
- Finally, it explores the under-theorised process of organisational adaptation within hierarchical public sectors. It aims to develop a comprehensive conceptual framework that explains how the interaction between Diffusion of Innovation and the Sociology of Translation facilitates adaptation to top-down mandates (as presented in Paper 3).

### 1.3 RESEARCH OBJECTIVES

#### *1.3.1 To investigate how datafication transforms budgeting practices in public sector healthcare*

The first research objective investigates a key tension highlighted in the public sector accounting literature: the gap between the potential of datafication and its complex real-world application. While data-driven reforms are promoted worldwide to enhance efficiency (Argento *et al.*, 2025), their implementation in resource-constrained, non-Western contexts remains underexplored (van Helden and Uddin, 2016). This is particularly important for understanding the contested processes through which new budgeting systems are actively shaped by practitioners rather than merely being implemented (Preston *et al.*, 1992).

This academic gap became particularly clear through a series of initial, informal discussions held before the main fieldwork stage. These conversations consistently showed that the COVID-19 pandemic was a major catalyst for datafication, encouraging new management accounting practices that developed under significant pressure. A notable discussion with a

senior nurse, recorded in the field note below (Figure 1-1), emphasised how this digital transformation has become closely linked to the pressures of government funding.

**Figure 1-1** Formative fieldnote excerpt on datafication and funding mechanisms

**Wednesday, April 26, 2023**

...

**Telephonic Dialogue:**

I: Could you expand on what you're doing now that you've linked to digital?

A nurse: Sure! I need to teach village health volunteers how to use a mobile app so that I can gather information from the villages, including details about households, employment, income, and treatment history. The government has now mandated that all state healthcare offices must participate in [Datafication] and keep data up-to-date. We believe that if our data is more comprehensive, we will have a better chance of securing funding from the government. I'm interested in whether datafication could help us accelerate this process or make our data even more useful.

**Reflection:**

This conversation demonstrated how the government uses funding mechanisms to encourage the adoption of big data in healthcare, revealing both the potential advantages of datafication strategies and the pressure to gather comprehensive data for financial incentives.

*Note: This excerpt is based on the researcher's initial experience and informal conversations that took place before the formal, ethics-approved data collection phase.*

This practical insight from practice aligns with and empirically supports a notable gap identified in the literature. The nurse's comment - linking the completeness of data directly to the chances of receiving government funding - serves as a compelling, real-world example of the pressures that lead to the local fabrication of budgeting practices. It suggests that data collection is not a neutral activity but a strategic one, shaped by the need to meet centrally imposed funding criteria. This observation confirms that while digital transformation is widely discussed, research often overlooks the complex realities of emerging economies, where such resource pressures can lead to significant unintended consequences and paradoxical outcomes (Adhikari *et al.*, 2023; Quattrone, 2016).

### ***1.3.2 To explore how digital co-production transforms accountability in the public sector***

#### ***healthcare***

The second research objective is motivated by a notable debate in public administration literature about the rise of digital co-production - the process where citizens shift from being passive recipients to active collaborators in delivering public services (Nabatchi *et al.*, 2017; Osborne *et al.*, 2016). This shift has important implications for accountability, challenging traditional hierarchical structures (Roberts, 1991) and encouraging complex, networked relationships (Arun *et al.*, 2021). However, although the transformative potential of digital co-production is widely recognised, there remains a conceptual gap in understanding how accountability is actively reshaped in practice, especially in non-Western contexts where formal digital systems are intertwined with deeply rooted informal practices (van Helden and Uddin, 2016).

This theoretical puzzle was clarified through insights from those initial conversations, especially the senior nurse's emphasis on training village health volunteers (Figure 1-1), which led to further exploration. I realised that these volunteers are a crucial link between the new

digital systems and the community, acting as key mediators in the transformation. This realisation prompted a targeted investigation into how Thailand's network of over one million village health volunteers - within a national population of 71 million - whose contributions during the COVID-19 pandemic were highlighted by the WHO (2020) - fundamentally reshape accountability relationships through digital co-production. Extended fieldwork confirmed that these volunteers are vital bridges between formal healthcare systems and community practices, representing a form of localised adaptation that traditional, Western-centric accountability models often overlook.

### ***1.3.3 To examine how public healthcare organisations adapt to mandated digital management accounting controls***

The third research objective addresses a key theoretical challenge in explaining how innovations are adopted within complex, hierarchical organisations. The literature presents two influential but often conflicting perspectives: the Diffusion of Innovation theory, which offers a broad framework for understanding how innovations spread through a social system, often via top-down mandates (Rogers, 2003); and the Sociology of Translation, which provides a more detailed view of how innovations are actively negotiated and adapted through localised, bottom-up practices (Callon, 1986). Relying on either theory alone offers an incomplete explanation (McMaster *et al.*, 1997), leading to a conceptual gap in understanding how organisational change genuinely emerges from the interaction of these forces.

This theoretical tension is particularly apparent in public healthcare, where the history of management control reforms is marked by numerous examples of centrally mandated initiatives encountering local resistance and adaptation. Research has consistently shown that top-down approaches in professionalised public services often face opposition (Lega and Vendramini, 2008). More specifically, studies reveal that the same centrally imposed

performance management system can yield very different outcomes, resulting in genuine quality improvements in one organisation while causing conflict, crises, and unintended gaming behaviours in another (Conrad and Uslu, 2012). This emphasises that the outcome of a mandated reform is not solely determined by its design but also depends on local interpretation and the agency of practitioners. The mandated digitalisation of MACs is the most recent example of this pattern, creating an urgent need to understand how practitioners navigate the friction between centrally diffused directives and the necessity for local adaptation. This tension was powerfully demonstrated in a revealing digital exchange with a frontline practitioner (Figure 1-2).

This exchange vividly illustrates the central theme of this investigation: for practitioners on the ground, digitalisation is often experienced not as a choice but as a top-down directive. However, as my fieldwork consistently showed, this mandate encounters a complex reality of bottom-up negotiation and adaptation - more aligned with Sociology of Translation. This apparent paradox indicates that an integrated approach is necessary to understand the dynamic between mandated diffusion and its practical implementation.

The third paper, therefore, addresses this gap by examining how organisational adaptation results from the interaction between top-down and bottom-up dynamics. It moves beyond merely comparing the two theories to focus on the key mechanisms that enable adaptation, such as the role of organisational intermediaries and the emergence of new professional practices - including the development of a 'hybrid professional ethos' (Kurunmäki, 2004) and the performance of significant 'hidden work' (Barnard *et al.*, 2024) - which are crucial for ensuring mandated systems operate effectively. Based on this analysis, the paper proposes an integrated conceptual model to explain this complex adaptation process.

**Figure 1-2** Formative fieldnote excerpt on the experience of mandated digitalisation

**Wednesday, May 15, 2023 (LINE Chatting application)**

**Conversations:**

I: Hey! 😊 I'd like to know how the use of digital technology has changed your work.

A village health volunteer:



**Reflection:**

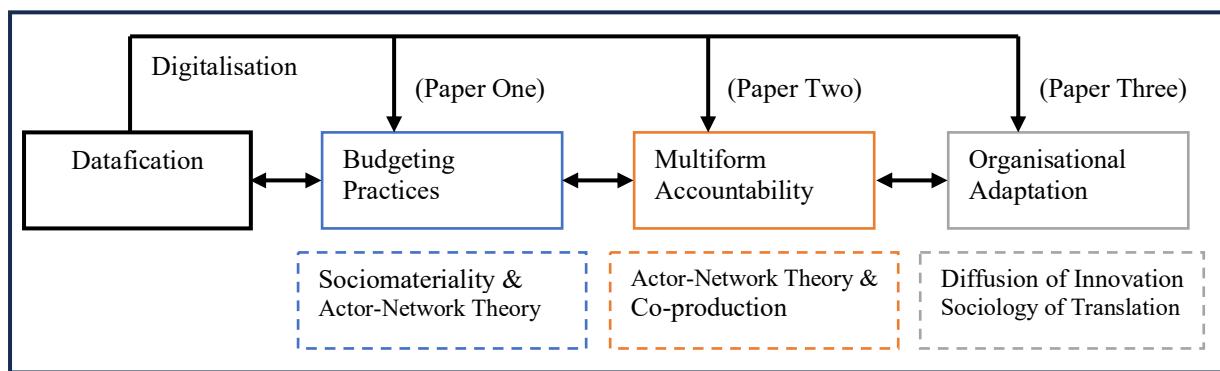
The emoji used in this exchange is especially revealing. In Thailand, this salute gesture is widely understood as a sign of receiving a command that must be obeyed, similar to a soldier accepting an order. This single image powerfully captures a core theme of the changes: for practitioners on the ground, digitalisation is often experienced not as a choice, but as a top-down directive. The conversation that followed this gesture shed light on the complex reality of this mandate, revealing a picture that includes both the recognised benefits and the substantial burdens of the ongoing digital transformation.

*Note: This excerpt is based on the researcher's initial experience and informal conversations that took place before the formal, ethics-approved data collection phase.*

## 1.4 CONCEPTUAL FRAMEWORK

To achieve the research aims of this study, a conceptual framework was developed (Figure 1-3). The framework is based on the review of relevant literature (see Chapter 2), the theoretical framing (see Chapter 2), and the research objectives addressed in the three papers of this thesis (see Papers 1, 2 & 3 in Chapters 3, 4 & 5). Overall, the diagram provides a roadmap for the study, guiding the investigation into how mandated digitalisation is interpreted, negotiated, and adapted within Thailand's primary healthcare sector, leading to changes in management accounting, accountability, and professional practices.

**Figure 1-3** Conceptual framework of the study



While the three empirical papers are interconnected by an underlying interest in actor-networks, each paper employs different theoretical frameworks or approaches to address specific conceptual debates and research objectives. To articulate the logical alignment among these studies, this thesis is structured to provide a cumulative understanding of digital transformation, moving from material practices to relational dynamics, and finally to a holistic process of adaptation.

**Paper One** aims to address a key debate in accounting research regarding the role of technology. It seeks to move beyond traditional approaches that see technology as a separate, external tool whose effects on an organisation can be predicted in advance. This perspective,

criticised by scholars (e.g., Adhikari *et al.*, 2023; Quattrone and Hopper, 2001), often fails to capture the complexity of organisational change, which is rarely linear or predictable. Instead, they argue that change is an emergent phenomenon, heavily influenced by local interpretations and social dynamics. To overcome these limitations, this paper is primarily guided by a sociomateriality perspective (Orlikowski, 2007; Orlikowski and Scott, 2008). This lens helps us understand how budgeting practices are co-constructed through the inseparable interplay of human actors and digital technologies. This sociomaterial analysis is also supported by insights from Actor-Network Theory or ANT (Latour, 2005), which provides the methodological tools to trace the network of actors involved in this entanglement.

**Paper Two** contributes to an ongoing, decades-long debate on the nature of public sector accountability. As outlined by Roberts (1991), conventional models often conceptualise accountability through formal, hierarchical structures. However, as recent scholarship confirms, the digital transformation of public services has challenged these traditional frameworks, creating unaccounted-for effects and new complexities that require novel analysis (Agostino *et al.*, 2022b; Argento *et al.*, 2025). To understand how accountability functions in the complex, networked environment of modern public services, this paper employs ANT as its primary analytical framework. Grounded in the classic ANT tradition of tracing the associations between actors (Latour, 1987, 2005), this approach is uniquely suited to investigate how a diverse network of human actors (like clinicians and patients) and non-human actors (such as digital platforms and reporting metrics) collectively negotiate new forms of accountability through digital co-production (Bovaird, 2007; Osborne *et al.*, 2016).

**Paper Three** aims to examine the longstanding theoretical tension between competing models that seek to explain how innovations are adopted in complex organisations. This challenge, as highlighted by McMaster *et al.* (1997), revolves around the limitations of the traditional

diffusion metaphor, which often portrays innovation as the spread of a fixed and stable entity through a social system. The paper is therefore primarily guided by Diffusion of Innovation (Rogers, 2003), offering a suitable macro-level framework for understanding how innovations disperse. However, to address the limitations of diffusion of innovation theory in explaining local agency and on-the-ground adaptation over the long term, the paper enhances this perspective with the Sociology of Translation, a foundational approach within ANT (Callon, 1986; Latour, 1987). This integrated approach is especially significant in the context of government-led organisations within a strict hierarchy, such as those in Thailand.

In such contexts, it is difficult for localisation to happen initially, as change is usually driven from the top down. Therefore, it makes more sense to start with a diffusion perspective to explain the initial spread (e.g., during the COVID-19 pandemic); however, over time, translation processes inevitably evolve and take place at the local level. By combining these two theories, a cohesive conceptual model is developed based on empirical evidence. This integrated framework offers a more comprehensive explanation of how organisational adaptation results from the tension between mandated diffusion and contextual translation. The process involves building a hybrid professional ethos and considerable hidden effort by practitioners.

## 1.5 RESEARCH CONTEXT

### 1.5.1 Thailand's healthcare system

Thailand, an upper-middle-income country in Southeast Asia with a population of 71 million (UN, 2025), provides a unique research environment for studying public sector digitalisation. Its healthcare system is not a new or undeveloped setting for digital innovation; rather, new technologies are being incorporated into a mature and complex Universal Healthcare Coverage (UHC) system. This UHC framework was, in itself, a transformative solution to major public

health challenges well before the current era of big data (Center for Global Development, 2019). The COVID-19 pandemic acted as a powerful catalyst for this recent change, creating an urgent need for data-driven solutions to enhance public services and their supporting management accounting and control processes (ADB, 2022). This makes Thailand a compelling case study (real-world laboratory in ANT) for analysing the crucial intersection of legacy public systems and advanced digitalisation.

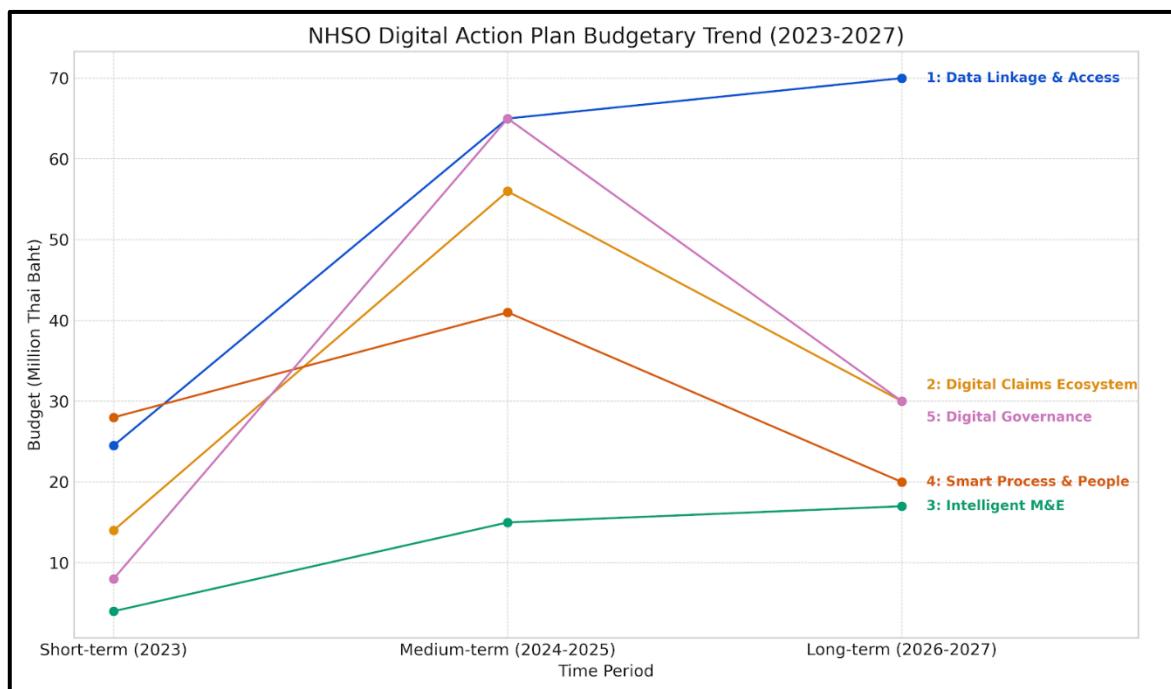
The foundation of this system was built over several decades. Starting in the 1970s, Thailand gradually developed its public health infrastructure. It expanded social protection through various programmes, including the Medical Welfare Scheme (1975) (offering coverage for low-income citizens), the Civil Servant Medical Benefit Scheme (1978) (for government workers and their families), and the Social Security Scheme (1990) (for private sector employees). Despite these efforts, a significant coverage gap remained. By 2001, nearly a third of the population still lacked insurance, leading to serious consequences: more than 17,000 children under five died each year from preventable diseases, and out-of-pocket health expenses pushed one in five of the poorest households below the poverty line (Center for Global Development, 2019; P4H Network, 2025).

This critical situation laid the groundwork for a transformative change in 2002 with the introduction of the Universal Coverage Scheme (UCS). The scheme is a tax-funded, non-contributory system managed by the National Health Security Office (NHSO) - the leading organisation responsible for budget control, which is central to this argument. The UCS had a significant and immediate impact: within just a year, it provided coverage for the 18 million previously uninsured people, a notable achievement in the aftermath of the 1997 Asian financial crisis (P4H Network, 2025). This achievement notably reduced the financial burden

on citizens, as out-of-pocket health expenses declined from 34% in 2001 to 8.7% by 2019 (P4H Network, 2025).

Today, Thailand's healthcare system revolves around three main public schemes, with the UCS being the largest by far (National Health Security Office, 2024b). Managed by the NHO, the UCS covers about 47 million people - roughly 72% of the total population. The other two schemes are the Civil Servant Medical Benefit Scheme (covering 5.7 million people) and the Social Security Scheme (covering 12.3 million people) (National Health Security Office, 2024b). The efficient management of this dominant scheme by the NHO has been vital in promoting national health equity, ensuring that access to care for most of the population is now comparable to that available to civil servants and private sector employees (Thammatacharee, 2024).

**Figure 1-4** NHO Digital Action Plan budgetary trend (2023-2027)



*Source: Adapted from the National Health Security Office Digital Action Plan (2023-2027)*

To oversee this extensive system, the government has allocated substantial funds towards digitalisation, as described in the NHSO Digital Action Plan (National Health Security Office, 2023). This plan provides a strategic roadmap for transformation, outlining specific budget allocations across five critical areas aimed at establishing a new digital infrastructure, as illustrated in Figure 1-4.

This budgetary roadmap, as shown in Figure 1-4, reveals a significant total investment of 387.5 million Thai Baht (approximately £8.82 million<sup>1</sup>). The timing of the expenditure is crucial: a concentration of funding in the medium-term (2024–2025) indicates a period of intensive system development. The government's priorities are also clear, with Data Linkage & Access, as well as Digital Governance, receiving the most substantial investment, establishing them as foundational pillars of the new infrastructure. Other areas, such as Digital Claims and Smart Process & People, show a funding peak during the same period, a pattern consistent with high initial development costs. While this detailed, phased allocation provides tangible evidence of a definite financial commitment, its implementation through data-driven performance metrics creates the very tensions this thesis aims to explore. As the findings will demonstrate, linking funding to centrally imposed targets can increase resource inequalities and force local practitioners to adopt workaround strategies to meet these new demands.

### ***1.5.2 Institutional structure and digitalisation policies***

Thailand's healthcare system is characterised by a fundamental tension between its formal structure and operational reality. On one side, it is a complex, top-down hierarchy designed for

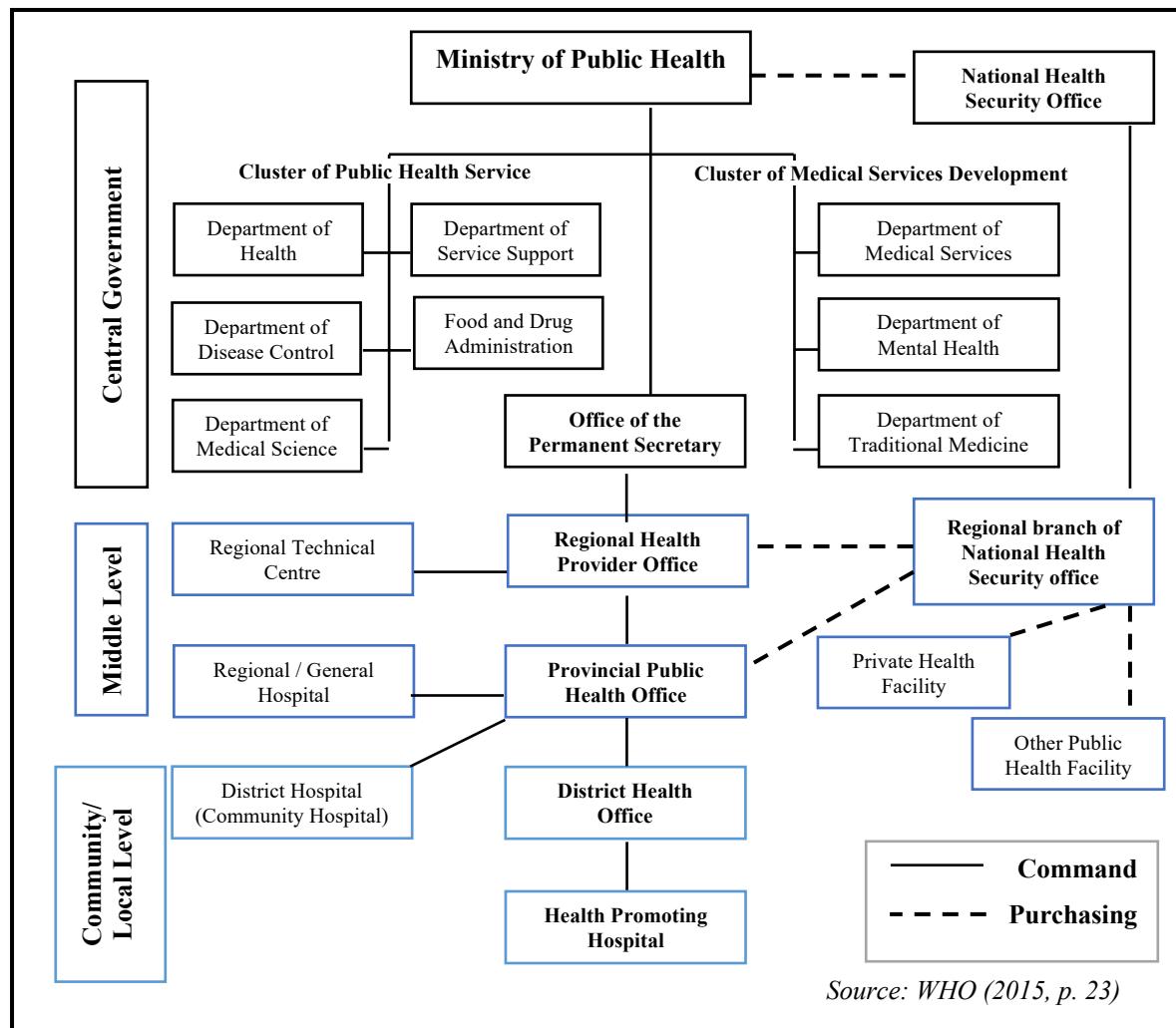
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<sup>1</sup> Converted at average 2023 exchange rate: THB 44 = GBP 1

centralised control. As shown in Figure 1-5, the formal system cascades from the Ministry of Public Health down through regional and provincial offices to local District Health Offices, establishing a clear pathway for central mandates. On the other side, the system's effectiveness relies on a deeply ingrained, bottom-up tradition of community engagement. At the grassroots level, it depends on a network of over one million Village Health Volunteers - a form of indigenous co-production that predates contemporary management theories and is central to how policies are actually implemented and negotiated (Kowitt *et al.*, 2015). This inherent duality between the formal, state-controlled hierarchy and the informal, community-based network creates the foundational tension explored in this thesis, shaping the adaptation of digital controls, transforming accountability, and evolving budgeting practices.

This dual structure creates a complex environment for the country's digitalisation agenda, a process that can be understood in two phases. Importantly, the motivation for these reforms can be traced back to the 1997 Asian financial crisis. After the crisis, the Thai government faced fiscal insolvency and was compelled to secure USD 16.7 billion (approximately £10.2 billion) in emergency financing from the International Monetary Fund under strict conditions. (Keerasuntonpong *et al.*, 2019; World Bank, 2000). These conditions mandated comprehensive governance reforms prioritising transparency and increased public accountability, including the implementation of integrated Government Fiscal Management Information Systems and the adoption of new accounting and auditing frameworks (World Bank, 2009). This crisis acted as a catalyst for externally driven MA reforms, laying the foundation for subsequent modernisation.

**Figure 1-5** Thai national health service: Institutional and governance framework



Building on this foundation, a key phase of the current digitalisation journey commenced with the National Health Security Act (2002) (National Health Security Office, 2002), which established the National Health Security Office (NHSO) as the strategic ‘purchaser’ of health services (as shown in Figure 1-5) and created a data-intensive system by linking funding to patient-centred metrics.

This laid the foundation for an active digitalisation phase, led by the NHSO and propelled by a series of policies aimed at modernising the public sector, including the eHealth Strategy Field (Ministry of Public Health, 2017), the 20-Year National Strategic Plan (2017–2036) (Thai

Government, 2017), and the Digital Government Act (2019) Field (Thai Government, 2019). Although the basic diagram of this institutional structure dates back to 2015 (Figure 1-5), its core components were confirmed to be accurate and operational during the fieldwork for this study. This policy trajectory culminated in the NHSO Digital Master Plan (2023–2027) (National Health Security Office, 2023), which promotes comprehensive data exchange and analytics across the entire network. It is within this complex framework - where top-down digital mandates intersect with the realities of community co-production - that this thesis examines processes of adaptation, resistance, and translation.

### ***1.5.3 Socioeconomic context and research significance***

Thailand's healthcare system provides a robust research environment, based on the mature and effective universal coverage model introduced in the early 2000s. The long-term success of this model is evident in notably better public access to healthcare. For instance, the average number of outpatient visits per UCS member rose from 2.45 in 2003 to 3.42 in 2020, while a 2019 snapshot showed that unmet health needs were very low (1.4% for outpatients and 0.1% for inpatients) (P4H Network, 2025). Achieving this level of effectiveness, however, requires considerable government investment. Health expenditure increased from 3.8% of GDP in 2019 to 5.36% in 2022 (Macrotrends, 2025), a commitment that was reinforced during the pandemic. The management of this significant financial obligation poses the central challenge examined in this thesis: how digital tools, community co-production, and new accountability mechanisms are mobilised to control these rising costs while maintaining service quality.

An internal tension between centralised and decentralised forces influences the governance of this large-scale financial commitment. On one side, the system functions through a top-down, hierarchical structure, where central agencies like the NHSO establish policy and oversee funding. On the other side, it draws on a deeply rooted tradition of community co-production,

most notably through its national network of village health volunteers. This duality results in what this thesis describes as a continuous negotiation between central mandates and local realities - a process in which these volunteers have served as vital mediators for decades (WHO, 2020, 2022). They interpret official public health directives into locally understandable language and practices, foster trust within the community, and gather grassroots data - shaping distinctive service delivery patterns that differ markedly from the more formal, professionally led models typical of Western systems.

The COVID-19 pandemic subjected this unique system to a severe stress test, revealing two key effects. First, it confirmed the system's notable financial resilience; unlike in many other countries, no signs of informal side payments for care appeared, even under extreme pressure (Thammatacharee, 2024). Second, the pandemic served as a strong catalyst for change, compelling the top-down hierarchy to accelerate digitalisation. This involved the swift deployment of new digital tools that directly interacted with and relied on the bottom-up community structures, highlighting the system's inherent tension (Regional Health Provider Office 12, 2020).

Ultimately, this convergence of factors - a mature and universal healthcare system, a deep tension between central control and community co-production, and a crisis-driven digital transformation - creates a natural experiment in public sector adaptation. It offers a rare opportunity to examine how management accounting practices develop under dual pressures, enabling the study to follow Latour's (1987) methodological advice to investigate a system before its internal operations become a stabilised 'black box'. The insights gained from this complex yet successful system are likely to be valuable in addressing the ongoing academic debate and shaping practical policy. Furthermore, these lessons have considerable global relevance, as Thailand, through the NHSO, regularly shares its health financing expertise with

other emerging economies (Herberholz *et al.*, 2025), emphasising the wider importance of this research.

## 1.6 METHODOLOGY

### 1.6.1 *Ethnography*

This investigation employs an ethnographic research method to examine the organisational transformation driven by datafication. Although ethnography has been less common in accounting research (Kalyta and Malsch, 2018), it is increasingly valued for its ability to reveal the subtleties of organisational life and develop theory from actual practice (Ahrens and Chapman, 2006; Bamber and Tekathen, 2023; Deng, 2023). Given this study's focus on how practitioners negotiate, adapt, and experience mandated digital controls, an interpretive ethnographic approach is the most suitable for understanding how management accounting is created in practice. This choice is also greatly influenced by my research journey. Having been a subjective participant within this context from 2020 to 2022, I had a deep, intuitive understanding of its complexities. Therefore, this research required a methodological framework that could utilise this insider perspective while maintaining a structured and objective analytical approach.

This study primarily explores the real-life experiences of practitioners, making an interpretive ethnographic approach the most suitable choice. While formal data collection spanned six months, the ethnographic immersion itself was significantly longer, effectively countering potential limitations regarding the duration of engagement. This research journey was characterised by three distinct phases of involvement. First, having served as a subjective participant in this context from 2020 to 2022, I possessed a deep, insider understanding of the organisational complexities prior to the study, which substituted for the prolonged familiarisation period typically required in traditional ethnography. Second, during the formal

six-month fieldwork (August 2023 - January 2024), I shifted to a dual role, acting as both an objective observer and a subjective participant to document practices systematically. Finally, the engagement extended into a post-fieldwork phase, involving follow-up interviews to trace the longer-term trajectories of digital adaptation. Ethnography is especially appropriate for navigating this longitudinal dynamic, as it allows researchers to move flexibly along a spectrum between observer and participant (O'Reilly, 2009, 2012). Adopting this dual role required a significant epistemological shift towards interpretive engagement (Brewer, 2000), ensuring that the depth of data collection was commensurate with rigorous ethnographic standards despite the specific timeframe of the formal observation.

To provide an analytical framework for this immersive and reflective process, this study adopts Latour's (2005) 'oligopticon perspective' as a basis for analysis, employing micro-level details to understand macro-level transformations. The approach is guided by ANT, which is utilised here not only as a theoretical lens but also as a methodological tool for tracing how accounting systems are constructed in practice (Preston *et al.*, 1992). As a method, ANT directs the research to follow a broad and diverse list of human and non-human actors that form a network (Lowe, 2001). The investigation was also informed by Latour's (1987) concept of the 'accumulation cycle,' which highlights that understanding develops through repeated encounters with phenomena. Throughout the research process, an emphasis is placed on analytical reflexivity rather than mere descriptive documentation, a practice essential to rigorous ethnographic inquiry (Bamber and Tekathen, 2023; Brewer, 2000).

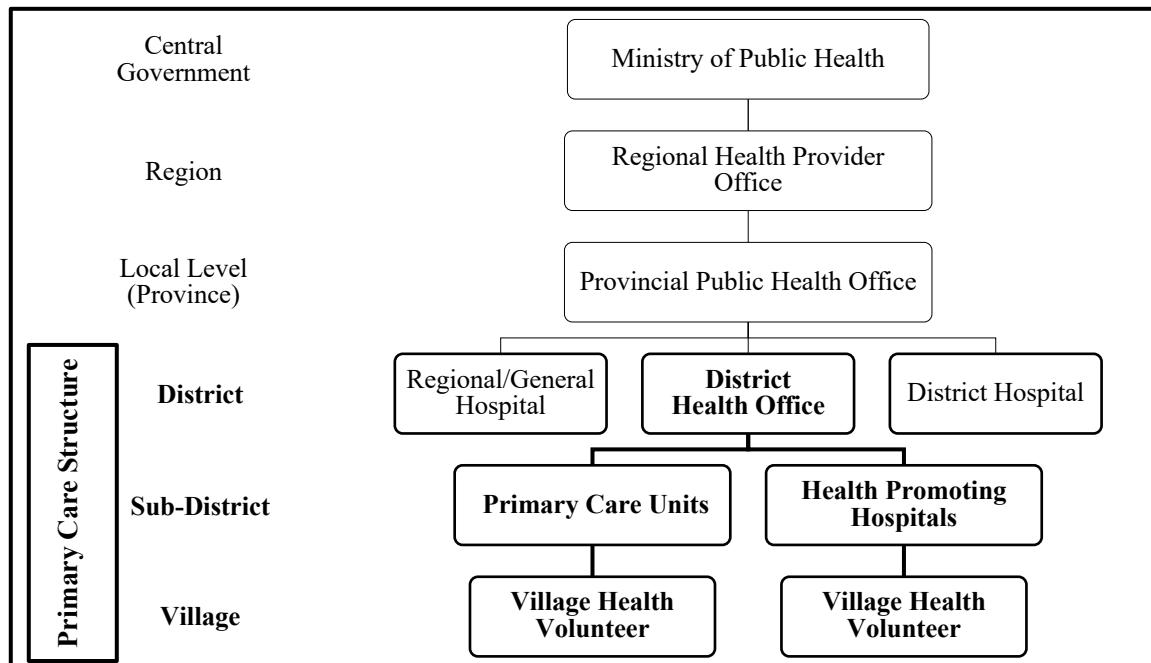
### ***1.6.2 Site selection***

A District Health Office in Southern Thailand was selected as the primary research site through purposive sampling. This form of sampling targets specific groups or locations that can provide the necessary information, either because they are the sole sources or because they meet

particular criteria established by the researcher (Bougie *et al.*, 2020). This approach was deemed most appropriate for an in-depth ethnographic study aiming to generate rich, contextualised insights rather than statistical generalisability. The site was chosen because it met several key criteria: it was recognised as an early and distinguished adopter of digital technologies, reflected the national hierarchical structure of public healthcare, and possessed a distinctive, distributed IT support system, making it an information-rich case for examining adaptation and translation. The researcher's embedded position as a university lecturer within the local academic community, combined with extensive familial connections to Thailand's healthcare system, further facilitated access. This unique positionality, along with formal access agreements negotiated with key organisational gatekeepers, did not influence the selection but enabled comprehensive ethnographic access to the institutional processes and organisational dynamics of this significant site (Hammersley and Atkinson, 2019; O'Reilly, 2009, 2012).

The organisational structure of the research site, as shown in Figure 1-6, demonstrates a sophisticated integration of traditional healthcare delivery with emerging digital capabilities. Operating under a Provincial Public Health Office and a Regional Health Provider Office, the organisation coordinates with an extensive network of around 20 primary and sub-district healthcare facilities. This network serves a population of over 90,000. It is staffed by more than 130 healthcare professionals, including over 15 physicians, along with a community network of nearly 1,400 village health volunteers (Department of Health Service Support, 2024).

**Figure 1-6** A primary healthcare structure of a district health office



The integrated system provides comprehensive healthcare services at no cost to patients through the Universal Coverage Scheme (UCS), including preventive care, medical treatment, consumer protection services, emergency care, dental services, traditional Thai therapeutic practices, and other services (Hfocus, 2015). The location of the site is also significant because of its rich multicultural environment, where different ethnic and religious groups coexist, shaping social interactions and engagement with public services.

Furthermore, the researcher's prior professional experience in the region, from 2020 to 2022, provides essential contextual insight into the district's development of data management methods during the COVID-19 pandemic. This historical perspective allowed for systematic observation of the transition from traditional manual reporting systems in early 2020 to the structured adoption of datafication in healthcare delivery during 2021. Before these digital initiatives, data management mainly relied on manual processes, with practitioners and

volunteers using paper-based documentation systems (Regional Health Provider Office 12, 2020).

The District Health Office's early adoption of digital technologies provides a rich empirical platform for this study. The organisation's impressive implementation of its datafication efforts is evidenced by its 'Outstanding' rating from Thailand's Ministry of Health and a top national position among 9,000 primary care facilities in Thailand in 2024. This success is partly attributable to its extensive digital ecosystem and a strategically decentralised IT department. This distinctive IT structure is a key reason for selecting the site. A central manager oversees a team of over 20 IT officers, each positioned within one of the network's 20 primary and sub-district healthcare facilities. This decentralised support model creates an ideal environment for analysing the processes of technological translation and strategic intermediation within a resource-limited setting.

### ***1.6.3 Ethical considerations***

This research followed a strict two-stage ethical approval process to ensure compliance with both local and international standards. Recognising the importance of local governance, approval was first obtained from the executive committee of the partner District Health Office in Southern Thailand. This local approval was a necessary condition for site access and was later included in the comprehensive ethics application submitted to the University of Essex.

After a thorough review of the application, including prior approval from the Thai health authority, the study received formal ethical approval from the University of Essex Ethics Committee (ERAMS reference: ETH2223-1198). This final approval confirmed the study's compliance with international academic standards and authorised the research activities to be conducted outside the United Kingdom.

A key ethical principle of this study was the requirement for informed consent. Before collecting any data, all participants received a comprehensive Information Sheet outlining the research aims, methodological approach, and the implications of their participation. Participation was entirely voluntary, and participants were informed that they could withdraw their consent at any time without needing to give a reason, as outlined in the information sheet.

To ensure confidentiality and protect participant privacy, strict data management procedures were implemented to maintain data integrity. All collected information was securely stored on password-protected computers, with access restricted to the research team members only. To preserve anonymity in all research outputs, including this thesis and any future publications, participant numbers or pseudonyms are used, and all identifiable details have been removed.

Participants were also informed that, although a list linking pseudonyms to real names would be kept securely, their data, as part of a doctoral study, might be reviewed by authorised University of Essex staff for assessment purposes. The formal ethical approval documentation from the University of Essex Ethics Committee, along with the signed consent form from the partner organisation's executive, is included in APPENDIX A. The generic Participant Information Sheet and consent form templates used in this study are provided in APPENDIX B.

#### ***1.6.4 Data collections***

Data collection for this study was conducted in multiple phases to develop a comprehensive, longitudinal understanding of the research context. Additionally, an initial period of informal observation during my previous professional experience (2020–2022) provided a valuable historical perspective. This allowed for systematic observation of the district's shift from

traditional, paper-based reporting systems to the structured adoption of datafication during the COVID-19 pandemic.

Following ethical approval from the University of Essex, this preliminary engagement was followed by the formal data collection phase for this thesis, which involved six months of intensive ethnographic fieldwork from August 2023 to January 2024. During this immersive period, the researcher's role shifted along the observer-participant continuum, alternating between objective observation of workflows and subjective participation to gain deeper insights into practitioners' lived experiences (O'Reilly, 2009, 2012). A comprehensive range of ethnographic techniques was employed, including participant observation, informal conversations, semi-structured interviews, focus groups, and documentary analysis. To support ongoing reflexive analysis, a shared digital field diary was maintained throughout the fieldwork to record observations, personal reflections, and emerging analytical insights (Brewer, 2000). The specific data collection methods are detailed in the subsections that follow.

### ***In-depth interview***

Semi-structured interviews served as the main methodological tool for exploring the complex socio-technical interactions that arose through healthcare datafication. A total of 50 semi-structured interviews were conducted with a diverse range of stakeholders across the macro (societal/policy), meso (organisational), and micro (individual practitioner) levels (Grossi *et al.*, 2017). However, in line with an emergent ethnographic approach, this initial plan acted as a guide rather than a strict quota.

To ensure representativeness and mitigate selection bias within this qualitative design, a stratified purposive recruitment strategy was employed, moving from the strategic top to the operational bottom (Saunders *et al.*, 2019). Recruitment commenced at the upper hierarchy

(Provincial and Hospital Directors) to secure permissions and identify key informants. Subsequently, a snowball sampling technique was utilised where these initial participants suggested relevant practitioners at lower levels (O'Reilly, 2012). Crucially, to prevent the sample from being limited to only those recommended by management, I leveraged my observer-participant status to independently recruit staff during daily operations. This mixed recruitment channel ensured a form of qualitative randomisation, capturing a diverse range of voices - including both compliant adopters and resistant critics - that a purely top-down recommendation process might have excluded (Hammersley and Atkinson, 2019).

To navigate my unique positionality and establish the deep rapport essential for ethnographic research, the first two months of fieldwork were intentionally focused on immersive participant observation. This foundational period, described further in the relevant sections on observation, involved working alongside practitioners in their daily roles. Such immersion was a purposeful methodological decision, enabling me to gain a nuanced understanding of the organisational context and to build trust at all levels. This approach allowed practitioners to see me as a fellow participant in their work rather than merely an external researcher or a relative of the executive team. This vital groundwork proved crucial for gaining authentic insights, and as a result, the first formal interviews began in the third month of fieldwork (October), once this essential rapport had been established.

Following this foundational period, the final selection of participants was a purposive and iterative process that unfolded after arriving at the research site (Hammersley and Atkinson, 2019). This selection was guided by three primary sources: insights gained during the initial months of observation, which helped identify key actors; recommendations from organisational directors and managers once trust had been established; and ongoing analytical

discussions with the supervisory team to ensure the sample aligned with the evolving theoretical framework.

The investigation used a semi-structured interview protocol as a preliminary guide (see Appendix C). Due to my unique positionality, implementing formal elements - such as consent forms, a clear script, and audio recording for 49 of the 50 participants who agreed - was vital for maintaining my role as an external researcher and ensuring a professional tone (O'Reilly, 2009). Despite this framework, the interviews were carried out with considerable flexibility. In practice, questioning was tailored to each interviewee's organisational level, role, and the emerging themes of the discussion. This flexible approach aligns with the reflexive style of ethnographic interviewing (O'Reilly, 2012), and recognises the research interview as a complex social interaction rather than merely a data collection tool (Qu and Dumay, 2011). This perspective fosters a theoretically sound yet conversational style, enabling participants to share insights openly. Such investigation ultimately conducted 50 in-depth interviews from October 2023 to January 2024, with durations ranging from 15 to 120 minutes<sup>2</sup> (see Appendix D).

### ***Focus groups***

The investigation involved six carefully organised focus group discussions to explore the complex sociomaterial dynamics of healthcare datafication through collective dialogue and interactive discussion. These sessions included a total of 24 participants from various

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<sup>2</sup> It is important to note that a grant received from the BAFA-AFEE seedcorn research fund (2023) provided valuable support for the data collection phase of this research, and used the funding to cover transportation costs for participants where appropriate.

stakeholder groups: patients (Groups 1-3, n = 11), village health volunteers (Group 4, n = 5), local government officers (Group 5, n = 5), and a mixed group of doctors and nurses (Group 6, n = 3). Conducted in the final two months of fieldwork, the focus groups took place after the main period of participant observation and in-depth interviews. This timing was intentional, as it required considerable time to build trust and prepare for these collective discussions. This methodological choice aligns with recent developments in management accounting research that emphasise the importance of group-level data for understanding organisational change processes (Krueger and Casey, 2009).

The diverse composition of the groups required different mediation strategies to encourage genuine and balanced discussions. In the first three focus groups with patients (Groups 1-3), it became apparent that cultural and social factors - such as differences in religion, gender, and age - initially caused some reluctance among participants to speak openly with me, the lead researcher. To address this and foster an environment of trust, two respected dentists known within the community helped mediate the initial interactions. Their role as trusted cultural mediators was not to lead the focus group but to assist in building rapport and reducing social barriers between participants. This foundational support created a comfortable and open atmosphere, allowing me, as the lead researcher, to guide the discussions effectively. This reflective adjustment of field methods is a key ethnographic principle for genuinely engaging with a community (O'Reilly, 2012).

**Figure 1-7** Focus group sessions with patients, assisted by cultural intermediaries



A different dynamic was observed in the subsequent focus groups. For the session with village health volunteers (Group 4), no external mediator was needed. After working closely with them for four to five months, a strong sense of trust and collaboration had been established. For the focus group with local government officers (Group 5), I spent time building informal connections with them during the mornings, meeting them at a local coffee shop between 7:30 and 8:00 AM before they started their workday. The final focus group, with doctors and nurses (Group 6), was deliberately scheduled for January 2024, as it aimed to discuss their patient-related project that had concluded in December 2023.

In sessions with more experienced and naturally vocal participants (Groups 4-6), the challenge was to ensure their valuable insights did not overshadow the perspectives of less-experienced or quieter participants. In these instances, the researcher employed active mediation techniques to balance the discussion, gently redirecting dominant speakers and creating specific opportunities for others to contribute (Krueger and Casey, 2009).

Similar to the in-depth interviews, a rigorous and academic tone was maintained throughout all sessions. Informed consent was obtained from all participants before the start of each focus group. This process involved providing information sheets and securing permission to use a voice recorder, a measure to which all six groups consented<sup>3</sup>.

Such a tailored and reflective approach to focus group moderation revealed complex patterns of resistance, adaptation, and translation as different organisational actors navigate between traditional practices and digital innovation. The detailed empirical insights provided significantly contributed to each paper's analytical framework, improving the understanding of budgeting practices and accountability relationships across all focus groups in Papers 1 and 2. Groups 5 and 6, in turn, offered a targeted examination of management control dynamics in Paper 3.

### ***Participant observation***

The guiding principle of this research was sociologist Robert Park's well-known exhortation to his students to engage directly with the world they study.

*“Go and sit in the lounges of the luxury hotels and on the doorsteps of the flophouses; sit on the Gold Coast settees and on the slum shakedowns; sit in the Orchestra Hall and in the Star and Garter Burlesk. In short, gentlemen, go get the seat of your pants dirty in real research.” (Park, cited in O'Reilly, 2012, pp. 20-21)*

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<sup>3</sup> As with the interviews, funding from the BAFA-AFEE seedcorn research fund (2023) supported the data collection by covering transportation costs for participants where needed.

Embracing this spirit, I adopted a deeply immersive and multi-sited participant observation approach to trace the flow of datafication from policy centres to the front lines of practice. My fieldwork began in the ‘luxury lounges’ of the system - sitting on sofas in the air-conditioned offices of district and regional headquarters, where I participated in executive meetings to gain insights into strategic decision-making. I then moved to the local level, sitting in community hospitals to observe daily operational realities, and finally to the ‘slum shakedowns’ - sitting on the ground with Village Health Volunteers in their communities to witness firsthand how data was collected at its source.

This methodological approach employs a technique of ‘zooming out’ to capture broad views of strategic decision-making and ‘zooming in’ to examine micro-level details through what Latour (2005) is called the ‘Oligopticon’. This method enables the researcher to observe the action from both an insider’s and an outsider’s perspective, similar to a camera lens (Nicolini, 2009), providing vital insights into how sociomaterial relationships develop.

To gain a deeper understanding, I also assumed the role of a patient, experiencing the system firsthand from a service user’s perspective. This was carried out with the full knowledge and support of the hospital management, who viewed it as an opportunity for the researcher to observe the entire patient journey in a way that could not be fully captured through second-hand accounts. To ensure patient care was not disrupted, these appointments were scheduled after the regular patient queue had been attended to. This approach not only provided invaluable, first-hand insights into the patient journey and how data was collected at key points of care, but also offered a tangible benefit to the healthcare facility. As a university employee covered by the Social Security Scheme, the hospital could claim a direct cash payment for the services rendered. This was more financially advantageous for the hospital than treating

patients under the standard Medical Welfare Scheme, which offers a lower rate of future reimbursement, and it also positively affected their key performance indicators (KPIs).

This multi-faceted observational methodology, involving 80 hours of direct participant observation and 87 hours of meeting observations (detailed in Appendix F), was essential for uncovering the complex patterns of hybridisation where manual and automated systems become deeply connected. Executive board meetings provided critical insights into the strategic decision-making processes around digitalisation, while observations of frontline activities demonstrated how practitioners develop hybrid practices that link technological demands with operational realities.

Such direct interaction with healthcare material artefacts - like digital dashboards, patient record systems, ID card readers, and paper-based forms - and the practices surrounding them offers unique insights into their materiality that might otherwise be overlooked (Aagaard and Matthiesen, 2016). By observing these artefacts in use, the research can go beyond official descriptions of how systems should work to reveal how they actually function in practice.

This methodological approach aligns with recent advances in management accounting research that emphasise the importance of examining tacit organisational practices and implicit social dynamics underpinning formal processes (Deng, 2023). Observing informal workarounds, hidden data entry tasks, and subtle negotiations between staff and technology provides direct evidence of the translation and adaptation at the heart of this thesis. Ultimately, this immersive approach offers the rich empirical data needed to trace how digital MACs are created in practice and how their implementation transforms healthcare delivery through complex, evolving networks of human and non-human actors.

### ***Documentation and archival records***

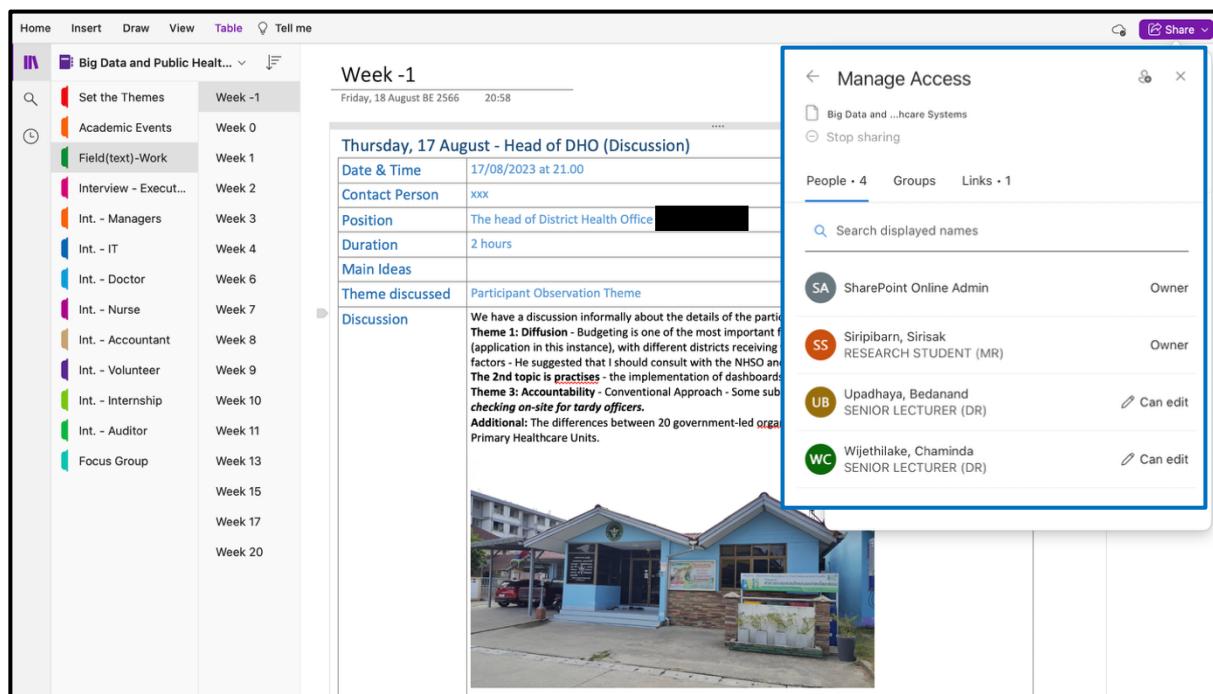
Documentation serves as a vital methodological tool for examining the complex socio-technical interactions involved in healthcare datafication (see Appendix F). The collection of documents reveals a sophisticated development of digital transformation initiatives, beginning with fundamental governance frameworks and progressing through strategic digital policies such as the National Health Security Act (2002), the eHealth Strategy (2017), the Digital Government Act (2019), and contemporary implementation frameworks outlined in the NHSO Digital Master Plan (2023-2027). Employing an ANT analytical approach, these documents act as key artefacts that underscore the evolving relationships between technological systems, institutional practices, and organisational change (Barros *et al.*, 2019).

Alongside national policy frameworks, this investigation assembled a collection of over 20 key documents and numerous internal records directly from the case organisation that illustrate how datafication alters institutional practices. These materials included a variety of advanced operational records, such as seven national policy frameworks, multiple accounting charts and performance matrices, technical specifications for digital systems, summaries from the 17 observed board and sub-committee meetings, and detailed implementation guides for both IT officers and village health volunteers. The research notably benefits from participants' willingness to share practical examples of digital accounting technologies, including dashboard implementations and system interfaces, offering essential empirical evidence of how technological innovation manifests in daily healthcare operations.

Moreover, methodological rigour was supported by a comprehensive field diary managed in Microsoft OneNote. This diary served not only as a repository for notes but also as a valuable analytical tool for examining the researcher's dual positionality (see Figure 1-8). To facilitate

a continuous and collaborative analytical process, all research files - including paper notes, photos, media, documents, and interview recordings - were securely shared with the supervisory team via the University of Essex's Box platform. This dual-platform approach created a shared digital environment that enabled the entire research team to access emerging data in real time.

**Figure 1-8** The shared digital field diary as a reflexive analytical tool



Such immediacy fostered a continuous, dialectical relationship between data collection and analysis, enabling ongoing analytical reflection and collaborative interpretation throughout the fieldwork period. This reflective framework, supported by participants' personal records and organisational artefacts, such as multilingual patient communication materials (see Paper 2, Appendix - Figure C for an example), aids in developing rich conceptual models. Through integration with ethnographic methods, these documentary sources demonstrate how different actors negotiate authority via digital control mechanisms while maintaining essential healthcare delivery capabilities (Saunders *et al.*, 2019).

### **1.6.5 Data analysis framework**

The analytical approach for this thesis was an iterative and inductive process, with data analysis beginning during the six-month ethnographic fieldwork and continuing throughout the writing phase of this thesis. The reflexive analytical framework, operationalised through the shared digital field diary discussed earlier, facilitated a continuous dialogue between empirical observation and theoretical development (Brewer, 2000).

Considering the linguistic complexity in cross-cultural research, a detailed transcription and translation protocol was followed. All interviews and focus groups were first transcribed verbatim in Thai to ensure an accurate record in the original language. Subsequently, this Thai transcript was translated into English by the primary researcher, who is a native speaker of both languages. To confirm the accuracy of the translation, a process of back-translation and verification was periodically conducted with bilingual colleagues; this crucial step was funded by the BAFA-AFEE seedcorn research fund (2023), which provided honourariums for their professional time. This multi-stage process was essential for preserving cultural nuances and local meanings. To further ground the analysis in the participants' own expressions, an In-Vivo coding approach was used during the initial analysis (Miles *et al.*, 2020). This involved coding key segments using the participants' original Thai phrases, thereby capturing their authentic linguistic expressions before any theoretical interpretation or abstraction into English.

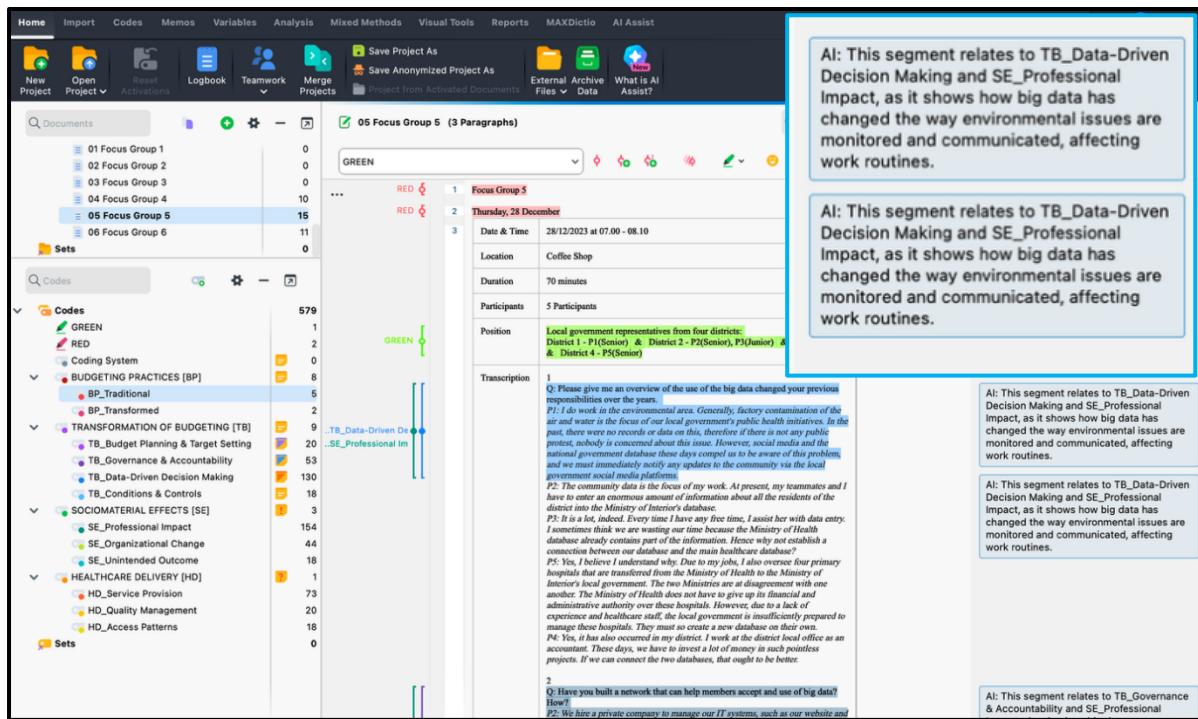
To ensure the research was comprehensive, the extensive data from this ethnographic study was organised using the qualitative data analysis software (QDAS) MAXQDA 24. This software was essential for a project that produced three separate papers, as it helped manage the large volume of information and avoid unintentional repetition across them. However, it is important to recognise that some key themes, such as the constraints and challenges common in emerging economies, were intentionally presented in more than one paper. This was a

deliberate choice, as these challenges are central to the research context. MAXQDA 24 also offers features that are particularly beneficial for ethnographic research, as they enable a close connection between coding, analysis, and analytical memoing (Jacques, 2021). The software's capabilities allow for the creation of detailed memos that can be directly attached to data segments, codes, or documents, ensuring that emerging theoretical insights remain closely linked with the empirical evidence throughout the analytical process. The analysis followed established frameworks for qualitative data analysis (Miles et al., 2020) and was conducted in three main stages.

- The first cycle, Initial Coding and Data Immersion, involved thorough familiarisation with the data through repeated reading. In-Vivo coding techniques were used to preserve participants' authentic language. During this stage, the software's AI Assist feature was not employed for automated coding but as a reflective tool. It was used to generate analytical summaries of coded segments, providing an external perspective for the researcher to review and question their initial interpretations (MAXQDA, 2025). This process, shown in Figure 1-9, helped enhance analytical reflexivity and control potential researcher bias. By comparing the researcher's emerging interpretations with the AI-generated summaries, any inconsistencies or hidden assumptions became clear (McKinnon, 1988). This encouraged critical thinking and closer engagement with the data, preventing the analysis from being influenced by selective perception.
- The second cycle, following the principles of second-cycle coding methods (Miles *et al.*, 2020), involved Focused Coding and Category Development. This process was more targeted and abductive, comparing, contrasting, and grouping initial codes to generate more abstract theoretical categories. The Code System in MAXQDA was actively managed to organise codes into hierarchies and enhance conceptual density

through an iterative process of retrieval, review, and recoding. Nonetheless, the researcher retained final interpretive authority over all coding decisions to ensure theoretical coherence and analytical rigour.

**Figure 1-9** Application of MAXQDA's AI assist as a tool for analytical reflexivity



- The final stage, Thematic and Conceptual Development, integrated these refined categories into the overarching theoretical themes that structure this thesis. This systematic process revealed sophisticated patterns that coalesced into the interconnected dimensions examined in each of the three papers: the sociomaterial entanglement in budgeting practices (see Paper 1); the emergence of new accountability configurations (see Paper 2); and the transformation of management control systems (see Paper 3). The detailed coding structures and thematic maps illustrating this analytical process for each paper are provided in their respective methodology sections in Chapters 3, 4, and 5.

Finally, to ensure the validity and reliability of the findings, the research design incorporated multiple, overlapping strategies consistent with established ethnographic practice. The six-month field engagement was a key strategy, as an extended period in the setting is crucial for minimising observer effects and gaining access to data, thereby improving both validity and reliability of the collected data (Fetterman and Ochs, 1990; McKinnon, 1988). This immersive phase was supplemented by two follow-up visits to the research site in 2024 and 2025.

During these visits, a formal member checking process was conducted, involving 10 follow-up interviews with key informants from all organisational levels - including executives, managers, and village health volunteers. This enabled participants to review emerging theoretical interpretations, confirming they accurately reflected their lived experiences and organisational dynamics. Secondly, methodological triangulation (Creswell and Miller, 2000) was systematically applied - not to verify claims from a single source but to develop a comprehensive and corroborative understanding of the phenomenon. Insights from the interviews were therefore compared and contrasted with observations of practices in the field and the contents of archival documents. This use of multiple methods provides a strong safeguard against the threats to validity and reliability inherent in any single data collection technique (McKinnon, 1988).

## **1.7 CONTRIBUTION OF THE STUDY**

This thesis offers several contributions to the field of public sector accounting and management, particularly regarding the ongoing challenges of digitalisation in emerging economies. These contributions are detailed in each of the three research papers (Chapters 3, 4, and 5). A summary of the main theoretical, practical, and methodological contributions is outlined below.

### 1.7.1 Theoretical contributions

This thesis moves beyond the mere application of Western-centric theoretical frameworks to extend and refine existing accounting theories within the context of an emerging economy. Rather than simply using these theories as passive lenses, the study leverages the unique frictions of the Thai public sector to advance theoretical understanding in three specific ways:

- First, it extends sociomaterial perspectives on budgeting control (Paper 1). While existing literature (Orlikowski, 2007; Orlikowski and Scott, 2008) often views resistance as an opposition to technology, this analysis refines this view by conceptualising data fabrication as a constitutive sociomaterial practice. It demonstrates that in resource-constrained environments, datafication does not replace legacy systems but leads to hybrid practices (Preston *et al.*, 1992), where resistance is not about rejection, but about the creative (and sometimes subversive) realignment of material and social elements to ensure system survival.
- Second, it extends the theoretical boundaries of accountability (Paper 2). By introducing the concept of multiform accountability, this thesis challenges the binary distinction between hierarchical and socialising forms of accountability (Roberts, 1991). It extends the theory by demonstrating that in digital co-production, these forms do not compete but are actively co-produced into a fractured, multiple enactment. This offers a new theoretical vocabulary for understanding how accountability is mediated by local intermediaries in non-Western, high-context cultures.
- Third, it advances a theoretical synthesis of Diffusion and Translation (Paper 3). The thesis overcomes the limitations of using Diffusion of Innovation (Rogers, 2003) or Sociology of Translation (Callon, 1986; Latour, 1987) in isolation. By integrating them, it theorises emergent adaptation - a process that explains how top-down structural

diffusion is made operational only through bottom-up translation. This contribution extends the literature on public sector innovation by identifying the critical role of hybrid professional ethos (Kurunmäki, 2004) and hidden work (Barnard *et al.*, 2024) as the theoretical mechanisms that bridge the gap between policy mandates and practice.

### ***1.7.2 Empirical contributions***

Based on extensive ethnographic fieldwork, this thesis offers in-depth insights into the effects of digitalisation in Thailand's healthcare system, which have significant implications for policy and practice. It contributes by:

- Documenting how data-driven budgeting can unintentionally widen inequalities between well-resourced and under-resourced facilities, the research shows how performance pressures lead practitioners to develop workaround strategies, including fabricating data to meet centrally imposed targets and secure funding (Adhikari *et al.*, 2023). This offers a crucial warning to policymakers about the unintended effects of rigid, data-driven control systems (Paper 1).
- Highlighting the vital role of community and cultural intermediaries in mediating accountability reforms. The findings show how top-down digital health initiatives can fail if the local context is not carefully considered. Trusted figures, such as religious leaders and village health volunteers, are crucial for turning institutional goals into culturally appropriate practices (Arun *et al.*, 2021). For example, they can transform mobile application messages into oral announcements through mosque speakers. This indicates that policymakers should formally recognise and strategically support these mediators (Paper 2).

- Showing that organisational adaptation to digital mandates heavily depends on new, often unseen, professional practices. Practitioners form hybrid roles by combining technical and clinical skills (Kurunmäki, 2004; Begkos and Antonopoulou, 2022) and undertake significant hidden work - such as late-night data entry or relying on family for technical support - to keep digital systems functioning (Barnard *et al.*, 2024). This indicates that for digital transformations to be sustainable, organisations must recognise, support, and allocate resources for this hidden labour (Paper 3).

### ***1.7.3 Methodological contributions***

This thesis highlights the importance of immersive, multi-sited ethnography in revealing the complex sociomaterial entanglements of digitalisation. The six-month fieldwork, which was demanding and involved extensive interviews, focus groups, and observations, was crucial for capturing informal negotiations and lived experiences that quantitative methods would miss. (O'Reilly, 2009, 2012).

A notable aspect of the methodology was its approach to reflexive analysis. The study operationalised Latour's oligopticon perspective by systematically shifting between detailed observations of micro-level practices (such as a practitioner's specific data entry workaround) and the analysis of macro-level strategic mandates (such as a national policy document). This approach enabled the development of a multi-layered understanding of how seemingly small, local actions and broad institutional pressures are interconnected.

Furthermore, the research enhances ethnographic practice in accounting by illustrating how digital tools are utilised to increase rigour. A shared digital field diary and cloud platform facilitated ongoing, collaborative analysis between the researcher and the supervisory team (Brewer, 2000). Importantly, while MAXQDA software was employed for data management,

its AI Assist function was used in a targeted and reflective manner. To clarify, it was not used for automated coding or analysis. Instead, it served as a reflective tool to generate external summaries of coded segments. The researcher then used these machine-generated prompts to challenge, question, and refine their initial interpretations, thereby boosting analytical rigour and minimising potential bias (MAXQDA, 2025). This aligns with recent calls for rigorous and reflexive qualitative research in accounting (Bamber and Tekathen, 2023; Deng, 2023; Steccolini, 2023) and demonstrates how such tools can support, rather than replace, in-depth interpretive inquiry.

## 1.8 OUTLINE OF THE THESIS

This thesis adopts a ‘3-Paper PhD’ format and comprises six chapters, organised as follows:

**Chapter One** offers a thorough introduction to the research. It starts with a reflective narrative that traces the study’s origins, followed by an overview of the research background, problematisation, objectives, and guiding questions. It outlines the conceptual framework, describes the unique research context and ethnographic methodology, and summarises the main contributions of the thesis.

**Chapter Two** reviews relevant scholarly literature to establish the main research problem and provide the contextual foundation for the empirical studies. It begins by exploring the digital turn, emphasising how datafication is transforming public services. The review then links this transformation to reforms in public sector management accounting, examining how the digital shift is reconfiguring key areas such as budgeting, accountability, and management control. Notably, the chapter highlights the limitations of Western-centric models in understanding the realities of emerging economies, thereby establishing the main research problem. Finally, it

presents the key theoretical perspectives that underpin the thesis, including ANT, Sociomateriality, Co-Production, and the Diffusion of Innovation theory.

**Chapter Three (Paper 1)** introduces the first empirical article, titled “Transformation of Budgeting Practices through Datafication: A Sociomaterial Analysis of Thailand’s Primary Healthcare”. This chapter examines how datafication influences budgeting, emphasising the development of hybrid paper-digital systems rather than a simple replacement of traditional methods. Using sociomateriality and ANT, it shows that these digital initiatives can worsen existing resource inequalities and cause unforeseen effects, such as increased administrative complexity and more advanced workaround strategies by practitioners.

**Chapter Four (Paper 2)** presents the second empirical study, “Digitalisation, co-production and mediating accountability: Evidence from Thailand’s Primary Healthcare.” This research examines how digital co-production enhances community healthcare and alters accountability relationships through the collaborative involvement of various actors. The findings demonstrate that digital co-production generates multifaceted accountability - a dynamic blend of official institutional requirements and informal, community-based practices. It emphasises the crucial mediating role of Village Health Volunteers, illustrating how local sociocultural contexts significantly shape the development of accountability in a digital age.

**Chapter Five (Paper 3)** features the third empirical article, “Adapting to Digitalisation: Diffusion, Translation, and Emergent Professional Practices in Thailand’s Primary Healthcare.” This chapter examines how a hierarchical public sector organisation adapts to mandated digital controls. It presents an integrated conceptual model that combines the Diffusion of Innovation theory with the Sociology of Translation. The findings show that adaptation is an emergent process heavily influenced by intermediaries, such as hybrid IT

specialists, and requires the development of new adaptive practices, including the formation of hybrid professional identities and the undertaking of significant, often hidden work.

**Chapter Six** provides an integrated discussion and conclusion of the thesis. It synthesises the key findings and theoretical contributions from the three empirical papers, establishing links between the themes of hybridity, mediation, and adaptation. The chapter concludes by summarising the overall contribution of the research, recognising its limitations, and proposing potential avenues for future research.

## 1.9 CHAPTER SUMMARY

This introductory chapter offers an overview of the thesis, starting with a personal, reflective narrative that grounds the research in the practical reality central to its ethnographic approach. Following this, the chapter presents a formal problem statement that clarifies the study's focus and outlines its main elements. It discusses the research gap related to digitalisation in Thailand's primary healthcare and sets out the objectives for the three interconnected papers. The chapter then introduces the conceptual framework, research context, and detailed ethnographic methodology, including the rigorous analytical techniques that support the study. It concludes by summarising the main contributions of the thesis and providing a roadmap for the subsequent analyses.

## CHAPTER TWO: LITERATURE REVIEW

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### 2.1 INTRODUCTION

This chapter reviews the scholarly literature that underpins the three empirical investigations in this thesis. The discussion is positioned within the wider context of the digital shift in public sector management - a paradigmatic change transforming management accounting and control systems globally, which was notably accelerated and highlighted by the COVID-19 pandemic. As a crisis, the pandemic illustrated the complexities of modern governance, prompting governments worldwide to implement data-driven technologies that significantly changed citizen-state relationships and raised new questions about accountability (Ahn and Wickramasinghe, 2021).

This transformation is driven by datafication - the systematic conversion of organisational processes into quantifiable data (Mayer-Schönberger and Cukier, 2013) - which is reshaping key aspects of public governance, including budgeting, accountability, and management control. However, a critical review of the literature shows that scholarly research into these significant changes often reveals a persistent Western-centric epistemic bias (van Helden and Uddin, 2016). Existing studies frequently fail to capture the complex translation processes and hybrid practices that emerge when externally mandated digital reforms encounter the unique institutional realities of resource-constrained settings (Alawattage *et al.*, 2017; Hopper *et al.*, 2017). As a result, the implications of digitalisation remain largely under-theorised within the contexts of emerging economies. This thesis addresses these theoretical gaps by investigating how centrally mandated digitalisation reshapes budgeting practices, accountability relationships, and management control systems within Thailand's primary healthcare sector.

To lay the groundwork for this analysis, this chapter is organised as follows. Section 2.2 first reviews the literature on the digital turn, examining its specific impact on budgeting, accountability, and control to identify the main research issues. Section 2.3 then explores scholarship on public sector management accounting reforms, contrasting established Western models with the realities of emerging economies. Lastly, Section 2.4 reviews the key theoretical frameworks that underpin the empirical analyses: Actor-Network Theory (ANT), Sociomateriality, Co-Production, and Diffusion of Innovation.

## **2.2 THE DIGITAL TURN: RESHAPING BUDGETING, ACCOUNTABILITY AND CONTROL**

### ***2.2.1 Conceptualising the digital turn: from digitisation to digital transformation***

At the core of this research is the idea of digitalisation - the process of organisational change driven by digital technologies that is fundamentally transforming public service delivery and governance. To accurately analyse its effect on public sector management accounting, it is essential to distinguish digitalisation from two related concepts. This section therefore explains the logical progression between three key terms: digitisation as the initial technical foundation, digitalisation as the main process of operational and strategic change, and digital transformation as the comprehensive outcome.

#### ***Digitisation***

The foundational layer upon which other transformations are built is digitisation, which involves the technical conversion of analogue materials into digital formats (Mergel *et al.*, 2019). The primary aim of digitisation is to shift from traditional to digital technology, encompassing the creation of new delivery channels and altering the way administration is generally managed. Extant literature highlights various aspects of digitisation processes and

their impact on accounting, accountability, and public services more broadly (Agostino *et al.*, 2022a). However, even this seemingly technical shift is not value-neutral. A comprehensive approach that considers behaviour, emotions, accountability, and context is necessary to manage the design, implementation, and cultural change within public organisations.

Empirical research shows that practitioners at different hierarchical levels perceive and implement digitisation in different ways. For instance, central management accountants tend to value predefined, standardised, high-quality information more, whereas local management accountants prefer information that can be customised to local needs (Carlsson-Wall *et al.*, 2022). Furthermore, mandatory technology adoption can create significant pressure. In Brazilian government organisations, for example, skilled and unskilled accountants are compelled to adopt digital innovations, especially when it comes to information generation (Lino *et al.*, 2022). These changes often remain confined to the accounting department, as accountants are responsible for submitting fiscal and financial data to oversight bodies, which directly influences their professional roles. In healthcare settings, similar tensions arise as practitioners balance standardised reporting requirements with the need for operational flexibility to accommodate variations in patient care.

### ***Digitalisation***

Digitalisation is the main focus of this study, going beyond simple digitisation by fundamentally changing how public services are designed, delivered, and experienced (Mergel *et al.*, 2019). It influences knowledge production, sharing, interpretation, and decision-making, transforming citizen-state interactions and accountability structures (Agostino *et al.*, 2022b). While technology-driven changes can improve accountability by promoting more dialogue and horizontal relationships, the involvement of many actors in public service delivery can also

cause blurred accountability (Agostino *et al.*, 2022b). Therefore, this presents risks in the translation processes and the roles of translators regarding the quality and reliability of data.

Although digitalisation has been conceptualised as a sociomaterial practice in broader literature (see, for example, Orlikowski, 2007, 2010; Orlikowski and Scott, 2008), the discourse in the public sector has paid less attention to its social aspects (Chua *et al.*, 2022). It is necessary to explore a wider range of stakeholders to deepen our understanding of how digital technologies are embraced and contested by different actors and in various spaces (Chua *et al.*, 2022). This includes examining the values held by these stakeholders and the organisation's cartographic legacies. This study addresses this analytical gap by investigating how digitalisation processes are negotiated within Thailand's healthcare system, where formal hierarchical structures intersect with community-based practices.

All three empirical papers explore different aspects of digitalisation processes: how digitalisation transforms budgeting practices through sociomaterial entanglements (Paper 1), how digitalisation redefines accountability via co-production mechanisms (Paper 2), and how organisations respond to the mandated digitalisation of management controls (Paper 3).

### ***Digital Transformation***

Digital transformation involves these deeper structural and cultural shifts. It refers to a more comprehensive reimagining of governance enabled by digital technologies, including new institutional arrangements, norms, and power relationships (Mergel *et al.*, 2019). At its core, digital transformation requires a complete reconfiguration of entire business and operational models, going beyond incremental technological updates to include systemic organisational restructuring (Mergel *et al.*, 2019). The concept builds on earlier paradigms such as 'e-government', which since the 1990s has described technology-driven changes in service

delivery (Dunleavy *et al.*, 2006). According to UNESCO (2011), e-governance is defined as the public sector's use of information and communication technologies (ICTs) to improve service and information delivery, encourage citizens to participate in decision-making, and make government more effective, transparent, and accountable.

Digital transformation stresses ongoing adaptation and organisational learning, a process notably sped up by the COVID-19 pandemic (Agostino *et al.*, 2021; Leoni *et al.*, 2021). The lessons gained from this period can inform future solutions and help scholars explore accounting and accountability practices worldwide (Leoni *et al.*, 2021). To maximise long-term benefits, organisations must actively initiate this shift, considering factors such as a country's size, history, and environment (Mergel *et al.*, 2019). While recognising the broader transformational context involving the complete overhaul of operational models, this study specifically concentrates on digitalisation processes rather than comprehensive systemic change, examining how mandated digital initiatives are adopted and modified within existing institutional frameworks.

This digital transformation is not limited to healthcare but is reshaping the entire public sector landscape. For instance, in the public financial sector, the rise of 'datafication' often forces professionals to adapt their practices to fit metric-based accountability systems (Alawattage & Azure, 2021). Similarly, in local government, the drive for digital efficiency frequently creates a gap between the smart vision of top-down control and the complex reality of service delivery. In these settings, civil servants must negotiate how digital tools are actually used, ensuring that rigid mandates do not displace professional judgment (Barrett *et al.*, 2016; Orlikowski & Scott, 2008). These cross-sectoral examples illustrate that the friction between central digital mandates and local implementation is a systemic challenge across the public sphere.

Having established these foundational conceptual distinctions, the subsequent analysis examines how digitalisation manifests through big data and datafication technologies, exploring their specific implications for healthcare management accounting transformation.

### ***2.2.2 Big data and datafication: technologies, practices, and implications***

The digital shift is driven by the growing availability and use of ***Big Data***. The term describes a set of features that include volume, diversity (both structured and unstructured), source (public and private), level of detail (more variables providing more specific attributes of individuals, locations, events, and interactions), and the time lag between data collection and analysis (Mergel, 2016).

Generally, big data differs from traditional databases in several key ways. The Three V's - Volume, Variety, and Velocity (Gandomi and Haider, 2015) - are the main differences. The reported sizes of big data are several terabytes and petabytes. It is a significant fact that 90% of the world's data has been generated since 2010, amounting to 10 zettabytes (10 billion terabytes) and doubling every two years (Baker and Andrew, 2019). Variety, which can be organised, semi-structured, or unstructured, is the structural heterogeneity of a dataset. Velocity describes how quickly data is generated and how quickly it should be analysed and utilised.

Several major data dimensions beyond the three Vs have also been noted. They include veracity, variability (and complexity), and value (Gandomi and Haider, 2015). Veracity, which relates to the reliability and accuracy of data sources, was identified as the fourth V by IBM. SAS added variability and complexity as two further aspects, emphasising the need to connect, match, clean, and transform data from diverse sources. Oracle proposed Value as a key characteristic, often distinguished by low value density; however, large quantities of such data can be analysed to generate high value.

In this context, public sector organisations are increasingly harnessing big data to inform evidence-based planning and real-time decision-making. The Asian Development Bank (ADB, 2022) suggests that the characteristics of big data can be used to evaluate potential benefits across various sectors, with public healthcare being particularly notable. For instance, the enormous volume of digitised information generates large datasets that can be analysed to guide resource allocation and track health challenges, such as non-communicable diseases in Thailand (UNDP, 2020). As this thesis demonstrates, these vast data volumes are fundamentally transforming budgeting practices through sociomaterial entanglements between digital systems and traditional paper-based processes (Paper 1). This transformation is further driven by the variety of data available, including structured medical records and unstructured sources. In Thailand, leveraging this variety is especially important for Village Health Volunteers, who often serve as the first point of contact for primary care (ADB, 2022). Healthcare organisations are increasingly integrating these diverse data streams to create comprehensive clinical profiles that support personalised treatment, enabling new forms of digital co-production and reshaping accountability (Paper 2).

However, the effective use of such data depends on its veracity, or reliability, which is essential for insightful analysis and patient safety, as demonstrated by the use of ICT-based contact tracing systems in South Korea (Ahn and Wickramasinghe, 2021) and Singapore (Cho *et al.*, 2020). Paper 3 of this thesis examines how organisations develop adaptive frameworks to manage data veracity while balancing the tensions between top-down digital mandates and bottom-up translation processes. Ultimately, the aim is to create value, which is evident in applications like remote patient monitoring that can boost treatment capacity. In fact, Thailand Ministry of Public Health (2017) identified the use of datafication as a key reform throughout its eHealth Strategy. The creation of value through datafication thus extends beyond clinical

care to include population health management and resource optimisation, manifesting differently across the analytical dimensions of budgeting, accountability, and professional practice discussed in the three empirical papers.

While big data describes the characteristics of modern information, it is the underlying process of *datafication* that actively creates these extensive datasets. As a key element of digitalisation, datafication refers to the systematic transformation of actions, behaviours, and processes into measurable data (Mayer-Schönberger and Cukier, 2013). This significantly influences professional roles and performance expectations, as it is not just about generating more data but about fundamentally redefining what counts as evidence and how organisational decisions are justified (Moll and Yigitbasioglu, 2019; Redden, 2018). Importantly, these changes do not happen in isolation. As will be examined in Section 2.3, they interact with wider reforms in public administration, most notably New Public Management (NPM), which have often found it difficult to align with the public sector's unique values and complexities (Steccolini, 2019).

Datafication and digitalisation have both reinforced and challenged these reform trajectories, resulting in the emergence of hybrid organisations that blend different institutional logics - managerial, professional, and civic field (Grossi *et al.*, 2017). These hybrids operate across multiple levels.

- Macro-level: where accounting practices intersect with national political, economic, and environmental systems, and digitalisation is often driven by policy imperatives around open government and transparency (Begkos *et al.*, 2024). In this context, macro-level datafication manifests through national health information systems, population health surveillance networks, and integrated health service planning that connect local clinical data with national health policy objectives and resource allocation frameworks,

encompassing budgeting policy transformations (Paper 1) through to comprehensive diffusion and translation dynamics (Paper 3).

- Meso-level: where organisations navigate conflicting accountability demands and stakeholder pressures, and must balance expectations for performance, compliance, and participatory engagement (Caperchione *et al.*, 2017). Healthcare organisations at the meso-level face particular tensions as they integrate digital management systems with existing clinical workflows, requiring careful negotiation between administrative efficiency imperatives and clinical autonomy while maintaining patient care quality standards. These tensions are explored in Paper 2 through multiform accountability configurations.
- Micro-level: where individual actors take on multifaceted roles, blending professional norms with new digital skills and accounting tools, thereby transforming how frontline workers interpret data, construct narratives, and exercise discretion (Begkos and Antonopoulou, 2022). Healthcare practitioners at the micro-level increasingly function as hybrid professionals, combining clinical expertise with data literacy as they navigate electronic health records, digital diagnostic tools, and performance dashboards that both support clinical decision-making and meet administrative accountability requirements. These professional transformations are evident across all three empirical papers through distinct yet interconnected micro-level practice adaptations.

In these hybrid contexts, datafication functions as a dual force of innovation and tension. While it opens new opportunities for stakeholder engagement by transforming citizens into active collaborators (Nabatchi *et al.*, 2017; Osborne *et al.*, 2016), it also introduces ambiguity and resistance by questioning the alignment of technology with professional values (Agostino *et al.*, 2022b; Broadbent *et al.*, 2001). This dynamic is especially intense in healthcare, where the

promise of improved clinical outcomes through evidence-based practice often conflicts with the potential for reduced professional autonomy and increased administrative burdens from new surveillance mechanisms (Kraus *et al.*, 2021). To understand this complex interaction, the rest of this section examines how these datafication processes specifically alter three key areas of public sector management accounting: budgeting procedures, accountability relationships, and control mechanisms.

### ***2.2.3 Datafication and its impact on budgeting practices***

Contemporary public sector budgeting practices are undergoing significant transformation through the systematic integration of datafication technologies, challenging longstanding paradigms of financial planning, resource allocation, and fiscal accountability within government contexts (Agostino *et al.*, 2022a). While datafication is often promoted as a tool for improving allocative efficiency, increasing fiscal transparency, and supporting evidence-based decision-making, empirical research shows much more complex and debated realities that contest these techno-optimistic stories (Clarke, 2016; Quattrone, 2016). This shift involves the adoption of advanced digital innovations such as big data analytics, cloud computing platforms, machine learning algorithms, and artificial intelligence systems, each bringing distinct implications for redefining the epistemological bases of management accounting practices (ACCA and IMA, 2013; ICAEW, 2018).

The theoretical importance of big data analytics in budgeting frameworks goes beyond simple computational improvements, involving a fundamental reorganisation of planning methods, forecasting accuracy, and value creation processes within resource-limited public sector settings (Vasarhelyi *et al.*, 2015). However, Quattrone's (2016) insightful critique highlights the paradoxical nature of data abundance, warning that faster access to large information repositories may actually lead to poorer decision-making rather than the expected rational

optimisation. This analytical scepticism questions the usual assumptions about the clear benefits of digital transformation and calls for a more detailed examination of the real effects of datafication on management accounting knowledge and professional practice.

Cloud-based accounting architectures mark a notable technological shift, providing improved data security, reduced synchronisation issues, and real-time analytics through advanced dashboard interfaces (Ionescu *et al.*, 2013; Ma *et al.*, 2021). Despite their significant potential to cut capital expenditure on IT infrastructure (Grubisic, 2014), actual adoption varies widely due to factors like cost, concerns about infrastructure reliability, and technological skills (Yau-Yeung *et al.*, 2020). These insights highlight the key role of contextual factors in shaping technology implementation outcomes.

Significantly, datafication processes do not simply replace traditional methodologies but rather promote the development of complex hybrid budgeting configurations where digital innovations coexist with legacy paper-based practices through intricate sociomaterial entanglements (Orlikowski, 2007). This hybridisation reflects the fundamental nature of accounting systems as sophisticated assemblages of normative guidelines, material artefacts, and interpretive practices that convey organisational values, performance expectations, and accountability frameworks across multiple organisational levels.

The institutional dynamics surrounding budgeting transformation are fundamentally shaped by pre-existing resource inequalities and infrastructural disparities between well-resourced and under-resourced organisational entities (Carlsson-Wall *et al.*, 2022). Well-capitalised organisations demonstrate enhanced capacity for adopting data-driven analytical tools, while financially constrained facilities face significant barriers, including limited internet connectivity, platform instability, and inadequate technological training. These differing

capabilities raise important questions about whether mandated digital adoption unintentionally worsens existing institutional disparities rather than fostering equitable access to technological benefits.

In such resource-limited settings, practitioners often develop complex resistance and adaptation strategies in response to pressures for mandatory digital implementation. When faced with high demands for performance measurement related to financial accountability and funding distribution, some practitioners resort to data manipulation, including fabricating budgetary information to meet centrally imposed performance targets (Lino *et al.*, 2022). These practices highlight the inherently sociomaterial nature of budgeting processes, where technologies are not neutral tools but contested objects that require active interpretation and translation by various organisational actors working across diverse institutional contexts.

The different approaches used by central and local management accountants highlight the complex negotiations involved in implementing digitalisation. Central practitioners usually focus on standardised, high-quality information that helps with comparison and strategic oversight, while local practitioners stress flexibility and customisation to meet specific operational needs and community requirements (Carlsson-Wall *et al.*, 2022). This conflict between standardisation and localisation mirrors broader debates about balancing administrative efficiency with the need for local responsiveness in public sector management.

Contemporary advances in advanced analytical technologies, especially machine learning (ML) and artificial intelligence (AI) applications, remain mainly theoretical within practical management accounting contexts despite extensive academic discussion (Korhonen *et al.*, 2021; Nielsen, 2022). Though emerging applications in environmental, social, and governance (ESG) rating systems show potential technological capabilities (Crona and Sundström, 2023;

Fluharty-Jaidee and Neidermeyer, 2023; Svanberg *et al.*, 2022), significant uncertainties still exist regarding the practical usefulness and real-world implementation of these complex technologies in current management accounting practice.

The transformation of budgeting practices through datafication thus reveals the complex interplay between technological capabilities, institutional constraints, professional adaptation strategies, and organisational power dynamics. This complexity necessitates theoretical frameworks capable of capturing the sociomaterial entanglements that emerge when digital technologies encounter existing organisational practices, particularly within the resource-constrained and culturally distinctive contexts characteristic of emerging economy public sector environments. Paper 1 of this thesis empirically investigates these sociomaterial dynamics, demonstrating how hybrid budgeting configurations emerge through the constitutive entanglement of digital systems and traditional practices within Thailand's primary healthcare sector. Having established the foundational understanding of budgeting transformation, the following section examines how parallel datafication processes reshape accountability relationships through the emergence of digital co-production mechanisms.

#### ***2.2.4 Datafication and the transformation of accountability***

The digital shift is fundamentally redefining accountability frameworks within public sector governance, altering both theoretical foundations and practical aspects of institutional responsibility. Roberts' (2009) influential critique of transparency-based accountability mechanisms highlighted the inherent limitations of technocratic approaches that prioritise visibility over genuine engagement, advocating instead for an ethic of intelligent accountability that recognises the contextual complexity and relational aspects of organisational responsibility. This analytical framework is especially relevant within digitalisation contexts, where technological solutions often promise greater transparency but may also undermine the

dialogue-driven and contextually nuanced accountability relationships that Roberts sees as essential for authentic democratic governance.

Accountability fundamentally creates a social relationship where an actor feels obliged to explain and justify their actions to a significant other (Bovens *et al.*, 2008). Bovens *et al.* (2014) further refined through an analytical distinction between accountability as a normative virtue - emphasising the intrinsic qualities of responsible conduct - and as an institutional mechanism - concentrating on formal structures and processes that enable systematic account-giving. However, organisational discourse displays an asymmetrical focus on the advantages of big data while neglecting the complex risks and institutional challenges involved in transforming accountability, particularly in relation to authority relationships and accountability dynamics (Clarke, 2016). This has prompted scholars to concentrate on the challenges of digitalisation, especially its impacts on professional autonomy, organisational authority, and the balance between personal and collective accountability mechanisms (Agostino *et al.*, 2022a).

Contemporary accountability frameworks increasingly diverge from traditional principal-agent models, evolving into distributed, networked, and participatory governance structures. Digital platforms enable unprecedented co-production mechanisms between citizens and governments, transforming service users from passive recipients into active partners (Agostino *et al.*, 2022b). These technological innovations provide opportunities for improved governance while also revealing resistance patterns and implementation challenges associated with new accountability frameworks.

This transformation introduces significant complexity through hybridisation processes, where organisations collaborate within flexible, evolving structures that complicate traditional accountability boundaries (Steccolini, 2019). Bovens *et al.* (2008) Provided analytical clarity

by distinguishing between accountability as a normative virtue and as an institutional mechanism, where technological transformation challenges both behavioural expectations and formal arrangements intended to ensure systematic account-giving. These tensions give rise to various accountability configurations - structures where formal reporting hierarchies intersect with informal, community-based mechanisms operating under different epistemological assumptions. While these overlapping forms can improve governance effectiveness, they can also cause conflicts or weaken responsibility attribution (Grossi and Steccolini, 2014).

Crisis situations highlight these complexities. During COVID-19, governments deployed data-intensive surveillance technologies that changed citizen-state relationships and raised questions about accountability mechanisms within societies of control (Ahn and Wickramasinghe, 2021). Counter-accounts - narratives created by marginalised actors - gain vital importance by providing perspectives that are invisible to formal systems, supporting arguments for moving from accounting-based accountability to accountability-based accounting that includes diverse social interests (Dillard and Vinnari, 2019).

In Thailand's healthcare context, these insights shed light on how digitalisation fosters accountability arrangements that go beyond hierarchical boundaries. Village health volunteers demonstrate how technology facilitates distributed accountability, where community actors become integral to formal processes while preserving informal, culturally rooted roles. Paper 2 empirically examines how digital co-production produces multiple forms of accountability by blending formal requirements with informal practices through trusted intermediaries who translate institutional mandates into culturally legitimate actions.

Consequently, accountability within datafication includes transparency, voice, inclusion, and recognition of various evidence forms stemming from different epistemic traditions. This

requires integrating formal and informal mechanisms within frameworks that handle complexity while upholding democratic legitimacy, as exemplified by counter-accounts supporting comprehensive control systems addressing financial, social, and cultural aspects simultaneously (Agyemang, 2024).

### ***2.2.5 The evolving landscape of management control through datafication***

Contemporary datafication processes are fundamentally reshaping the epistemological foundations and operational structures of management control systems within public sector governance, surpassing traditional paradigms of administrative oversight to include advanced combinations of technological surveillance, algorithmic governance, and networked accountability mechanisms (Berlinski and Morales, 2024). Management accounting, once considered a peripheral administrative tool, now serves as a central governmental technology for establishing organisational control through the systematic creation of structured informational architectures that facilitate sophisticated monitoring, evaluation, and strategic guidance of institutional performance across various organisational levels (Broadbent and Guthrie, 2008; Prowle, 2021). In modern digital governance arrangements, organisations increasingly employ complex database technologies that jointly merge accounting epistemologies with information technology infrastructures, producing hybrid control mechanisms that function through continuous data surveillance and real-time performance adjustment (Moller *et al.*, 2020; Moll and Yigitbasioglu, 2019).

The rise of algorithmic control signals a fundamental shift where power is exercised through ongoing modulation rather than episodic surveillance. This change radically redefines traditional disciplinary mechanisms into interconnected governance structures characterised by unprecedented speed and spatial reach (Redden, 2018; Mergel *et al.*, 2019). The strategic implementation of data-driven control manifests through the institutionalisation of Analytics

3.0 frameworks, which include descriptive, predictive, and prescriptive analytical models that collectively transform management control into a continuous, algorithmic process instead of periodic administrative actions (Appelbaum *et al.*, 2017; Davenport, 2014; Vasarhelyi *et al.*, 2015). These analytical models fundamentally alter control epistemologies: descriptive analytics supports ongoing oversight via dynamic benchmarking that enables real-time comparisons across distributed organisational networks; predictive analytics allows proactive governance by forecasting future risks and operational outcomes using advanced algorithms; and prescriptive analytics improves institutional control through algorithmically optimised recommendations, automating decision-making processes and reducing human discretionary authority.

As Bhimani (2020) critically observed, the primary function of datafication within management accounting is to standardise information flows. This standardisation aims to reduce operational uncertainty, especially in complex institutional environments with multiple stakeholder demands and conflicting performance objectives (Grossi *et al.*, 2017; Steccolini, 2019). To achieve this, contemporary digital transformation initiatives have led to the development of performance evaluation architectures that integrate accounting and budgetary data into sophisticated dashboards. These systems are designed to facilitate risk management and compliance controls, thereby creating comprehensive surveillance mechanisms that span across temporal and spatial boundaries (Arnaboldi *et al.*, 2017a; Arnaboldi *et al.*, 2017b; Dilla *et al.*, 2010).

However, the outcomes of these new digital MACs are not predetermined by their technical design. A significant body of research in public healthcare shows that implementing control systems is a strongly social and contingent process, where the influence of local actors is crucial in shaping the results. For example, a comparative case study of two NHS Trusts responding

to the same centrally imposed performance target found very different outcomes: one organisation made substantial quality improvements through a collaborative, bottom-up approach, while the other fell into a crisis characterised by gaming behaviour and a narrow focus on formal targets at the expense of patient care (Conrad and Uslu, 2012). This demonstrates that organisational adaptation is not uniform; it is an emergent process shaped by the ongoing interaction between structure and agency (Giddens, 1984). The effectiveness of a control system, therefore, relies heavily on how it is interpreted and enacted by managers and professionals within their specific organisational contexts.

This important role of managerial agency is further supported by evidence showing that the perceived usefulness of performance measurement systems is linked to how they are used. A strategic use of PMS - where managers actively employ them to identify opportunities and threats - is seen to improve performance more than a simple, non-strategic feedback style of use (Demartini and Trucco, 2017). This indicates that adaptation is not just about resisting or complying with controls, but about actively appropriating and re-purposing them. However, this is often a difficult and lengthy process. The development of performance budgeting in the Italian NHS demonstrates a gradual shift from top-down, cost-control-oriented systems to more negotiated, performance-focused frameworks that can gain the support of clinicians (Lega and Vendramini, 2008). Often, sophisticated tools such as the Balanced Scorecard are adopted ceremonially but remain underused as simple measurement dashboards rather than becoming core to strategic management (Gonzalez-Sanchez *et al.*, 2018).

However, empirical evidence shows that these technological systems rarely function as seamless solutions, instead requiring significant adaptation, negotiation, and translation processes - especially when implemented within rigid bureaucratic structures typical of public sector organisations (Agostino *et al.*, 2022b; Berlinski and Morales, 2024). Healthcare

practitioners exemplify these tensions, as digitised control processes impose administrative demands that often clash with patient-centred treatment protocols while also requiring compliance with audit frameworks designed to legitimise healthcare services and uphold institutional accountability standards (Akinyele *et al.*, 2024; Broadbent *et al.*, 2001; Kurunmäki, 2004). This setup necessitates complex translation work, where practitioners engage in creative data interpretation, strategic manipulation, or selective compliance to align technological needs with professional epistemologies and operational realities, highlighting the inherently sociomaterial nature of contemporary control architectures (Orlikowski, 2007; Quattrone and Hopper, 2001).

The complexities of organisational adaptation to mandated digital control systems reveal intricate dynamics where top-down technological mandates intersect with bottom-up translation processes, generating emergent professional practices that go beyond traditional theoretical explanations (Paper 3 systematically investigates these adaptation mechanisms). From an actor-network perspective, these digital control mechanisms form hybrid assemblages in which control emerges through networked relationships among human and non-human actors, requiring sophisticated theoretical frameworks that capture both diffusion dynamics and translational processes (Latour, 2005; Justesen and Mouritsen, 2011). Despite the apparent enhancement of control capabilities through digital technologies, many decision-makers still rely mainly on conventional accounting data and traditional control methodologies, potentially reflecting institutional resistance to technological change or strategic adaptation strategies that preserve operational flexibility (Fehrenbacher and Ghio, 2023; Spraakman *et al.*, 2021).

## 2.3 PUBLIC SECTOR MANAGEMENT ACCOUNTING REFORMS

### 2.3.1 *New Public Management and its tensions with professionalism*

The past three decades have seen a major shift in global public sector governance, driven by the rise of New Public Management (NPM) reforms. These neoliberal-inspired reforms fundamentally changed management accounting from a minor administrative task to a core government technology aimed at improving allocative efficiency, organisational effectiveness, and fiscal rationalisation (Hood, 1991, 1995). This shift made management accounting a key governmental technology, creating the foundational infrastructure for later waves of reform that have led to current digitalisation initiatives discussed earlier (Prowle, 2021).

However, the translation of these private sector techniques into the public sphere has been filled with tension, especially within professionalised services such as healthcare. Financial rationalisation goals often clash with core professional knowledge that highlights patient care and fair access principles (Broadbent and Guthrie, 2008; Macinati and Anessi-Pessina, 2014). Changes driven by accounting and finance have consistently met resistance from powerful professional groups, particularly clinicians, who usually see such mechanisms as epistemological threats to their established normative frameworks (Broadbent *et al.*, 2001; Chua, 1995; Kurunmäki, 2004).

This inherent conflict means that the healthcare sector serves as an illuminating empirical site for exploring how management accounting innovations are not just implemented but are actively shaped through complex and contested socio-political processes (Preston *et al.*, 1992; Robson and Bottausci, 2018). Academic research into these transformation processes has, however, shown a strong geographical bias towards developed, Western institutional contexts (see e.g. Broadbent and Guthrie, 2008; Goddard, 2010; Scapens and Bromwich, 2001). This epistemic bias has resulted in a significant theoretical gap concerning how these global reforms

are understood and enacted in the majority world, where institutional conditions differ significantly.

These dynamics are heightened in the context of Thailand, which serves as a compelling example of these pressures. The country's healthcare system has faced exponentially rising fiscal demands, with government health expenditure soaring from US\$2.6 billion ( $\approx$ £1.80 billion<sup>4</sup>) in 2001 to US\$26.57 ( $\approx$ £21.6 billion<sup>5</sup>) billion by 2022, thereby creating unprecedented pressure for robust yet adaptable control architectures (Center for Global Development, 2019; Macrotrends, 2025). This intense financial environment makes the Thai healthcare sector a crucial site for examining how management accounting innovations are developed and implemented in practice, setting the stage for a more detailed analysis of these dynamics within the broader context of emerging economies.

### ***2.3.2 The translation of management accounting reforms in emerging economies***

While tensions between NPM and professional work are universal, scholarly research into these transformation processes has mainly focused on developed, Western institutional contexts (see e.g., Broadbent and Guthrie, 2008; Goddard, 2010; Scapens and Bromwich, 2001; Van Helden, 2005). This epistemic bias creates a significant gap in theory, weakening the idea that NPM paradigms are universally applicable. In emerging economies (EEs), the gap between reform rhetoric and actual practice is especially pronounced, as unique institutional structures, resource limitations, and cultural epistemologies critically shape reform processes (Alawattage *et al.*, 2017; van Helden and Uddin, 2016).

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<sup>4</sup> Converted at average 2001 exchange rate: USD 1.44 = GBP 1

<sup>5</sup> Converted at average 2022 exchange rate: USD 1.23 = GBP 1

The genealogy of NPM reform adoption in EEs can be traced back to mid-twentieth-century developmental paradigms (Hopper *et al.*, 2017). Characterised by a structural dependency on foreign aid, EEs began implementing policy frameworks influenced by Western neoliberal models during the 1980s and 1990s, which institutionalised NPM principles emphasising privatisation and deregulation. Critically, this adoption was often not voluntary but a manifestation of structural adjustment conditionality imposed by international donor agencies, which operationalised compliance with specific NPM reforms as a prerequisite for accessing essential development financing (Hopper *et al.*, 2009).

Consequently, NPM manifestations in EE contexts show significant morphological variation. Many EEs, while formally adopting NPM principles, often lack the necessary indigenous expertise and political capital for effective large-scale institutional reforms (van Helden and Uddin, 2016). In response to these analytical challenges, management accounting scholarship within EE contexts has expanded its theoretical base to better understand indigenous dynamics and prevent epistemic colonisation (Alawattage *et al.*, 2017). Studies have used diverse analytical frameworks - including institutional theory, cultural political economy, Bourdieusian practice theory, and structuration theory - to explore how sociopolitical factors influence management control arrangements (see e.g., Hopper *et al.*, 2009; Hopper *et al.*, 2017; Wickramasinghe and Hopper, 2005; Wickramasinghe *et al.*, 2004). This diversification of theory highlights a growing focus on amplifying indigenous voices and recognising how cultural practices and religious frameworks fundamentally shape management accounting in ways that differ significantly from Western contexts (Hopper *et al.*, 2012; Wickramasinghe and Hopper, 2005).

This thesis responds directly to these theoretical imperatives. It examines how centrally-mandated digital reforms - representing a contemporary evolution of NPM principles through

deploying digital technologies as a new form of accounting control - are not merely implemented within Thailand's primary healthcare sector but are actively translated and adapted through localisation processes that reveal the agency of indigenous actors. This analytical approach aligns with the scholarly priority to understand how decision-makers translate global accounting reforms through local adaptation mechanisms (Alawattage *et al.*, 2017), sometimes through resistance strategies informed by theoretical perspectives such as ANT (How and Alawattage, 2012). Through this lens, the research illuminates how localisation generates hybrid budgeting practices, novel accountability configurations, and distinctive organisational adaptations. Critically, the research amplifies the epistemological voices of indigenous actors, such as village health volunteers, whose pivotal mediating roles are systematically marginalised within conventional analytical frameworks, thereby addressing a significant lacuna identified within the broader literature (Hopper *et al.*, 2009).

Having established the historical background of management accounting reforms and their debated translation in emerging economies, it is evident that understanding contemporary digitalisation requires a solid theoretical toolkit. To analyse the complex interaction of technology, practice, and adaptation across this thesis's main areas of investigation - budgeting practices (Paper 1), accountability relationships (Paper 2), and management control systems (Paper 3) - this thesis draws on several complementary theoretical perspectives. The following section will therefore outline the key analytical frameworks that underpin this empirical investigation: ANT, Sociomateriality, Co-production, and the integrated perspectives of Diffusion of Innovation and the Sociology of Translation.

## 2.4 THEORISING TECHNOLOGICAL CHANGE AND ORGANISATIONAL ADAPTION

### 2.4.1 Actor-Network Theory (ANT)

#### *The origins and development of ANT*

Actor-Network Theory (ANT) emerged as a distinctive analytical framework within the broader field of science and technology studies (STS) in the late 1980s. It fundamentally reconceptualised the epistemological bases of scientific knowledge creation and technological development. Developed through collaborative efforts at the Centre de Sociologie de l’Innovation (CSI) at the École des Mines de Paris, ANT was advanced by a group of influential scholars, including Michel Callon, Madeleine Akrich, Bruno Latour, and John Law. Their collective contributions marked a significant shift away from traditional sociological explanations of scientific and technological phenomena (Muniesa, 2015).

Bruno Latour’s influential work, ‘Science in Action: How to Follow Scientists and Engineers through Society’ (1987), serves as a key text that encapsulates ANT’s core theoretical ideas and methodological approaches. Latour’s framework challenges conventional epistemological views on the stabilisation of scientific facts and technological artefacts, instead proposing that knowledge production arises through dynamic, process-oriented networks of diverse actors engaged in ongoing translation and negotiation processes (Latour, 1987). This represents a major departure from traditional sociology of science approaches, which tend to either focus on social constructivist explanations or technological determinism in scientific development.

The intellectual roots of ANT reflect a sophisticated integration of various theoretical traditions, including phenomenology, ethnomethodology, and post-structuralist philosophy, while remaining empirically grounded through detailed ethnographic studies of scientific and

technological practices (Callon, 1986; Law, 1992). This eclectic mix of theories allows ANT to go beyond conventional boundaries between the social and technical, advocating instead a radically symmetrical view that gives equal analytical importance to human and non-human entities within sociotechnical assemblages.

The theoretical importance of ANT extends beyond its origins in science and technology studies, gaining considerable traction across various disciplines, including management accounting research. Here, its principles are employed to shed light on the complex sociotechnical processes involved in the creation of accounting innovations, which are seen not merely as implemented but as actively fabricated (Justesen and Mouritsen, 2011; Robson and Bottausci, 2018). In management accounting, ANT has proved especially useful for examining the dynamic interactions between technological systems, professional practices, and organisational change, providing analytical tools capable of capturing the inherent complexity and contingency of accounting change processes (Lowe, 2001).

Critical scholarly engagement with Latour's foundational work has produced a rich body of literature that both extends and questions core ANT propositions. Table 2-1 synthesises key contributions that have shaped ANT's theoretical development, illustrating how concepts such as actants, networks, and translation processes have evolved through sustained academic debate and empirical investigation.

**Table 2-1** Critical engagements with Latour's ANT

| Author           | Theoretical Contributions   | Critical Implications   |
|------------------|---|---|
| Etzkowitz (1987) | Examined science-industry collaboration networks and their role in knowledge production | Demonstrated the importance of institutional boundaries and their permeability in scientific networks |

| Author                 | Theoretical Contributions   | Critical Implications  |
|------------------------|---|--|
| Myers<br>(1988)        | Applied discourse analysis to scientific writing practices, revealing rhetorical construction of knowledge claims | Highlighted the linguistic and communicative dimensions of network formation and stabilisation               |
| Fujimura<br>(1989)     | Analysed scientist networks for controversy resolution, emphasising heterogeneous actor enrolment strategies      | Demonstrated the active work required to mobilise diverse human and non-human allies in knowledge production |
| Amsterdamska<br>(1990) | Critiqued ANT's apparent ethical neutrality and potential for legitimising power asymmetries                      | Identified critical limitations in ANT's treatment of power relations and normative considerations           |
| Hacking<br>(1992)      | Examined the principle of symmetry and its implications for understanding human-technology relationships          | Questioned the analytical utility of treating humans and non-humans as equivalent actants                    |
| Rude<br>(1992)         | Investigated rhetorical processes in scientific knowledge construction and fact stabilisation                     | Revealed the persuasive dimensions of scientific practice and their role in network stabilisation            |
| Bijker<br>(1998)       | Contrasted diffusion and translation models of technological development  | Established translation as superior to diffusion for understanding technological change processes            |

This scholarly dialogue reveals ANT's evolution from its initial formulation toward increasingly sophisticated theoretical frameworks capable of addressing complex empirical phenomena while acknowledging inherent analytical limitations. The trajectory of ANT development demonstrates its capacity for theoretical refinement through sustained empirical application and critical reflection, establishing its credentials as a robust analytical framework for investigating sociotechnical transformation processes.

For this thesis, ANT's theoretical apparatus provides essential analytical tools for examining the complex processes through which mandated digital management accounting controls are not merely implemented but actively translated, negotiated, and adapted within Thailand's primary healthcare sector. The symmetrical analytical approach enables investigation of how digital platforms, policy documents, performance metrics, and algorithmic systems function as powerful actants alongside human practitioners in constituting organisational realities. This theoretical orientation facilitates movement beyond conventional explanatory frameworks that privilege either technological determinism or social constructivism toward more nuanced understanding of the sociomaterial entanglements that characterise contemporary digital transformation processes within emerging economy contexts.

The subsequent analysis examines ANT's core theoretical concepts - including actants, networks, and translation processes - demonstrating their analytical relevance for understanding the complex dynamics of digitalisation within emerging economy healthcare contexts.

### ***Actants, networks, and the translation process***

Latour's theoretical proposal suggests that the formation and stabilisation of scientific facts and technological artefacts happen through diverse networks involving both human and non-

human actors. In this analytical framework, different entities - including practitioners, technological systems, and institutional structures - engage in ongoing translation processes where they are strategically placed to promote specific scientific or technical claims. The final stabilisation of these networks allows contested propositions to become recognised as accepted factual knowledge.

Building on this foundational premise, Fujimura (1989) empirical investigations have shown how scientific practitioners systematically mobilise diverse alliances that extend beyond immediate collegial networks to include various non-human actors, such as instrumental technologies and analytical apparatus, as essential components in knowledge consolidation processes. This analytical perspective aligns with Bijker's (1998) complementary observations, which characterised fact formation as fundamentally collaborative efforts where both human agents and material objects contribute constitutively to the construction of accepted reality. These investigations collectively highlight the inherently sociotechnical nature of knowledge production processes.

Central to ANT's theoretical framework is the radical principle of analytical 'symmetry', which Hacking (1992) is fundamentally aimed at challenging traditional anthropocentric viewpoints within scientific analysis. Latour's conception of 'actants' systematically removes conventional distinctions between human and non-human entities, thereby establishing new analytical frameworks for examining technoscientific assemblages. This symmetrical analytical approach provides the theoretical basis for this thesis, allowing the treatment of digital platforms, algorithmic systems, and policy documents as having equivalent agency to human practitioners - including clinicians, managers, and village health volunteers - in shaping budgeting outcomes (Paper 1), accountability arrangements (Paper 2), and organisational control mechanisms (Paper 3).

The importance of this symmetrical approach becomes especially clear when examining Latour's fundamental rejection of linear diffusion models, as highlighted by Bijker (1998). Latour's support for translation-based frameworks marks a significant departure from perspectives that see innovations as stable entities subject to passive adoption. Instead, the 'Sociology of Translation' emphasises active processes through which networks are built, negotiated, and stabilised around particular innovations (Callon, 1981; Callon, 1986; Latour, 1987). This processual understanding includes four key moments described by (Callon, 1986):

1. *Problematisation*, wherein specific actors define particular issues and position their proposed solutions as 'obligatory passage points' (OPP).
2. *Interessement*, involving strategic actions designed to align diverse actors with proposed solutions and integrate them within emerging networks.
3. *Enrolment*, characterised by actors' acceptance of prescribed roles and definitions through processes of negotiation and compromise.
4. *Mobilisation*, ensuring sustained alignment of enrolled actors to maintain network durability and stability.

However, theoretical developments within ANT scholarship reveal important analytical nuances. While Callon's (1986) original formulation emphasised how complex relational configurations achieve representation through singular objects, subsequent elaborations by Latour (1987) and others (Callon, 1999; Law, 2002; Robson and Bottausci, 2018) recognise the inherently multiple and distributed nature of these representational processes. This enhanced understanding of translation processes provides the analytical framework for all three papers within this thesis, offering sophisticated tools for examining how mandated digital controls undergo active adaptation within emerging economy contexts.

The analytical depth of *Sociology of Translation* becomes especially clear when compared to traditional innovation models that emphasise phased adoption processes. It highlights the fundamental flexibility of technological assemblages, which are continually reshaped through ongoing sociotechnical negotiations (McMaster *et al.*, 1997). This theoretical approach shifts analytical focus towards the active process of network building, the strategic use of inscriptions, and the continuous negotiations through which digital management accounting controls either achieve or fail to attain stability within complex organisational settings. As a result, sociology of translation offers a nuanced examination of how mandated technological implementations are actively interpreted through local practices, exposing the intricate sociomaterial entanglements characteristic of contemporary digital transformation within emerging economy healthcare systems. Section 2.4.5 will further explore how these translation processes can be theoretically integrated with broader diffusion patterns to provide comprehensive explanations of implementing digital management accounting controls in hierarchical public sector environments.

### ***Rhetoric and persuasion in science***

The analytical sophistication of ANT extends beyond actor enrolment to encompass the fundamental role of rhetorical processes in scientific knowledge stabilisation. Latour's theoretical framework fundamentally reconceptualises scientific claims not as objective discoveries but as products of sophisticated persuasive strategies deployed within complex sociotechnical networks. Rude (1992) illuminated this rhetorical dimension by demonstrating how scientific assertions emerge through strategic communicative practices rather than through purely empirical verification processes. This perspective reveals that scientists employ comparable rhetorical strategies to political actors, systematically mobilising social and discursive resources to achieve network stabilisation around particular knowledge claims

Within the empirical context of this thesis, such rhetorical analysis offers essential tools for understanding how central authorities and local managers employ diverse communicative strategies to convince healthcare practitioners of the necessity and legitimacy of new digital management accounting controls (MACs). These persuasive mechanisms include formal policy documents outlining institutional requirements, official mandates establishing regulatory frameworks, performance dashboards displaying efficiency metrics, and structured training sessions conveying technical skills. The strategic use of these communicative tools highlights the inherently rhetorical nature of digital transformation processes, where technological adoption relies fundamentally on successful persuasion rather than merely technical implementation superiority.

Building upon this rhetorical foundation, Myers (1988) advanced the analysis by examining discursive practices within scientific writing, revealing how scientific texts function not merely as neutral information transmission mechanisms but as sophisticated rhetorical constructions that actively shape knowledge through strategic communicative techniques. His analytical alignment with Latour's rejection of traditional scientific rationality demonstrates how scientific practice becomes deeply embedded within social processes and rhetorical strategies that fundamentally determine how knowledge achieves representational legitimacy and institutional acceptance. This rhetorical construction of epistemic authority proves particularly salient within healthcare digitalisation contexts, where the transformation of clinical practice requires sustained persuasive efforts to achieve professional buy-in and operational effectiveness compliance.

The rhetorical dimensions of scientific practice achieve even greater analytical sophistication through Gross's application of classical Aristotelian rhetoric to scientific writing, as discussed in Rude (1992). Gross argued that scientific practitioners inevitably depend on established

rhetorical strategies because purely rational proof mechanisms are insufficient for achieving knowledge stabilisation within contested domains. This theoretical framework indicates that the legitimacy of organisational facts - including budgetary accuracy, performance measurement validity, and accountability authenticity - arises through ongoing rhetorical construction rather than solely through objective verification mechanisms. As a result, the deployment of digital management accounting controls, similar to other forms of strategic institutional communication, requires advanced persuasive skills to garner consensus among diverse organisational stakeholders concerning particular versions of operational reality.

Contemporary examples of rhetorical construction in crisis-driven digitalisation contexts highlight these theoretical dynamics clearly. During the COVID-19 pandemic, the rhetorical framing of public health measures - including the scientifically contested two-metre social distancing protocols, fourteen-day quarantine standards, and digital proximity-based infection tracking applications - showed how scientific facts become stabilised through strategic rhetorical positioning rather than indisputable empirical evidence. (Ahn and Wickramasinghe, 2021; Cho *et al.*, 2020). These pandemic-driven digitalisations illustrate how rhetorical strategies serve as vital mediating mechanisms between technological possibilities and social acceptance, offering essential analytical foundations for understanding how digital management accounting controls gain legitimacy within emerging economy healthcare contexts, where formal technological mandates must be strategically translated into culturally appropriate and professionally acceptable practices through ongoing rhetorical efforts by institutional actors intermediaries.

### ***Controversy and closure***

A key contribution of Latour's work is his focus on scientific controversies as the sites where knowledge is built. He argued that controversies, rather than disrupting scientific progress, are where facts and machines are created. In the book *Science in Action* (1987), Latour showed how facts depend on social agreements and only become facts once the controversy around them is resolved. This perspective is crucial for this thesis, which looks at how the mandated introduction of digital MACs sparked significant controversies that needed local-level negotiation and adaptation to reach a state of functional closure.

However, Amsterdamska (1990) critiqued this view, questioning Latour's indifference to ethical considerations in how these controversies are resolved. She argued that Latour's approach, which can see science as a war of domination between networks, could be used to justify unethical practices if they succeed in stabilising facts. Her critique highlighted a potential flaw in a pure ANT analysis: it can focus on network strength and success without sufficiently considering the means by which this success is achieved. Building on these foundational concerns, contemporary accounting research has further complicated this debate, with critical realist perspectives (Modell, 2020a) challenging ANT's capacity to adequately address structural power relations, whilst ANT proponents maintain its analytical utility for examining emergent organisational processes (Baxter and Chua, 2020).

These interconnected theoretical concerns and epistemological tensions inform this critical, ethical dimension that is central to the analytical approach of this thesis. By applying Amsterdamska's (1990) critique, ANT can be used not just to describe how a network was stabilised, but to critically examine the power dynamics and ethical consequences of that stabilisation process. This perspective is particularly relevant for investigating the tensions that

arise when top-down digital mandates intersect with on-the-ground realities. Within digitalisation contexts, these controversies manifest across multiple domains: disputes over data integrity when practitioners face performance pressures linked to funding mechanisms (Paper 1), negotiations between formal institutional demands and informal community-based accountability practices (Paper 2), and tensions surrounding professional identity transformation required to operationalise mandated digital systems within hierarchical contexts (Paper 3).

### ***Limits of Latour's ANT: Ethics and power***

While Latour's ANT offers a comprehensive framework for understanding the construction of knowledge, it has its critics. As mentioned, Amsterdamska (1990) challenged the ethical implications of viewing science as a process of network-building devoid of ethical considerations. She argued that power dynamics, including coercion and manipulation, can be downplayed or ignored in Latour's framework, raising concerns about how far his symmetrical analysis can be taken.

Furthermore, Hacking (1992) pointed out that while Latour's concept of actants is revolutionary, it risks becoming too inclusive, blurring distinctions between different kinds of entities in ways that may not always be analytically useful. For example, treating microbes, machines, and humans as equivalent actants might obscure the specific roles these entities play in scientific processes.

Contemporary organisational scholars have further critiqued ANT's analytical limitations, with critical theorists arguing that it relies on a naturalising ontology and epistemological positivism that may inadequately address structural power relations and resistance dynamics (Whittle and

Spicer, 2008). Such critiques highlight ongoing concerns about ANT's ambiguous relationship with reflexivity and its seemingly political neutrality within complex organisational contexts.

This thesis considers these critiques. Instead of applying ANT uncritically, it uses these limitations to develop a more nuanced analysis. To address these challenges, this study combines ANT with additional theoretical frameworks, including sociomateriality perspectives and diffusion of innovation theory, to overcome some limitations while maintaining analytical coherence. It recognises that although digital platforms and policies are powerful actants, their agency differs from that of human actors who have intention, cultural understanding, and the capacity for ethical reflection. The analysis in the subsequent papers, therefore, remains attentive to the distinct roles of various actors within the network, especially the unique mediating roles of human actors like village health volunteers (Paper 2) and hybrid IT specialists (Paper 3).

Despite these critiques, Latour's network theory remains a powerful tool for understanding the dynamics of knowledge creation. By recognising the distinct contributions of various actors and being mindful of the ethical and power dynamics at play, this thesis employs ANT as a robust framework for analysing the intricacies of sociotechnical change. This integrated analytical approach proves particularly valuable for examining digital transformation within emerging economy contexts, where externally mandated reforms intersect with distinctive cultural epistemologies and resource constraints. Such an approach is especially relevant for the discussion in Paper 3, which explores the ethical considerations and power dynamics embedded in the process of organisational adaptation to mandated digital controls.

### ***Rethinking networks and knowledge in science and technology***

Latour's ANT, with its emphasis on how networks function, the symmetrical treatment of human and non-human elements, and the way knowledge is constructed, has notably influenced the field of science and technology studies and provides the fundamental framework for this thesis. The literature reviewed here demonstrates that these concepts offer an essential basis for understanding the intricate social interactions in science and technology.

While critics such as Amsterdamska raised valid concerns about the ethical implications and power dynamics that Latour's theory might overlook, scholars like Fujimura, Hacking, and Bijker offered compelling examples of how they expand and improve upon Latour's insights, enriching our understanding of how science develops in practice. In doing so, Latour's work illuminates the inner mechanisms of science, revealing the intricate interactions of social, material, and rhetorical factors that influence our understanding of scientific facts and technological progress.

This comprehensive theoretical toolkit is exactly what allows this thesis to go beyond merely describing digitalisation. It offers the analytical capability to examine:

- The fabrication of hybrid budgeting practices that emerge from the entanglement of new digital tools and long-standing manual processes (Paper 1).
- The complex negotiations through which multiform accountability is co-produced by a network of practitioners, digital platforms, and community volunteers (Paper 2).
- The overarching processes of organisational adaptation, where top-down digital mandates are translated into workable local solutions (Paper 3).

In a later work, Latour (1999) emphasised the crucial importance of re-establishing connections to develop a new understanding of scientific and social phenomena. This line of thought was

significantly expanded in his effort to “reassemble the social” in 2005, a major revision that offers concepts particularly vital for this thesis, such as the distinction between intermediaries and mediators. The next section will delve into this important revision, which provides the crucial tools needed to trace the complex network of associations that define Thailand’s healthcare transformation.

#### ***2.4.2 The revision of ANT: reassembling the social***

Bruno Latour’s “***Reassembling the Social: An Introduction to Actor-Network Theory (2005)***” offers a transformative view on social theory, aiming to address critiques of his earlier works and broaden the scope of ANT. Latour contends that traditional sociological frameworks, especially those relying on predefined categories like ‘society’ or ‘structure’, are inadequate because they do not demonstrate how social interactions are actively constructed and sustained over time. Instead, Latour promotes a sociology of associations focused on empirically tracing the links among diverse actors, both human and non-human. This approach sees the social not as a fixed domain but as a continually evolving network of associations (Muniesa, 2015). Within these associations, non-human actors, while not intentional agents like humans, significantly influence and shape human actions (Law, 1992).

Central to Latour’s argument is his redefinition of the social. Instead of viewing it as an independent realm, he argues that it forms only one aspect of a larger ‘collective’ - a dynamic and shifting assemblage of relationships. This change differentiates the ‘sociology of associations’, which tracks fluid connections, from the traditional ‘sociology of the social’ (Collier, 2009). The practical applications of ANT have extended far beyond sociology, gaining prominence in interdisciplinary fields (Gubert, 2007; Langlais, 2006; Valverde, 2007). Its principles strongly resonate within accounting research, which uses ANT to examine how

accounting innovations are created through complex sociotechnical processes rather than merely implemented (Justesen and Mouritsen, 2011; Robson and Bottausci, 2018).

However, ANT's application in accounting has not been without controversy, sparking a significant debate regarding its epistemological foundations and, most notably, its treatment of social structure. From a critical realist perspective, scholars argue that ANT's flat ontology - which avoids privileging social structures - neglects the pre-existing, enduring structures that both constrain and enable agency. This critique suggests that such an approach can lead to an overly optimistic view of agency as a largely unfettered engine of emancipation (Modell, 2020a). Proponents of ANT counter that its purpose is precisely to deconstruct these taken-for-granted structural explanations and to empirically trace how the social is actively assembled through local associations. They contend that this offers a more practical and grounded way to study change, avoiding the metaphysical dogmatism of trying to access an unobservable intransitive reality posited by critical realist perspectives (Baxter and Chua, 2020).

This tension is particularly sharp in accounting research, where the dominant normal science tradition and its theory are the prevailing ethos - demanding cumulative, generalisable theoretical contributions - clash with classic ANT's seemingly a-theoretical stance that emphasises detailed, singular descriptions over abstract theory (Lukka *et al.*, 2022). This creates a practical epistemological dilemma for researchers, who must reconcile ANT's suspicion of pre-set agendas with the expectations of an applied field. Some scholars suggest addressing this by embracing Latour's later, more political work, which permits an engaged researcher to facilitate change rather than impose it (Lukka and Vinnari, 2017).

This thesis operationalises Latour's methodological principle by ethnographically tracing the network of associations among Ministry of Public Health directives, digital reporting

platforms, local accountants, and village health volunteers to demonstrate how the healthcare system is actively assembled in practice. While recognising the importance of the structural context (Modell, 2020b), the study concentrates on the transformative work of ‘mediators’. Latour (2005) introduces a critical distinction between intermediaries, which merely transport meaning without transforming it, and mediators, which actively translate, reshape, and modify the meanings they carry, often leading to unforeseen outcomes (Galusky, 2008). This distinction is of paramount importance to the arguments of this thesis, as it provides the analytical lens to investigate how key actors, such as the volunteers (Paper 2) and the hybrid IT specialists (Paper 3), function not as simple conduits for digital mandates but as powerful mediators who reconfigure these central directives to align with local realities. This focus on the transformative work of mediators aligns with calls within accounting research to move beyond ANT to trace the long and heterogeneous list of actors that constitute a network (Lowe, 2001).

Such a notion of mediation highlights Latour’s broader argument that the social is not fixed but an ongoing process of negotiation and reassembly. Through translation, associations are formed and meanings are constantly redefined, indicating a move from rigid explanatory models to descriptive approaches that recognise the fluidity of social interactions (Collier, 2009; Lissandrello, 2008). Further developing this idea, Latour employs the concept of the ‘work-net’ to emphasise the action, movement, and transformation within these networks, shifting focus from static structures to the processes whereby associations are assembled, altered, and maintained (Latour, 2011). By concentrating on mediators, this thesis examines how this work is practically carried out, as it creates a negotiable space for actants to shape and reshape their work-nets, enabling the analysis to capture the heterogeneous relationships that make up the network.

Latour's revised ANT emphasises that social realities are not fixed but are enacted through diverse practices that constantly shape our understanding of society. In this way, society itself results from associations rather than their origin (Latour, 2005). By redefining the social as a network of shifting associations, Latour opens new paths for inquiry, encouraging scholars to explore the subtle relationships and mediations that construct social realities. It is this dynamic framework that supplies the necessary analytical tools for this thesis to study the negotiated and emergent nature of digital transformation. This perspective, which views the social and material as continuously assembled through networked practices, directly leads to the complementary lens of *sociomateriality*, which further investigates this constitutive entanglement in the next section.

#### ***2.4.3 Sociomateriality: The entanglement of the social and the material***

Conventional social constructivist approaches have historically dominated the discourse on accounting changes (Quattrone and Hopper, 2001), often emphasising the role of social structures and human interpretation in shaping organisational practices (Burchell *et al.*, 1980; Burchell *et al.*, 1985). Such research has yielded valuable insights into how accounting is involved in institutional power and control. However, these paradigms tend to prioritise human agency as the main driver of transformation. While some studies have examined the impact of technology on accounting practices, this focus can be seen as insufficient for offering a complete picture of the complex, intertwined roles of technology and social factors (Orlikowski and Scott, 2008). This is particularly true when digital artefacts and other non-human actors - a key concern of ANT - act as constitutive elements in shaping practices and outcomes (Adhikari *et al.*, 2023).

Building on these analytical limitations, it becomes essential to adopt a *sociomateriality* perspective, which develops through the dynamic interaction between human activity and non-

human elements like technology. Sociomateriality challenges the separation of technology, work, and organisation, arguing that the social and material are inseparable and fundamentally constitutive of organisational reality through ongoing practice (Orlikowski, 2007; Orlikowski and Scott, 2008). This theoretical approach aligns with continuous improvement methods such as Total Quality Management, lean production systems, and Toyota Production System principles, all of which highlight the ongoing, iterative process of organisational enhancement through sociotechnical integration. It explores the interaction between social and material aspects of life, offering a more comprehensive understanding of organisational operations (Orlikowski, 2007). Since 2007, this theory has garnered increasing attention within organisation studies and information systems (IS). In fact, Orlikowski's work (Orlikowski, 2007, 2010; Orlikowski and Scott, 2008) has been recognised as foundational in most sociomaterial articles published on the topic between 2007 and 2011 (Jones, 2014).

The theoretical genealogy of sociomateriality uncovers its complex engagement with earlier structuration frameworks. Orlikowski's development of sociomateriality builds on Giddens' structuration theory (1984), which provided a solid foundation but fell short in explaining the intricacies of modern technology. Giddens' theory conceptualises human actions and institutional structures as recursively connected, but Orlikowski (1992) extended this by incorporating technology into the model, arguing that technology is both shaped by human action and, in turn, influences organisational structures. However, this structuration model's failure to fully account for the ongoing evolution of technologies and their implementation over time limited its usefulness (Orlikowski, 2000). Importantly, this realisation led to the understanding that technologies are not fixed or complete objects; rather, they are continuously enacted and re-enacted through practices, a key insight that forms the core of sociomateriality.

These theoretical developments addressed two significant limitations Orlikowski (2000) identified in structuration theory's treatment of technology. First, while the theory effectively explains the diverse outcomes of technology use in different contexts, it struggles to account for the continual evolution of technologies and their organisational roles. Second, adopting social constructivist ideas has led to the assumption that technologies stabilise after development and merely reflect social norms or political objectives. Subsequent theoretical refinements (Orlikowski, 2010) critiqued this view, arguing that technologies are always in the process of becoming through their interaction with human practices, never reaching a state of completion. This evolution demonstrates how sociomateriality offers a more comprehensive framework where Giddens' theory, while influential, could not specifically address the role of technology in structuring organisations.

As an analytical umbrella, sociomateriality (Orlikowski and Scott, 2008) organises research around various theoretical traditions, including ANT. Significantly, this positioning enables sociomateriality to occupy a distinctive epistemological stance that bridges two theoretical extremes - technological determinism on one side and social constructivism on the other - thereby offering a nuanced middle-ground perspective that recognises the constitutive entanglement of social and material agencies (as reflected in the conceptual framework outlined in Chapter 1). One of the key concepts introduced by ANT and incorporated into sociomateriality is symmetry (Latour, 2005), which argues that both human and non-human agencies - whether people, technologies, or objects - have equal potential to influence and reshape one another. This symmetrical approach contrasts with the traditional human-centred focus of social theory, which positions humans as the primary agents of change. From this theoretical foundation arises the concept of 'constitutive entanglement', suggesting that networks can comprise both people and technologies, with each playing an equally important

role in organising social life (Contractor *et al.*, 2011). In these networks, technologies are not passive tools but active agents that participate in constructing organisational realities alongside humans.

The operationalisation of sociomateriality requires attention to two interconnected themes in organisational research that Orlikowski and Yates (2006) described, materiality and practice. Materiality, often overlooked in traditional studies, demands a more nuanced analysis, as it plays a vital role in shaping organisational outcomes. Both ANT and the practice lens introduced by Orlikowski (2000) encourage researchers to focus on the small-scale actions of those who design, use, and maintain systems over time. This includes examining how human interpretations, social networks, and material objects (such as technologies) come together to make systems workable in practice.

The mature theoretical articulation of sociomateriality shows that it is not just about how humans use technologies but how technologies and humans are co-created in practice (Orlikowski, 2010). This framework promotes a relational ontology that rejects the dualism between human and non-human elements. Instead, technologies and human practices are viewed as inseparable, continually enacted, and reshaped in everyday organisational life. This sophisticated approach is especially useful in contemporary digitalisation contexts, where traditional binary distinctions between users and tools become less relevant as technologies grow more advanced and integrated within organisational workflows. Drawing on ANT principles, this perspective redefines agency as shared between humans and technologies, moving away from the traditional focus solely on human actions.

For this thesis, Paper 1 adopts this integrated perspective, where sociomateriality provides the essential ontological foundation - the core understanding that organisational practices are

inherently socio-material - while ANT offers the methodological tools to track the actors and trace the processes of translation, negotiation, and network-building that drive transformation. In summary, sociomateriality serves as a potent lens to comprehend the interconnected and entangled nature of the social and material in organisational life. By moving away from the human-centred view of traditional theories, it offers a more nuanced and dynamic understanding of how technologies and social practices jointly shape organisational realities. This perspective not only enhances our understanding of organisational change in the age of digitalisation but also opens new avenues for future research into the fluid, distributed, and performative character of sociomaterial practices within organisations.

#### ***2.4.4 Conceptualising co-production in public services***

The concept of co-production has experienced a notable resurgence in public administration scholarship and practice, positioning citizens not merely as passive recipients of public services but as active partners in their design and delivery (Nabatchi *et al.*, 2017; Osborne *et al.*, 2016). In its broadest sense, co-production is an overarching concept that encompasses a wide range of activities that can occur at any stage of the public service cycle, where state actors and lay actors collaborate to generate benefits (Nabatchi *et al.*, 2017). This collaborative approach is based on the idea that citizens possess valuable assets, resources, and contributions that, when effectively harnessed, can lead to improved outcomes and increased efficiency (Bovaird and Loeffler, 2013). However, despite its growing theoretical significance, the concept remains characterised by conceptual ambiguity, with different theoretical traditions offering distinct epistemological perspectives on its core nature and practical application (Nabatchi *et al.*, 2017; Osborne *et al.*, 2016; Voorberg *et al.*, 2015).

A key distinction in understanding co-production comes from two related but often separate streams of literature: Public Administration and Management (PAM) and Services

Management (Osborne *et al.*, 2016; Osborne and Strokosch, 2013). The traditional PAM perspective, rooted in the work of Elinor Ostrom, sees co-production as a conscious, voluntary, and often participatory act designed to be integrated into the service delivery process. In this framework, public officials hold exclusive responsibility for designing and providing services, while citizens have limited roles involving demand expression, consumption, and assessment, unless explicitly invited into participatory activities. This scholarly tradition mainly concentrates on mechanisms to enable greater citizen involvement to enhance service quality, support democratic participation, and mobilise additional community resources through structured participatory frameworks (Pestoff *et al.*, 2006).

This conceptual divergence becomes especially clear when reviewing the Services Management literature, which promotes a fundamentally different theoretical view: co-production is not just an optional addition but an inalienable and often involuntary aspect inherent in service delivery arrangements (Osborne *et al.*, 2016; Osborne and Strokosch, 2013). This analytical approach is rooted in the unique qualities of services, notably their intangibility and the inseparable nature of production and consumption. Since services are consumed simultaneously with their production, users actively participate in creating the service, regardless of whether they do so knowingly or willingly - resisting the service provision is as legitimate a form of co-production as enthusiastic collaboration (Osborne *et al.*, 2016). This inherent interaction between provider and user at the crucial moment is where value is ultimately co-created (Normann, 1991).

Building upon these theoretical foundations, Osborne and Strokosch (2013) developed an integrated typology that elucidates the different modes of co-production.

- Consumer Co-production: Based on the Services Management perspective, this is the unavoidable, operational-level co-production that happens because production and consumption are inseparable in any service encounter. It concentrates on managing the interaction between the provider and the individual user to empower the user and match their expectations with their experience. This type of co-production is involuntary and inherent to the service itself.
- Participative Co-production: Aligned with the traditional PAM perspective, this method is voluntary and strategic, focusing on involving users and communities in the planning and design phases of public services. The goal is not necessarily to alter the service paradigm but to enhance the quality, relevance, and design of existing services through participative mechanisms.
- Enhanced Co-production: This advanced approach stems from combining the previous two methods. It merges operational insights from consumer co-production with the strategic involvement of participative co-production to foster user-led, transformational innovation. It goes beyond merely improving existing services to fundamentally challenging and reshaping service delivery paradigms.

The long-standing role of Thailand's village health volunteers, who are deeply involved in both the operational delivery and strategic implementation of local healthcare, can be seen as a form of enhanced co-production, a connection this thesis will explore in Paper 2.

To further operationalise these conceptual distinctions, scholars have developed analytical frameworks that categorise co-productive activities based on participant involvement (individual, group, or collective actors) and their timing within service cycles. This theoretical development has led to the widely used 'four Co's' analytical model, which identifies four key

phases of engagement (Bovaird and Loeffler, 2013; Loeffler and Bovaird, 2019; Nabatchi *et al.*, 2017):

1. Co-commissioning: Engaging citizens in identifying and prioritising public service needs and outcomes. This reflects citizen voice in strategic decision-making.
2. Co-design: Involving users in planning and designing service pathways to make sure they are relevant and easy to use.
3. Co-delivery: The collaborative, practical provision of services by professionals and lay actors, representing citizen involvement.
4. Co-assessment: Engaging citizens in the monitoring and evaluation of service quality and results.

These theoretical frameworks hold particular analytical importance within healthcare contexts, where patients are inherently key actors in promoting their own well-being. This fundamentally challenges traditional biomedical models that depict patients as passive recipients of expert-led treatment, while aligning with modern movements towards patient-centred care, involvement, and empowerment. However, implementing these approaches faces significant institutional barriers, including ongoing professional dominance, information asymmetries, and a lack of organisational capacity or willingness to genuinely involve patients as collaborative partners (Palumbo, 2016).

This thesis utilises these advanced theoretical frameworks to analyse accountability transformation within Thailand's primary healthcare system. Specifically, Paper 2 adopts ANT analytical perspectives to examine how digital co-production, mediated through the vital intermediary network of village health volunteers, creates novel hybrid accountability

structures that integrate formal institutional demands with informal, community-based governance practices.

#### ***2.4.5 Theorising adaptation: From diffusion pathways to negotiated translations***

Contemporary theoretical frameworks for understanding organisational innovation adoption reveal fundamental epistemological tensions between macro-structural explanatory paradigms and micro-processual analytical approaches, requiring sophisticated theoretical integration to capture the multifaceted dynamics of technological change within complex institutional environments (McMaster *et al.*, 1997). To offer a comprehensive view of organisational adaptation, it is helpful to consider the Diffusion of Innovation (DoI) theory. As developed by Rogers (2003), DoI provides a foundational framework for analysing how new ideas or technologies are communicated through specific channels over time among members of a social system. While DoI is highly valuable for describing these broad trajectories, traditional diffusion models may inadequately capture the complex dynamics through which innovations are reinterpreted and actively reshaped within specific organisational contexts, often underestimating the agency of adopters.

This theoretical limitation becomes especially clear when examining mandatorily imposed digital transformation in hierarchical public sector organisations, where the apparent linearity of diffusion processes masks complex negotiations, adaptations, and translations that fundamentally reshape technological innovations through local implementation practices (Callon, 1986; Latour, 1987). Indeed, as McMaster *et al.* (1997) critics argue, the diffusion metaphor can be limiting because it suggests a passive transfer, while translation better captures the active, negotiated process in which an innovation is co-constructed.

This distinction is critical because, as Quattrone and Hopper (2001) argue, organisational change is rarely a linear transition from one stable state to another. Instead, adaptation is an emergent process - a continuous drift where the outcome is not determined by the technology itself. This process is deeply social, arising from complex negotiations that rely on informal relationships - such as Kreng-jai - rather than strict adherence to algorithmic rules (Holmes, 2005; see also Chapter 4 Findings). In this view, change does not follow a straight line predicted by the software design; rather, it wanders and evolves as practitioners actively translate the system to fit their local reality. This thesis, therefore, adopts this definition of adaptation: not as the successful implementation of a fixed tool, but as the socially constructed outcome of these continuous negotiations.

The key epistemological difference between these paradigms lies in their contrasting assumptions about agency, power dynamics, and the nature of technological objects. DoI views innovations as relatively stable entities that spread through social systems following predictable patterns, whereas Sociology of Translation (SoT) sees innovations as flexible assemblages continuously reconstructed through situated sociotechnical negotiations (Law, 2002; Robson and Bottausci, 2018). As discussed in Paper 3, a more nuanced understanding of adaptation - particularly in a mandated, hierarchical context - requires combining the macro-level perspective of DoI with the micro-processual view of SoT.

These theoretical misalignments require the development of an integrated conceptual framework that combines the descriptive strengths of both paradigms while addressing their respective analytical limitations. This allows for a deeper understanding of how organisational adaptation arises through the dynamic interaction between diffusion pressures and translational processes. (Paper 3 develops such an integrated model through empirical investigation of Thailand's healthcare digitalisation).

At the core of DoI is the innovation itself, which in this thesis pertains to digital MACs. These are often not single objects but clusters of technology - interconnected architectures and frameworks that transform organisational practice. The speed of an innovation's adoption is greatly influenced by its perceived attributes: its relative advantage over existing ideas, compatibility with norms and experiences, complexity, trialability, and the observability of its outcomes.

### ***The innovation-decision process for individuals***

Fundamentally, diffusion is a social process that occurs through communication channels. Rogers (2003) distinguishes between mass media channels, which are effective at creating knowledge, and interpersonal channels, which are more influential in shaping and changing attitudes. Communication is most effective between individuals who are similar, a principle called homophily. However, new ideas usually enter a system through heterophily (interactions between different individuals), which can create barriers if ideas only circulate horizontally among similar elites rather than vertically throughout a system.

The importance of heterophilous communication channels becomes greater within emerging economies, where digital transformation efforts must cross not only hierarchical boundaries but also cultural, linguistic, and epistemological divides that shape how innovations are understood and implemented by various stakeholder groups (van Helden and Uddin, 2016). This challenge of vertical communication across heterophilous groups is a key focus of this thesis, which explores how centrally mandated digital policies are communicated downward through a complex public healthcare hierarchy and how intermediaries - such as IT specialists and village health volunteers - facilitate this flow of information between different professional and community groups. This is especially important when considering the diffusion of

management practices, which, as Abrahamson (1991) suggested, can spread like fashions, with adoption driven by institutional pressures for legitimacy as much as by technical efficiency.

The time aspect of DoI is represented in the five-stage ***Innovation-Decision Process***, which individuals go through to deal with the uncertainty inherent in a new idea. It starts with the *Knowledge stage*, where people ask about how and why an innovation functions. Here, the supply-side aspect of how information is presented is important; as Ax and Bjørnenak (2005, 2007) noted, IT specialists and other designated actors often act as key knowledge gatekeepers who can influence how digital systems are initially understood.

In emerging economy healthcare settings, this knowledge gatekeeping role holds particular theoretical importance, as intermediaries must not only translate technical information but also negotiate between competing epistemological frameworks - including biomedical, administrative, and community-based knowledge systems - that influence how digital innovations are understood and legitimised across various stakeholder groups.

It is followed by the *Persuasion stage*, where they seek evaluative information to clarify potential benefits and drawbacks. The *Decision stage* involves choosing whether to adopt or reject the innovation. However, in hierarchical public sector settings, this phase often diverges from a model of voluntary adoption. Instead, it frequently reflects 'forced selection' through top-down mandates that compel implementation regardless of practitioners' preferences. This pattern is especially evident in public sector transformations where governmental influence is decisive (Lapsley and Wright, 2004) and where adoption drivers can shift over time from efficiency motives to institutional isomorphic pressures (Malmi, 1999).

The theoretical implications of mandated adoption fundamentally challenge DoI's individualistic assumptions about decision-making autonomy, revealing how institutional

power dynamics bypass voluntary choice mechanisms while also creating conditions where translation processes become necessary for achieving effective implementation despite formal compliance pressures (Callon, 1986).

The *Implementation stage* involves putting the innovation into use, a phase where challenges may occur as implementers are often not the original decision-makers. Following this, the *Confirmation stage* sees users' experiences influence whether the innovation is either persistently adopted or discontinued. Rogers (2003) identifies two forms of discontinuance: replacement (adopting a superior alternative) and disenchantment (abandonment due to dissatisfaction). In the mandated context of this study, these forms manifest uniquely. Disenchantment seldom leads to outright abandonment but instead results in superficial compliance or extensive workarounds when digital controls clash with professional values. Conversely, replacement is usually not a user-led decision but is driven by administrative mandates from central authorities, who impose newer systems considered superior, often regardless of practitioners' evaluations of their local usability.

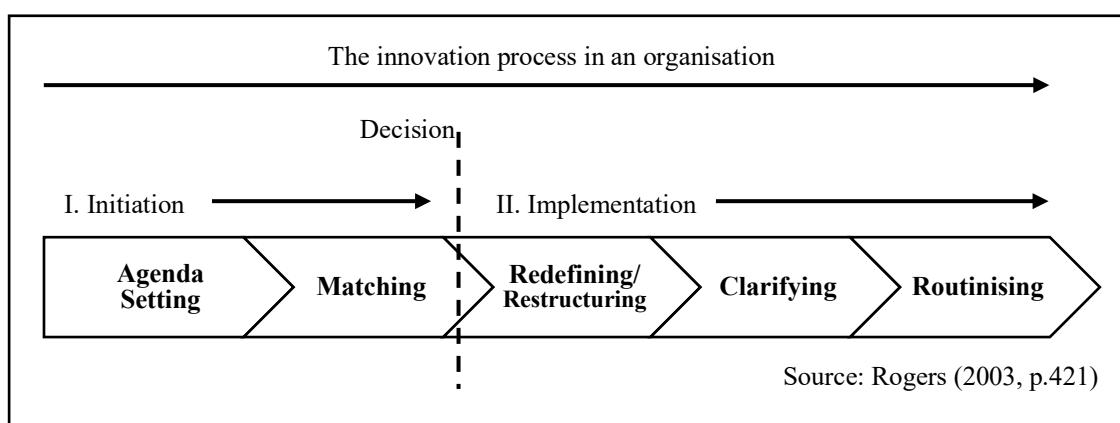
### ***The innovation process in organisations***

Organisational innovation processes exhibit greater complexity than individual adoption patterns, especially within the public sector where multiple institutional logics, professional epistemologies, and accountability frameworks intersect, creating diverse implementation environments that demand sophisticated theoretical analysis (Grossi *et al.*, 2017; Steccolini, 2019). Based on their relative timing of adoption, individuals can be categorised into adopter groups such as innovators, early adopters, and laggards (Rogers, 2003). These groups exist within a social system where norms, culture, and the roles of opinion leaders and change agents influence diffusion. In this thesis, actors like hybrid IT specialists and senior, respected Village

Health Volunteers are seen as fulfilling the roles of opinion leaders or change agents, whose endorsement and mediation are vital for the innovation to be accepted by their peers. Opinion leaders are especially important; they tend to closely follow system norms and are most innovative when those norms support change.

Within *organisations, the innovation process* follows a similar, yet distinct, set of stages as shown in Figure 2-1. The process begins with *Agenda-Setting*, often driven by a performance gap, followed by *Matching*, where a problem is conceptually linked with an innovation. In the context of this thesis, these initial stages were heavily compressed by the COVID-19 pandemic, which acted as a powerful focusing event that fundamentally changed the timing of innovation adoption by creating urgent performance gaps. This made digital transformation an immediate institutional priority rather than a gradual development. The crisis generated a pressing performance gap that strongly positioned digital MACs as an essential solution. From a SoT perspective, the pandemic served as a critical moment of problematisation, making new integrated digital controls a necessary step for the entire healthcare network.

**Figure 2-1** Five stages in the innovation process in organisations



A critical stage is *Redefining/Restructuring*, where innovation and organisation are mutually adapted. This stage marks the point where DoI and SoT perspectives converge most clearly, as

organisational adaptation requires both the structural changes anticipated by diffusion theory and the active translation work emphasised by ANT scholarship (Orlikowski, 2000; Tyre and Orlikowski, 1994). This is exemplified in the thesis by the development of hybrid paper-digital workflows and localised tracking systems created by managers. Tyre and Orlikowski (1994) noted, there is often a limited window for this adaptation before the innovation becomes routine. The temporal constraints on adaptation windows assume particular theoretical significance within mandated implementation contexts, where shortened adaptation periods may inadequately accommodate the complex translation work required to achieve meaningful integration between technological capabilities and existing organisational practices.

The process then progresses through *Clarifying*, where a shared understanding is developed, largely facilitated by intermediaries like the hybrid IT team and the informal peer-to-peer learning networks that compensated for inadequate formal training. This clarifying phase highlights the vital mediating role of human actors who act not merely as passive conduits for diffusion but as active translators, reconstructing innovations through local interpretation and adaptation practices (Latour, 2005). Finally, *Routinising* incorporates the innovation into everyday practice; in this study, this involved normalising hidden work and other workarounds that became vital for maintaining the mandated systems.

The routinisation process shows how apparent success in diffusion can hide underlying translation dynamics that fundamentally reshape innovations through unseen adaptive practices. This suggests that organisational stability around new technologies develops through ongoing micro-level translation work rather than simply accepting pre-existing technological features (Callon, 1999; Law, 2002). Finally, it is important to recognise that innovations have consequences that can be positive or negative, direct or indirect, and expected or unexpected. As Rogers (2003) notes, it is often impossible to distinguish the good outcomes from the bad.

The challenge of differentiating between intended and unintended effects becomes especially complex when examining the intersection of diffusion and translation processes, as local adaptations may lead to unforeseen effects that go beyond the original purpose of the innovation, while also creating new organisational capabilities or limitations (Orlikowski, 2000; Quattrone and Hopper, 2001). Therefore, while DoI offers a useful framework for understanding these complex dynamics, combining it with SoT/ANT enables a more detailed analysis of the active, constructive, and negotiated adaptations at play, which are central to this thesis.

This theoretical integration allows Paper 3 to build a comprehensive conceptual framework that captures both the broad diffusion patterns at the macro level, which characterise the initial deployment of technology, and the micro-level translation processes that determine the final implementation outcomes. This provides a more nuanced understanding of organisational adaptation within the complex institutional environment of Thailand's healthcare system.

## **2.5 CHAPTER SUMMARY**

This chapter has examined the literature on public sector management accounting, its digitalisation, and the theoretical frameworks supporting this study. The review confirms that although digitalisation is a worldwide phenomenon, a persistent Western-centric bias in the research has created significant gaps in understanding how these changes are implemented within the resource-limited and culturally diverse environments of emerging economies.

Specifically, this review has identified the following theoretical gaps, which this thesis will explore through comprehensive empirical investigation.

- The underexplored, practical consequences of datafication on budgeting, especially the creation of hybrid practices and the intensification of institutional inequalities through sociomaterial entanglements that go beyond traditional implementation stories.
- The theoretical gap in understanding accountability in digitally co-produced public services, particularly the emergence of various forms of accountability where formal and informal mechanisms intersect through networked governance arrangements mediated by trusted local intermediaries.
- The need for a comprehensive theoretical framework to explain organisational adaptation to mandated digital change in hierarchical contexts, progressing beyond isolated applications of innovation theories towards a sophisticated understanding of diffusion-translation dynamics within emerging economy institutional structures.

The theoretical synthesis establishes ANT as the primary analytical framework, complemented by perspectives on sociomateriality, co-production, and diffusion, enabling ethnographic investigation that traces the complex network of associations constituting Thailand's healthcare digitalisation. This integrated approach facilitates movement beyond mere descriptive documentation towards analytical insights that reveal how centrally mandated digital reforms are actively translated through situated practices, generating distinctive patterns of sociotechnical adaptation within emerging economy contexts.

Having established this scholarly rationale and analytical foundation, the thesis now advances to address these gaps through three interconnected empirical papers that collectively examine the transformation of budgeting practices (Paper 1), accountability relationships (Paper 2), and organisational adaptation mechanisms (Paper 3) within Thailand's primary healthcare sector.

## CHAPTER THREE: PAPER ONE

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### Transformation of Budgeting Practices through Datafication: A Sociomaterial Analysis of Thai Primary Healthcare<sup>6</sup>

#### ABSTRACT

**Purpose:** This study investigates how datafication transforms budgeting practices in the public sector healthcare within emerging economies. Using evidence from Thai primary healthcare organisations, it focuses on the tensions between centrally formulated policy directives and the challenges of local-level implementation.

**Design:** Drawing on sociomateriality and Actor-Network Theory, we conducted an extended six-month ethnographic study (August 2023-January 2024) in southern Thailand's public healthcare service, examining the interplay between human and non-human actors (i.e., human practices and digital tools) in translating central policies into local practice.

**Findings:** Our main findings show that (i) Datafication created hybrid budgeting systems blending traditional paper-based methods with digital tools rather than replacing older

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<sup>6</sup> 1. This research paper received a grant from the BAFA-AFEE seedcorn research fund (2023), and was presented at the 25th BAFA-AFEE Workshop Conference in Katowice, Poland. (Documentation of funding and a copy of the presentation certificate are provided in Appendix G of the thesis).

2. The research paper was revised into a manuscript, which has been submitted to the *Accounting, Auditing & Accountability Journal* and is currently under review (Revise and resubmit).

practices. (ii) Instead of promoting equality, digital initiatives amplified resource inequalities between well-equipped and less-resourced facilities. (iii) Significant unintended consequences emerged, including increased administrative complexity and sophisticated resistance strategies (e.g., entering fictional information) to meet centrally imposed targets. (iv) Data-driven budgeting introduced new oversight forms while generating refined patterns of local resistance. These findings reveal datafication as a complex sociomaterial phenomenon reshaping budgeting through interactions between technological affordances, institutional pressures, and local adaptations. the interplay of technological affordances, institutional pressures, and local adaptations.

**Originality:** This study highlights the intertwined nature of digital and social elements in public sector budgeting transformations within emerging economies (Thailand in this case). It reveals how digitalisation can unintentionally worsen inequities and shows how local adaptations and resistance shape centrally mandated policy outcomes, contributing to understanding how technology reshapes public sector budgeting in resource-limited healthcare settings.

**Keywords:** Budgeting, Public sector accounting, Digitalisation, Datafication, Healthcare budgeting, Emerging economies, Thailand, Sociomateriality, Actor-Network Theory

**Paper type:** Research Paper

### 3.1 INTRODUCTION

The global public sector's ongoing digital transformation over the past decade (Argento *et al.*, 2025; Mergel *et al.*, 2019) increasingly involves datafication: the fundamental reshaping of routine organisational practices - including services, processes, and social relations - into quantifiable data (Mayer-Schönberger and Cukier, 2013). Datafication aims to leverage

interconnected datasets and big data analytics to extract new value and insights for public management and resource allocation through socio-technical interactions (Redden, 2018). While existing literature indicates the rise of digitalisation in public sector contexts, the actual processes and implications of this change, particularly how digital tools become embedded in and reshape established institutional practices, remain empirically underexplored and theoretically underdeveloped (Agostino *et al.*, 2022b).

Prior studies indicate that big data initiatives significantly alter the epistemological bases of accounting practices (Arnaboldi *et al.*, 2017b; Quattrone, 2016; Vasarhelyi *et al.*, 2015). There is an ongoing debate concerning the need for professional autonomy versus increasing institutional demands for performance oversight and accountability. This concern is particularly pronounced in public services like healthcare, where accounting and finance-led changes have historically generated resistance as they perceived to intrude upon established professional norms and patient-centred values (Broadbent *et al.*, 2001; Kurunmäki, 2004). Healthcare professionals face challenges such as financial constraints, perceived exclusion of professional input, and increasing managerial responsibilities that often conflict with their primary commitment to patient care delivery (Rautiainen *et al.*, 2022). Data analytics tools are also reshaping professional work and judgment in these settings (Kastrup *et al.*, 2024). These financial constraints are substantial; for instance, Thailand's government health expenditure surged from US\$2.6 billion in 2001 to US\$26.57 billion by 2022 following its Universal Coverage Scheme (Macrotrends, 2025).

This knowledge gap is especially pronounced in emerging economy contexts. While theoretical frameworks, such as actor-network theory, have been applied in the prior studies to analyse management accounting and budgeting innovations in developed nations (Justesen and Mouritsen, 2011; Lowe, 2001) and revealed how new accounting systems are not simply

implemented but are fabricated through complex social processes. This includes key research in public services like the healthcare sector, which has shown how accounting technologies are negotiated and resisted by powerful actors like clinicians (Chua, 1995; Preston *et al.*, 1992). However, these frameworks, which are often rooted in Western contexts, may inadequately capture the complexities within emerging economies (van Helden and Uddin, 2016). While datafication, particularly through artificial intelligence, may optimise resource allocation in technologically advanced contexts (Valle-Cruz and García-Contreras, 2023), such approaches presume robust institutional infrastructures and uniform administrative systems - conditions frequently absent in emerging economy settings. In these contexts, localised factors - including socio-cultural norms, political dynamics, community power structures, and organisational hierarchies - profoundly shape how budgeting and performance management practices evolve (van Helden *et al.*, 2021). These elements influence the interpretation and implementation of digital innovations, leading to varied organisational responses ranging from resistance to hybrid systems blending traditional and new methods (Adhikari *et al.*, 2023).

Thailand's digitalisation efforts in healthcare, particularly the datafication of budgeting practices, provides a compelling research context for investigating complex socio-technical dynamics in public sector accounting. While this transformation predates COVID-19, the crisis critically accelerated the push for digital solutions and heightened budgetary pressures (Grossi *et al.*, 2020), while exposing frictions between national policies and local implementation realities (Regional Health Provider Office 12, 2020). These tensions highlight how centrally formulated policies are interpreted, modified, or resisted during local-level implementation (Latour, 1987). Thailand's Ministry of Public Health mandated systematic integration of datafication into budgetary planning, connecting healthcare facilities to a national database within a state-organised network (e.g., Ministry of Public Health, 2017; Thai Government,

2019). This networked system enhanced institutional capabilities, as Thailand achieved elimination of confirmed local virus transmission for over 100 consecutive days between May and September 2020 - a feat managed by only a handful of countries globally at that time (UN, 2020).

The tension between centralised policy directives for digitalisation and local implementation is magnified within emerging economies (van Helden and Uddin, 2016). Infrastructural limitations and institutional constraints frequently impede comprehensive digitalisation, creating significant hurdles, particularly where inadequate technological capacity intersects with existing healthcare delivery challenges. This raises critical questions: does datafication ameliorate or exacerbate existing limitations in healthcare budgeting and service delivery? Therefore, this study seeks to answer the following research question:

*RQ: How does the translation of digitalisation-related policies and practices (re)shape budgeting practices in the public healthcare sectors?*

To address this question, we draw on sociomateriality theory (Orlikowski and Scott, 2008) combined with Actor-Network Theory (Latour, 1987, 2005) as our primary analytical lens. Sociomateriality allows us to examine how budgeting practices are constituted through the inseparable entanglement of human actions and material (digital) elements, moving beyond the simple cause and effect relationships. Actor-Network Theory (ANT) on the other hand, complements this by providing tools to trace the dynamic processes of translation, negotiation and network formation involving both human and non-human actors (e.g., software, policies, reporting metrics), which we believe will be crucial to improve our limited understanding of how digitalisation policies are enacted and how such practices are reshaped amidst the resistance and adaptation in the local level.

Our study reveals the complex, often contradictory ways that datafication initiatives are translated and enacted within the unique socio-cultural and institutional context of an emerging economy's (Thailand in this case) healthcare system. We extend sociomateriality theory by demonstrating how datafication fosters new, often hybrid, entanglements between human actors and material elements in budgeting practices (Orlikowski, 2007). This understanding is particularly relevant in emerging economy healthcare settings, where institutional and infrastructural constraints necessitate contextualised application of dominant paradigms (van Helden and Uddin, 2016). We also illustrate how these sociomaterial entanglements interact with local translation mechanisms and stakeholder resistance, highlighting specific unintended consequences (such as exacerbation of inequalities between facilities and sophisticated forms of creative compliance by practitioners) that emerge during technological implementation.

The paper is structured as follows: Section 2 presents the proposed theoretical framework, integrating sociomateriality and ANT. Research context and datafication initiative are discussed in Section 3, which is followed by the ethnographic methodology in Section 4. Research findings are reported in Section 5. Finally, the discussion and conclusions are presented in Sections 6 and 7.

## 3.2 THEORY AND BACKGROUND LITERATURE

### 3.2.1 *Sociomateriality and Actor-Network Theory (ANT)*

Social constructivist approaches, while providing valuable insights into how accounting is implicated in institutional power and control (Burchell *et al.*, 1980; Quattrone and Hopper, 2001), often prioritise human agency as the primary catalyst for transformation. This focus becomes inadequate when digital artefacts actively shape practices and outcomes. Sociomateriality departs from paradigms that treat technology merely as a tool wielded by humans. In contrast to views that treat social and material elements as separate entities,

sociomateriality posits that they are indivisible and fundamentally constitutive of organisational reality through ongoing practice (Orlikowski, 2007; Orlikowski and Scott, 2008). This perspective is particularly relevant for analysing datafication in public healthcare budgeting, where the entanglement of human actions (e.g., budget preparation, patient interaction) and material elements (e.g., digital platforms, algorithms, performance metrics) is central to understanding how practices evolve. The replacement of traditional budgeting processes through digital technologies illustrates the recurrent relationship between technological opportunities and human practices, as noted by Orlikowski (2010), which is continually enacted and reshaped through everyday organisational practices.

While traditional frameworks such as contingency theory (Chenhall, 2003) or new institutional sociology (DiMaggio and Powell, 1983) provide valuable insights into organisational structures, they often conceptualise technology as a stable, exogenous variable that impacts performance in a predictable, linear manner. However, such perspectives struggle to capture the fluid, micro-level negotiations observed in this case study, where the digital and the social are continuously intertwined. Therefore, this study specifically prioritises a sociomaterial lens combined with ANT. Unlike the static variables of contingency approaches, ANT allows us to trace the dynamic agency of non-human actors (the digital platforms) and examine how they actively shape, and are shaped by, human networks (Latour, 2005; Justesen and Mouritsen, 2011). This approach is preferred because it reveals the messy reality of implementation, exposing how accounting practices are not simply installed based on institutional pressures, but are continuously enacted and modified through daily practice (Orlikowski, 2007).

ANT strengthens our comprehension of how organisational transformation emerges within complex ensembles of human and non-human actors. ANT has a significant history in accounting research for examining change, particularly in healthcare. Studies such as Chua

(1995) used ANT to show how accounting inscriptions (like cost data) can connect diverse interests and build networks among different hospital actors. Leotta and Ruggeri (2017), examining performance measurement system innovations in Italian hospitals, demonstrated that such innovations are not ready-made packages but are processes of translation where various actors - human (e.g., managers, physicians) and non-human (e.g., past and present PMSs, incentive mechanisms) - are enrolled into a network.

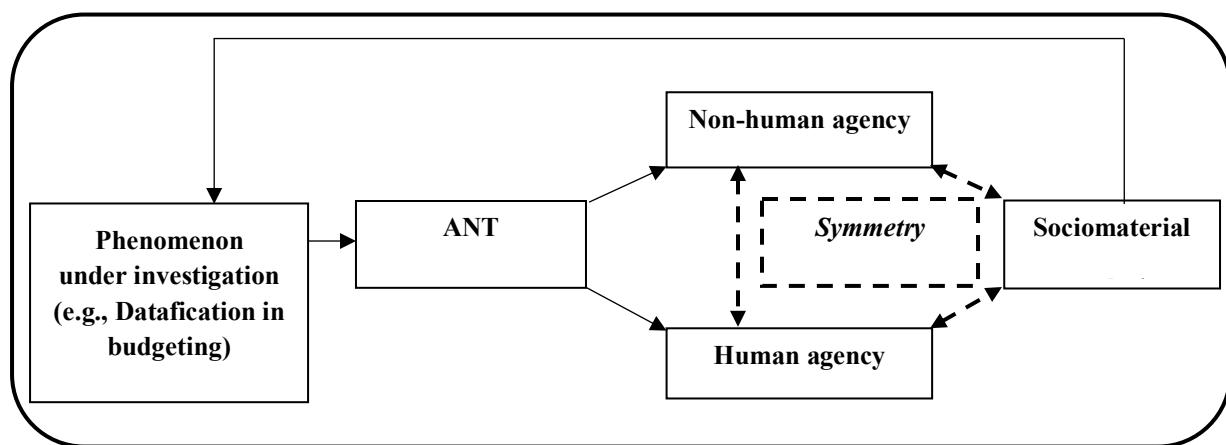
ANT offers conceptual tools for tracing network formation and change. The principle of symmetry, fundamental to ANT (Latour, 2005), proposes analytical equivalence between human and non-human actors (or actants) regarding their capacity to influence organisational reality. This means entities - technological artefacts, policies, data, human actors, and other material elements - can all act and shape events within a network. This conceptualisation results in what Latour (2005) refers to as the 'sociology of association,' which transcends traditional 'sociology of the social' explanations to investigate the ongoing formation and reformation of networks through dynamic interactions (translations) among actors.

Together, sociomateriality and ANT enable us to trace how budgeting practices are constituted through the entanglement of human actions and material elements, while following the processes of translation and network formation. This integrated approach allows us to trace networks (or 'work-nets') as they form and reform, serving as catalysts for organisational change. This aligns with Lowe's (2001) view of ANT as a practical research strategy that enables examination of the heterogeneous list of human and non-human actors that constitute a network, allowing phenomena to be studied in the making before they become a stabilised black box.

A recent study by Adhikari *et al.* (2023) shows how digital technologies act not only as instrumental tools but also as constitutive elements in organisational transformation processes within resource-constrained settings. In the Thai public healthcare system, work-nets are characterised by the interaction of various actors - healthcare professionals, administrators, community members, digital platforms, funding formulas, and analysis infrastructure - that transform traditional budgeting practices into data-driven processes.

The proposed analytical framework therefore leverages ANT's relational ontology and process-tracing tools within a broader sociomaterial understanding (de Moura and Bispo, 2020) as illustrated in Figure 3-1. This allows the analysis of how human actors (healthcare professionals, administrators, patients) and non-human actors (datafication algorithms, Apps, infrastructures, policies) together shape and alter organisational practices like budgeting through their interactions.

**Figure 3-1** Analytical framework with ANT as the lens



The analytical framework utilises a reflexive methodology that recognises the growing complexity of technological implementation within organisational settings. This integrated approach allows us to trace the network dynamics and understand the emergent, often unpredictable, outcomes of technological implementation. This approach corresponds with the

current academic focus on challenging conventional causal assumptions and examining the impact of existing networks on the results of technological innovations (Contractor *et al.*, 2011). This theoretical positioning aligns with the structuration perspective (Orlikowski, 1992, 2000), which asserts the bidirectional interactions between technology and social structures (illustrated by two-way arrows in the figure), indicating how technology influences and is influenced by these structures. The proposed framework facilitates an in-depth examination of how datafication initiatives reshape public healthcare budgeting practices, particularly acknowledging the interplay between central mandates and local adaptations in Thailand.

### ***3.2.2 The transformation of public healthcare budgeting through datafication***

Public sector budgeting allocates resources within revenue constraints (Pendlebury *et al.*, 1992). Its role has expanded significantly beyond mere financial control to include political negotiation, economic management, organisational strategy, managerial responsibility, and external accountability (Sicilia and Steccolini, 2017). This multifaceted nature positions budgeting at the nexus of various disciplines (e.g., accounting, public administration, economics, political science), often involving competing rationalities, professional identities, and cultures (e.g., politicians, managers, accountants) that can struggle to interact (Anessi-Pessina *et al.*, 2016).

The rise of New Public Management (NPM) promoted management accounting techniques from the private sector to enhance public service efficiency and effectiveness (Broadbent and Guthrie, 2008; Hood, 1991; Prowle, 2021). In healthcare, where the focus is on improving service delivery rather than profit generation (Macinati and Anessi-Pessina, 2014), these reforms created significant tensions. Healthcare budgeting has been a site of tension, particularly when financial imperatives are perceived to conflict with core professional values like patient care and equitable access (Broadbent *et al.*, 2001). Healthcare-specific literature

further illustrates how these reforms have reshaped accountability relationships and management practices within the sector (Chua, 1995; Jones, 1999; Leotta and Ruggeri, 2017). Funder-provider relationships significantly influence accountability (Cordery *et al.*, 2010). Persistent fiscal pressures, demands from supra-national institutions, and economic crises have intensified the need for robust, yet adaptable, budgeting systems. These financial constraints are substantial; for example, Thailand's government health expenditure increased from THB 84.5 billion (US\$2.6 billion) in 2001 to THB 247.7 billion (US\$7.6 billion) by 2008 (Center for Global Development, 2019). This continued, with expenditure reaching 5.36 percent of GDP (approximately US\$26.57 billion) in 2022 due to pandemic pressures (Macrotrends, 2025).

Public sector budgeting faces inherent difficulties, many of which are amplified within the healthcare sector. Its multifaceted nature, drawing together different actors and logics - clinicians, managers, and policymakers - can create conflict. Furthermore, the field itself has often been under-theorised within specific disciplines or relegated to the interstices between them, with its complexity and interconnectedness often downplayed (Anessi-Pessina *et al.*, 2016). A critical challenge lies in balancing traditional imperatives for fiscal control against increasing needs for flexibility to manage uncertainty and complex demands (Sicilia and Steccolini, 2017).

The landscape of public sector management is being transformed, by digital data–datafication (Mayer-Schönberger and Cukier, 2013). This trend, accelerated by COVID-19, involves leveraging digital technologies to collect, process, and analyse vast amounts of information, fundamentally altering organisational routines and decision-making processes (Argento *et al.*, 2025). Datafication moves beyond simple digitisation towards reshaping how public services are managed and resources are allocated (Mergel *et al.*, 2019).

Datafication promises new ways to inform resource allocation, enhance monitoring, and navigate the tension between control and flexibility (Barbera *et al.*, 2017). By introducing new data sources and analytical tools, datafication challenges traditional, incrementalist, budgeting methods (Anessi-Pessina *et al.*, 2020) and raises questions about its impact on professional judgment (Kastrup *et al.*, 2024). These issues echo long-standing tensions within healthcare management. Research from the late 1990s on the UK's NHS highlighted a fundamental conflict between managerialist financial controls and professional culture of clinicians, who viewed such mechanisms as bureaucratic intrusions secondary to their primary mission of patient care (Jones, 1999). The actual processes and implications of this transformation, particularly how digital tools become embedded in and reshape established institutional practices, remain empirically underexplored (Argento *et al.*, 2025), with research recently conflating datafication with broader digitalisation or digital transformation initiatives (Begkos *et al.*, 2024). Also, current discussions increasingly move beyond conventional NPM frameworks to address these newer challenges (Steccolini, 2019).

### **3.3 RESEARCH CONTEXT AND DATAFICATION INITIATIVE**

Thailand's public healthcare sector, despite achieving universal coverage since 2002 (National Health Security Office, 2002), faces persistent challenges including resource allocation across diverse geographical needs, efficient service delivery, increasing budget constraints, and complex institutional coordination (WHO, 2015). These issues, particularly inefficiencies in coordination and data management, were exacerbated by the COVID-19 pandemic. The pandemic exposed critical limitations in operational frameworks for managing treatment protocols, epidemiological surveillance, quarantine management, and resource deployment (Regional Health Provider Office 12, 2020). This crisis acted as a powerful catalyst, intensifying the need for solutions that could bridge the gap between centralised policy

objectives and the complex realities of local healthcare delivery, especially concerning timely and equitable budget allocation.

The Thai healthcare system delivers comprehensive services at no cost to patients, including preventive care, therapeutic interventions, and community health services at the primary level (Hfocus, 2015). It operates through a hierarchically integrated structure (see Appendix 1 Figure 3-3). Key institutional actors include the Ministry of Public Health, responsible for service delivery architecture, and the National Health Security Office (NHSO), which oversees strategic resource allocation. This dual governance framework emerged partly from reforms following the 1997-98 East Asian financial crisis, which mandated greater financial governance and accountability (Keerasuntonpong *et al.*, 2019). The structure involves central administration, 12 Regional Health Provider Offices, and 77 Provincial Public Health Offices coordinating community services. Prior to digitalisation, data management relied on manual, paper-based systems, particularly at the community level involving general practitioners and Village Health Volunteers (see Appendix 1 - Figure 3-4).

The legislative foundation began with the National Health Security Act (2002), which established the NHSO and initiated patient-centric funding models based on quantifiable service metrics, fundamentally altering healthcare resource allocation (National Health Security Office, 2002). Subsequent policies embedded datafication more deeply. The Ministry of Public Health's eHealth Strategy (2017) and the 20-Year National Strategic Plan (2017) signalled a paradigm shift, emphasising big data integration and digital transformation across healthcare management (Ministry of Public Health, 2017; Thai Government, 2017). The Digital Government Act (2019) further mandated public sector modernisation (Thai Government, 2019).

The COVID-19 crisis served as the critical inflection point. The pandemic's disruption exposed significant shortcomings in Thailand's resource allocation and data management systems. In response, the Ministry implemented a strategic reorientation towards data-driven budget planning. This involved establishing direct linkages between resource allocation and measurable patient metrics, mandating the connection of healthcare facilities to a national database. Further national plans, including the Revised National Reform Plan (2021) and the NHSO Digital Master Plan (2023-2027) and Action Plan (2024), systematically incorporated pandemic lessons, emphasising resource optimisation, real-time reporting, enhanced data exchange, and management through advanced analytics (National Health Security Office, 2023, 2024a; Thai Government, 2021).

**Table 3-1** A chronography of policies associated with the digital strategy

| Year | Document  | Authored by                     |
|------|---|---------------------------------|
| 2002 | National Health Security Act                    | National Health Security Office |
| 2017 | The 20-Year National Strategic Plan (2017-2036) | Thai Government                 |
| 2017 | eHealth Strategy                                | Ministry of Public Health       |
| 2019 | Digital Government Act                          | Thai Government                 |
| 2021 | Revised National Reform Plan (2021)             | Thai Government                 |
| 2023 | NHSO Digital Master Plan (2023–2027)            | National Health Security Office |
| 2024 | NHSO Action Plan (2023-2027)                    | National Health Security Office |

This policy evolution (summarised in Table 3-1) reflects an understanding of healthcare digitalisation's socio-technical dimensions. A persistent tension exists between centrally formulated policies and localised implementation. This tension is particularly acute in emerging economies like Thailand, where infrastructural limitations and institutional constraints impede comprehensive digitalisation. The process involves complex negotiations as policies are translated, transformed, adopted, or resisted at the micro-level.

## 3.4 RESEARCH METHODS

### 3.4.1 Ethnographic research design and site selection

Our ethnographic methodology analyses micro-level sociomaterial entanglements and actor-network formations that collectively shape organisational transformation via datafication. Ethnography's ability to reveal interactions between technological systems and institutional practices aligns with discussions regarding quality and rigor in qualitative accounting research (Steccolini, 2023; Vollmer, 2023). Particular attention was paid to ensuring consistency between research questions, theoretical framing, and analysis, while building confidence through triangulation of multiple data sources and maintaining transparency via a reflexive field diary (Creswell and Miller, 2000).

Following Latour's (2005) 'oligopticon perspective', we used micro-level details to understand macro-level transformations. This approach differs from Foucault's panoptic conceptualisation by enabling thorough analysis of sociomaterial entanglements in everyday organisational practices. Through ANT's symmetrical analytical perspective, we explored how networks of human actors (healthcare professionals, administrators, patients) and non-human actors (datafication algorithms, Apps, infrastructures) collectively reshape budgeting practices. Moreover, ethnographic approaches are used to a lesser extent in accounting research, making up about one percent of published studies (Kalyta and Malsch, 2018). However, they provide distinct analytical benefits for investigating organisational transformation processes, especially in marginalised or emerging contexts (Bamber and Tekathen, 2023). This methodological choice enables a thorough examination of the sociomaterial dimensions of accounting practice transformation, allowing for a systematic analysis of the impact of technological innovations on institutional practices and organisational routines.

A District Health Offices in Southern Thailand, was selected as the research site due to its established commitment to digital transformation initiatives. The organisation's adoption and ongoing refinement of datafication practices, prompted by COVID-19 response needs and later advancing into more complex applications, offered rich data for analysing the transformation of budgeting practices through digital innovation. The organisation functions as a local health management unit within Thailand's decentralised healthcare system, coordinating with community networks to provide comprehensive public health services. The service portfolio includes emergency care, dental services, traditional Thai therapeutic interventions, paediatric healthcare, and community-based outpatient services. Situated under the Provincial Public Health Office and Regional Health Provider Office, the organisation exhibits an organisational structure (Appendix 1 – Figure 3-5) that enables analysis of multi-level institutional dynamics.

The selection was strengthened by the researcher's embedded position within the local academic community, serving as a university lecturer with socially established networks among healthcare authorities. This position and formal access agreements with key organisational stakeholders facilitated thorough access to organisational processes and participant experiences (Hammersley and Atkinson, 2019; O'Reilly, 2012).

The organisation includes five Primary Care Units, staffed by multidisciplinary healthcare professionals (i.e., doctors, nurses, and other medical professionals), and sixteen Sub-district Health Promoting Hospitals. The district serves over 91,211 residents and employs 131 healthcare professionals, including 16 physicians, alongside a network of 1,391 village health volunteers (Department of Health Service Support, 2024). The district demonstrates excellence, with one hospital receiving an 'Outstanding' rating from Thailand's Ministry of Health and ranking second among over 9,000 national healthcare facilities in 2024.

### ***3.4.2 Data collection process and methods***

Our ethnographic fieldwork spanned six months from August 2023 to January 2024. The first author is a native resident of the district. Their prior experience in the region from 2020 to 2022 offered contextual insight into the development of datafication methodologies during the COVID-19 pandemic. This enabled observation of the transition from traditional manual reporting systems in early 2020, through initial data management efforts for pandemic control, to structured adoption of datafication in budgeting processes during 2021.

The formal research phase included embedded fieldwork within the case organisation, as outlined in Table 3-2. This methodological approach enabled systematic documentation of the transformative effects of datafication on budgeting practices in the healthcare system. The methodological framework employed multiple ethnographic techniques, drawing on Latour's (1987, p. 219) concept of the accumulation cycle: "the first time we encounter an event, we are unaware of it; we start knowing it at least the second time, when it becomes familiar to us." The prolonged fieldwork period improved findings via data verification, concept refinement, and triangulation (Creswell and Miller, 2000).

**Table 3-2** Details of formal data collection

| <b>Method</b>       | <b>Description</b>   | <b>Volume</b> |
|---------------------|--|---------------|
| In-depth Interviews | Executives (5), Auditors (3), District Managers (5), Accountants (3), IT Officers (4), Doctors and Dentists (5), General Practitioners and Nurses (10), Trainees (5), Village Health Volunteers (10) | 50 interviews |
| Focus Groups        | Sessions with Local Government Officials (1), General Practitioners (1), and Patients (4)  | 6 sessions    |

| Method                  | Description   | Volume   |
|-------------------------|---|----------|
| Participant Observation | District Health Office activities, Community hospitals operations, and Local community engagement | 80 hours |
| Meeting Observation     | Executive meetings on datafication and budgeting practices at District and Community hospitals    | 87 hours |

To ensure the representativeness of these interview participants, a stratified purposive recruitment strategy was combined with snowball sampling (Saunders *et al.*, 2019). This approach allowed access to a diverse range of actors - from executive directors to village volunteers - mitigating selection bias by capturing voices beyond just those recommended by management (O'Reilly, 2012).

Documentary evidence (including central-level policy and budget) clarified the sociomaterial relationships within the actor-network. We analysed organisational digital platforms, official policy documents, meeting minutes, internal operational records, and public communications. Participants supplied additional materials that enhanced our comprehension of the organisational context. Historical accounts from healthcare practitioners and community members offered insights into the evolution of data management practices, especially the shift from manual to digital systems during the pandemic. The fieldwork period enabled thorough examination of sociomaterial connections in budgeting practices.

### **3.4.3 Data analysis process**

Our iterative analysis proceeded concurrently with field data collection throughout the six-month fieldwork. This enabled a dialectical relationship between empirical observation and theoretical development, facilitating nuanced analytical insights that informed subsequent investigative strategies. A systematically maintained digital field diary transcended conventional data repository functions to serve as a critical analytical instrument (see Appendix

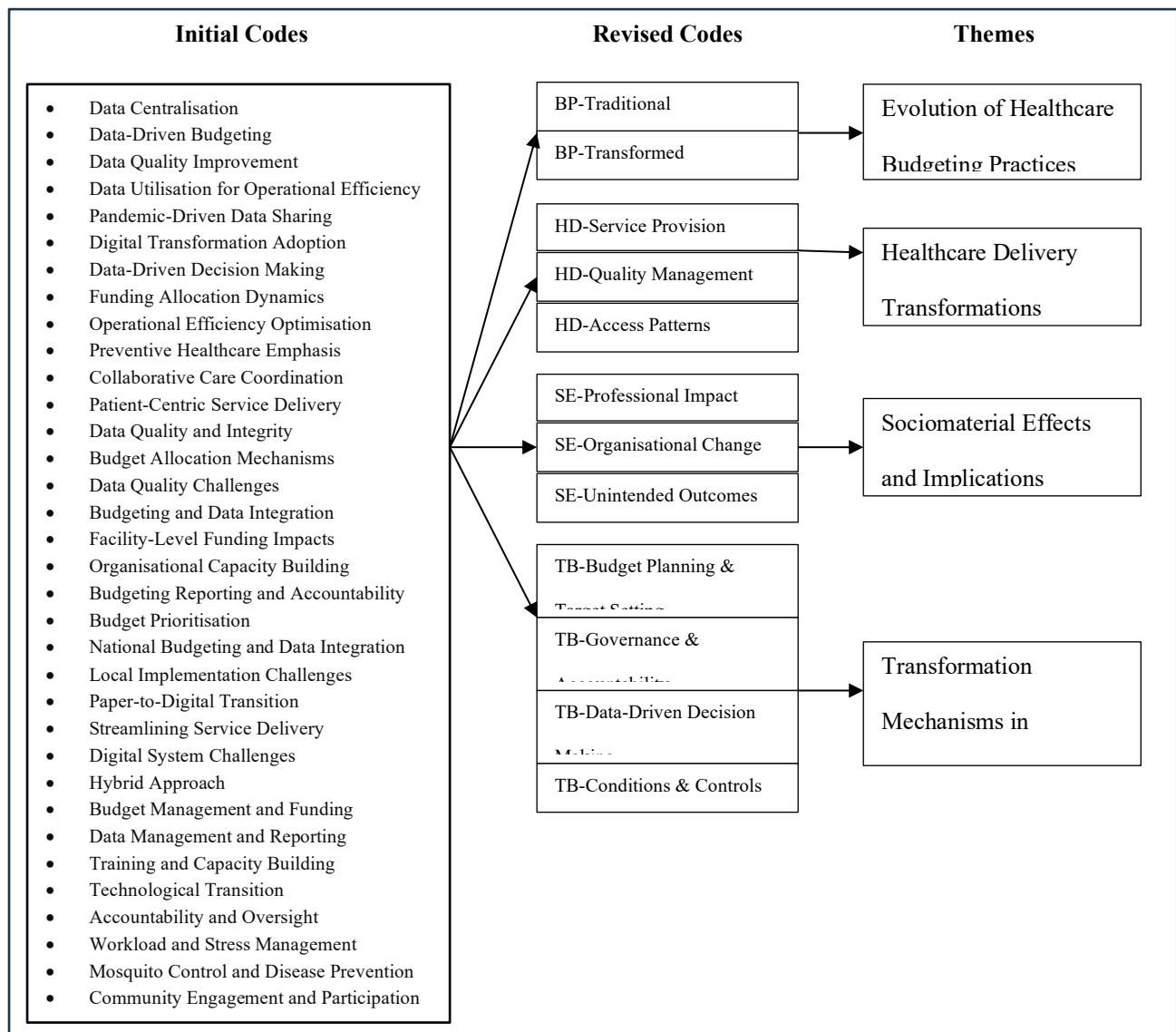
1 - Figure 3-6). This tool progressed from primary observational documentation to a platform for critical analysis that enabled rigorous examination of the first author's dual positionality as both researcher and participant.

Preliminary analytical insights emerged through daily reflexive practice and collaborative discourse among team members. These initial analyses iteratively shaped subsequent data collection, with evolving theoretical constructs informing both observational focus and participant selection. This aligns with Brewer's (2000) emphasis on analytical reflexivity over descriptive documentation, enabling a deeper understanding of the sociomaterial dynamics in healthcare digitalisation.

We implemented coding cycles using MAXQDA 24 software, following the framework described by Miles et al.'s (2020) for qualitative data analysis. Given the linguistic complexity inherent in cross-cultural research, we implemented stringent transcription and translation protocols for data collected in the local Thai language, ensuring preservation of nuanced meanings while maintaining analytical precision. Our analytical process encompassed three stages that progressively refined our theoretical understanding (Figure 2).

The initial coding cycle employed In-Vivo techniques (Miles *et al.*, 2020) to preserve participants' authentic linguistic expressions, crucial given the cultural and institutional nuances in Thai healthcare organisations. This methodological choice allowed us to capture the interplay between technological affordances and organisational practices while maintaining fidelity to participants lived experiences. The resulting initial coding framework identified fundamental sociomaterial entanglements and supported theoretical sensitivity to emerging patterns.

**Figure 3-2** Summary of initial and revised codes and themes



The second stage encompassed the development of Revised Codes, representing theoretical elaboration of our initial findings. Using MAXQDA 24's capabilities, we systematically processed and coded our dataset. The software's AI-assisted coding functionality helped minimise researcher bias by indicating codes derived from textual patterns; however, we maintained interpretive authority over final coding decisions (MAXQDA, 2025). This yielded four primary categories: Budgeting Practices (BP), examining the coexistence of traditional and transformed methodologies; Healthcare Delivery (HD), investigating service provision,

quality management, and access patterns; Sociomaterial Effects (SE), analysing professional impact, organisational change, and unintended outcomes; and Transformation of Budgeting (TB), exploring the interplay between technological implementation and institutional adaptation.

The third stage consolidated our analysis into four fundamental themes: (1) Evolution of Healthcare Budgeting Practices, examining the transition from traditional to data-driven methodologies; (2) Healthcare Delivery Transformations, analysing the reconfiguration of service provision patterns; (3) Sociomaterial Effects and Implications, investigating the entanglements between technological systems and organisational practices; and (4) Transformation Mechanisms in Budgeting, exploring the processes through which digital innovations reshape institutional arrangements.

## 3.5 FINDINGS

### *3.5.1 Evolution of healthcare budgeting practices*

The empirical evidence demonstrates multifaceted patterns of sociomaterial entanglement as healthcare organisations navigate between traditional documentation requirements and emerging digital platforms. As evidenced through extensive ethnographic observations and participant accounts, the implementation of national digital initiatives, from the foundational eHealth Strategy (2017) through the Digital Government Act (2019) to the recent NHSO Digital Master Plan (2023), catalyses sophisticated hybridisation patterns where manual and digital practices become constitutively intertwined rather than mutually exclusive. This transformation exemplifies how digitalisation policies are translated and enacted through complex interactions between human actors (healthcare administrators, accountants) and non-human elements (digital platforms, documentation systems), revealing the nuanced ways in

which technological implementation reshapes institutional practices while simultaneously being shaped by existing organisational structures and professional norms.

The implementation of digital initiatives has catalysed the emergence of hybrid systems that reflect both institutional persistence and technological innovation. This hybridisation manifests through interactions between established accountability structures and emerging digital capabilities. Auditor 1 described the persistence of centralised oversight:

“The district office did the accounting. Usually, one or two people at the district manage the accounts.”

This maintenance of centralised accounting functions, despite broader digital transformation initiatives, demonstrates how organisational hierarchies continue to shape the implementation of technological change. The resulting hybrid system generates patterns of documentation that span both digital and physical domains, as Manager 4 explained:

“...paperwork is still necessary for my job. Everything needs to be signed by the supervisor. Normally, he signs online after I send him a Line message [Digital documentation]. But I must submit documentation before I can submit an annual summary of the work. Although we preserve digital files for future use, it is kept in a book.”

This account reveals the entanglement between digital and traditional practices, where electronic communications supplement rather than replace physical documentation requirements. The preservation of paper records alongside digital systems reflects both regulatory imperatives and institutional inertia, demonstrating how organisations navigate multiple accountability demands within resource-constrained environments.

While maintaining traditional accountability elements like physical documentation, organisations simultaneously pursue new capabilities through digital integration. The pressures to modernise, improve precision, and overcome systemic inefficiencies, particularly evident

during the pandemic response and driven by national policies like the Digital Government Act (2019), have spurred significant evolution in financial roles. These roles now increasingly bridge traditional accounting functions and advanced data management responsibilities. However, this transition is not without friction. Accountant 2 described the challenges within the finance function itself:

“I work in finance [where] I handle financial software and oversee budgeting.... Even in finance, where precision is key, there’s still too much resistance to change... Unfortunately, the system is outdated... In the public sector, we’re trapped in the past, and older employees don’t want to develop new skills.”

This shift reflects a fundamental transformation in resource allocation methodologies, demanding hybrid competencies blending accounting expertise with digital literacy. Furthermore, the integration creates a complex entanglement between the demands of technological systems and day-to-day professional expertise and practice. This socio-technical entanglement highlights the complexities of modernising public sector operations, requiring ongoing negotiation between technological capabilities and the realities of professional practice in healthcare management.

### ***3.5.2 Healthcare delivery transformations***

The integration of datafication initiatives has fundamentally reconfigured healthcare delivery through three interconnected dimensions: service provision modalities, quality management frameworks, and access patterns. This transformation reveals how digital innovations enhance operational capabilities while generating new patterns of healthcare delivery.

#### ***Evolution of service provision modalities***

The implementation of digital platforms has catalysed significant improvements in service delivery efficiency through enhanced communication channels and systematic data management. Healthcare facilities have successfully adopted digital platforms, particularly

LINE messaging applications, as primary communication channels with patients. As IT Officer 3 explained:

“We use LINE Official Account to manage our notifications and communicate with the public. About two months [to get comfortable with the system], patients need our assistance with appointment scheduling.”

This technological adoption demonstrates the emergence of more efficient provider-patient interaction modalities mediated through digital interfaces. The transformation extends to community health volunteer roles, where frontline workers leverage digital systems to provide more comprehensive care. Volunteer 2 described these enhanced capabilities:

“It involves a wide range of responsibilities. We take care of pregnant women by conducting home visits and providing prenatal care. We also inspect for dengue mosquitoes in their homes. Additionally, we care for bedridden patients and educate the community about herbal medicines, explaining their benefits and how to use them.”

The digital transformation has enabled more systematic and timely responses to healthcare needs, particularly in disease surveillance and prevention. Volunteer 2 elaborated on these improved response capabilities:

“We also must visit the homes of dengue fever patients within three hours of being notified by the hospital. It’s one of our most urgent tasks... the mosquito larvae survey report must be submitted on the 20th of each month through the Smart ASM [Application]. It’s a key part of our job to help control mosquito-borne diseases like dengue fever in the community.”

However, this enhanced service delivery capacity creates new challenges in balancing administrative requirements with direct patient care. Manager 3 articulated this emerging tension:

“It seems that about 70-80% of the fieldwork doesn’t directly benefit patients. It feels like patient time is decreasing... Yes, there’s less time, and some patients need a lot... because when there’s a problem, they come to me.”

This observation highlights the need to carefully manage the integration of digital systems to ensure they enhance rather than impede direct patient care, transitioning our analysis to examining how organisations have adapted their quality management frameworks to optimise these new capabilities.

### ***Quality management advancements***

The integration of digital systems has catalysed significant transformations in healthcare quality management processes, demonstrating the constitutive entanglement between technological capabilities and organisational practices. Focus Group 6 discussions revealed how digital platforms enable enhanced patient outcomes through sophisticated monitoring and engagement mechanisms:

“P2: We saw a significant improvement in patients’ understanding of their condition [High blood pressure]. They started making better food choices and became more consistent with their medication and exercise routines.

P3: The LINE group [Mobile Application] fostered a sense of community among patients. They supported and motivated each other, which was something we haven’t seen before.

P1: The program also helped us as practitioners. It gave us a new way to engage with patients and made our interventions more effective.”

This transformation manifests through three interconnected dimensions. First, patient monitoring has evolved toward more structured methodologies, evidenced by increased home visits and systematic documentation. Volunteer 2 articulated this enhanced operational capacity:

“The number of home visits has increased from five to eight. This follows the government’s policy to track newborn development and provide education on infant care. Mothers must also complete the required vaccinations for their infants. We work with health officers on these visits, and we keep records and take photos of our work.”

This systematic enhancement in monitoring capabilities demonstrates how datafication enables more comprehensive and evidence-based healthcare delivery, particularly in preventive care and maternal health services.

Second, healthcare providers have developed the quality management practices that optimise resource utilisation within institutional constraints. GP 8 explained this adaptive capability:

“In community healthcare, we face a lot of constraints. Our working hours are set, but sometimes there are emergencies outside of office hours. We do our best to be there for the villagers, even though the system doesn’t offer much flexibility. There’s a lot of pressure to keep up with records and administrative work, too, which can be overwhelming.”

These adaptive practices reflect the emergence of hybrid professional competencies that bridge traditional healthcare delivery with digital innovation requirements.

Third, institutional learning mechanisms have evolved to support continuous improvement in service quality. While implementation challenges persist, as noted by Trainee\_03, organisations demonstrate commitment to enhancing digital capabilities:

“Maybe more training in practical applications and hands-on use of the technology. And perhaps a simpler system for entering patient data - it’s not as user-friendly as it could be.”

The cumulative impact of these transformations has resulted in significant enhancements in primary care quality, as evidenced by Executive 4’s observation:

“We’ve come far, though; primary care is now well-monitored, unlike before when private hospitals handled a lot in a big city. But now some primary hospitals rival the private sector... Now we compete, and funding follows patient numbers, which has led to a lot of improvements.”

This reflection demonstrates how performance-based funding mechanisms and enhanced digital monitoring capabilities have fundamentally reshaped competitive dynamics between public and private healthcare providers, establishing new paradigms of healthcare excellence.

### ***Access pattern reconfigurations***

The datafication of healthcare services has also generated the transformations in access patterns, revealing interactions between technological affordances and institutional practices. While digital systems enhance accessibility through improved communication channels, they also introduce new considerations in service delivery. IT Officer 1 articulated these emerging dynamics:

“Patients often find these systems challenging and tiring, particularly with the multiple stages of document submission required.”

Healthcare providers have developed refined communication strategies to address these challenges. GP 8 elaborated on these adaptive approaches:

“We are accessible to the locals, but it can be hard to balance everything. Communication is sometimes a challenge because not everyone fully understands what we do, so we must try to explain things in simple terms. We often end up bridging gaps in communication, which can take time and patience.”

Regional variations in digital adoption reflect broader socio-technical influences. IT Officer 3 described significant success with digital platforms in certain areas, attributing high adoption rates to specific outreach efforts:

“The Line Official Account platform has achieved nearly 100% patient adoption, reaching almost around 900 people through direct community outreach and assisted registration.”

However, Executive 2 observed important regional differences that highlight the role of cultural and institutional factors:

“It can improve patient communication, however most patients in area 12 [Southern Region] are not like those in Bangkok [Capital]. They have no interest in this matter. Leaders in the community and in religion have a greater influence on culture than does the state.”

The transformation has also reshaped service delivery patterns across different facility types.

GP 3 described these evolving dynamics:

“The secondary [district or province] hospital only treats patients for a brief period before letting the doctor do a checkup. But in the local community, it’s a small community with a population of about 1,000-2,000 people, consisting of one or two villages. There is more work to be done in the primary care system.”

These transformations demonstrate how datafication initiatives enhance healthcare accessibility while necessitating careful consideration of local contextual factors and institutional capabilities. The evidence reveals both the transformative potential of digital systems and the importance of adapting implementation strategies to diverse organisational and cultural contexts.

### ***3.5.3 Sociomaterial Effects and Implications***

The implementation of datafication initiatives generates sociomaterial entanglements that manifest through three interconnected dimensions: professional impact, organisational transformation, and unintended consequences. These dimensions illustrate how technological systems and human practices become constitutively entangled within healthcare organisations.

#### ***Professional impact: Skills and work routine changes***

Healthcare professionals face significant challenges in adapting to technological transitions while maintaining service quality. The primary challenge emerges from the generational digital divide, as articulated by GP 3:

“The work environment today is completely different from what was before. While much more technology is available now, our technological knowledge hasn’t kept pace. In the past, we only had to deal with a few basic programs, but now we’re confronted with many new technological systems that we need to learn.”

This generational tension particularly affects clinical personnel, as IT officer 4 elaborated:

“Most of the staff who have problems are those who graduated in public health or nursing, not in computer science. Yes, because they don’t really have much knowledge about computers. I didn’t major in this field either, but I am interested in it, so I studied more and ended up in this field.”

In response to these challenges, healthcare professionals develop sophisticated adaptive strategies through technological bricolage. Doctor 1 demonstrated this adaptation:

“Everything is kept in Excel. I designed the tracking system to avoid errors and manage billing and therapist payments... If a computer issue occurs, I log everything in our health [hospital] database as a backup, which can be accessed from any other computer.”

This technological improvisation reveals how healthcare professionals actively shape the materiality of digital systems to overcome resource constraints, creating hybrid solutions that bridge institutional requirements and operational needs.

The transformation extends beyond technical proficiency to reshape fundamental professional identities and work practices. While some practitioners, like executive 2, embrace the change:

“Big data has made my job easier than it was in the past. I have the speed to finish my work quickly. For instance, I used to spend two to three hours preparing for meetings, but today it only takes me ten minutes to use many data applications, like Canva and Google Bard.”

However, this digital efficiency often conflicts with healthcare delivery imperatives. Doctor 2 highlighted this tension:

“The system is often out of touch with the needs on the ground. There’s an enormous amount of paperwork. I also handle patient records, and if I’m away for a meeting or training, everything piles up. This backlog makes it difficult to provide continuous care.”

A unique sociomaterial adaptation emerges through intergenerational knowledge transfer, particularly involving family networks. Volunteer 2 described this phenomenon:

“The majority of volunteers are elderly, and they often struggle with using the app. Some of them need help from their grandchildren to manage it. There are also issues

with internet connectivity in some areas, which makes things more difficult. However, there is training provided for those who need it.”

This adaptation demonstrates how cultural resources are mobilised to bridge technological gaps, creating distinctive patterns of sociomaterial entanglement specific to Thailand’s healthcare context. The integration of grandchildren as informal technical support illustrates the complex interweaving of traditional social structures with modern technological requirements.

This technological bricolage reveals how healthcare professionals actively shape the materiality of digital systems to overcome resource, creating hybrid solutions that bridge institutional requirements and operational needs.

### ***Organisational transformation***

A fundamental challenge in organisational transformation lies in balancing technological progress with institutional stability. The integration of datafication initiatives creates significant tensions between maintaining traditional hierarchical structures and enabling digital innovation. Executive 5 articulated this core tension:

“Due to the efficient staff and the incapacity of the older generation to handle datafication, I attempt to maintain the bureaucratic and hierarchical relationships. The traditional relationships are still vital to our organisation.”

This preservation of hierarchical structures alongside digital innovation reflects a complex negotiation between technological imperatives and institutional stability, where traditional power structures persist even as technological capabilities redistribute operational responsibilities.

The materiality of workspace configurations presents another significant challenge, requiring fundamental reconfiguration of physical and virtual spaces. Auditor 1 described this spatial transformation:

“There aren’t any personal desks as General Auditors need to visit locations for inspections... we store data in our data system... Now, everything is online. The government gives us one computer, and we Zoom in groups... Only the director has a desk.”

This reconfiguration of physical workspace reflects fundamental shifts in institutional practices and professional interactions, signalling profound changes in established organisational paradigms. Executive 2 articulated these institutional transformations:

“Yes, a new culture has developed since big data was introduced. As we can work remotely these days, we rarely go out to lunch and have conversations like we used to. Instead, we communicate digitally via online data.”

The emergence of generational tensions presents a particularly acute challenge in organisational adaptation. Accountant 2 articulated this institutional friction:

“Meanwhile, businesses grow because they adapt. In the public sector, we’re trapped in the past, and older employees don’t want to develop new skills... And the younger workers get frustrated because they’re stuck doing all the work while older employees rest on their past achievements... People are overloaded with tasks that don’t fit their skills, and when you try to suggest improvements, it falls on deaf ears.”

This generational divide manifests concretely in the distribution of technological competencies and workloads. Healthcare practitioners 2 and 9 observed:

“Not everyone is good with technology, especially some of the older volunteers, so that can make things more difficult... For those who use paper, it’s fine since they can’t manage the app.”

These transformations reveal how datafication reshapes organisational structures through complex sociomaterial entanglements, creating new patterns of work distribution and professional relationships while maintaining certain traditional hierarchical elements. The

resulting hybrid organisational forms reflect the ongoing negotiation between technological innovation and institutional persistence within Thailand's healthcare context.

### ***Unintended consequences***

A critical challenge emerging from datafication initiatives is the reinforcement of structural inequalities among healthcare facilities. IT officer 3 from a smaller hospital articulated this systemic disparity:

“With only about a thousand patients, we [Small-size hospital] do not qualify for substantial funding like larger hospitals do. They have the budget to develop more advanced digital systems and a stronger ecosystem, which just widens the gap between us. This difference is driving patients to seek care at those hospitals instead. Honestly, if I had the opportunity, I would want to work there as well to access those resources.”

The intensification of workload pressures presents another significant unintended consequence, particularly affecting frontline healthcare workers. Volunteer 9 described these mounting demands:

“The app is convenient but significantly increases our workload - I would rate it 4.5 out of 5. I sometimes must work during holidays to keep up. I wouldn't want any more improvements because it would just make our tasks even more demanding.”

The impact on patient care quality emerges as a critical concern, as GP 4 explained:

“We must input data while seeing patients, though we shouldn't have to because it takes time away from patient care. The program is challenging to use - I can't even see it properly without my glasses, and if you miss entering any data, it affects your payment accuracy.”

Healthcare professionals face mounting challenges in balancing technological requirements with service delivery. Doctor 3 elaborated on these competing demands:

“It sounds like the digital systems have made some improvements but also added new challenges... adapting to new technology always takes time, and it can increase the workload for some staff who aren't familiar with technology... The workload

sometimes spills over into personal time, especially when trying to manage multiple tasks like dental care with school health data.”

Data quality issues emerge as another significant unintended consequence, revealing new patterns of resistance and adaptation. Volunteer 10 highlighted this challenge:

“We do not have any app-related problems in our village. However, a few members of our sub-district, which is the other village, disagree with this. Moreover, it is not a job that the older generation can perform properly. I sometimes notice that they enter fictional information because they must complete the task to be paid. In contrast to the past when we were not paid, and nothing happened if we failed to complete the task.”

These findings demonstrate how datafication initiatives, while intended to enhance operational efficiency, can inadvertently reinforce existing institutional inequalities and create new organisational challenges through complex sociomaterial entanglements. The transformation reveals the interplay between technological implementation and organisational adaptation within resource-constrained healthcare environments.

#### ***3.5.4 Transformation Mechanisms in Budgeting***

The transformation of budgeting practices through datafication manifests through sociomaterial entanglements across four key dimensions: budget planning evolution, governance reconfigurations, data-driven decision making, and control mechanisms. These dimensions collectively illuminate how digital initiatives reshape institutional arrangements through processes of translation, resistance, and adaptation.

##### ***Budget planning and target setting changes***

The transformation of budgeting practices reveals refined patterns of sociomaterial entanglement that fundamentally reshape institutional planning mechanisms. This transformation manifests first through the emergence of hybrid documentation requirements that bridge traditional and digital systems. Focus group 5 participants articulated this duality:

“P4: The rules and regulations still require accounting and financial paperwork to be completed in physical form. As a result, the rise of big data increases the number of jobs we have since we need to process both digital and traditional documents.

P1: All measurements of performance were required to report to the database in compliance with the paperwork over these two to three years.”

This hybrid documentation system reflects the complex negotiation between institutional persistence and technological innovation, where traditional accountability mechanisms coexist with digital transformation imperatives rather than being simply replaced.

The evolution extends beyond documentation to encompass sophisticated analytical capabilities that reshape resource allocation methodologies. Executive 4 described this epistemological shift:

“Now, we try to better support executives with analysis tools. For instance, instead of only descriptive analysis, we can now predict funding needs, like how much to allocate based on anticipated cases.”

This predictive capability becomes integrated into broader institutional frameworks, as Executive 5 elaborated:

“The big data software requires input from all data activities. The NHSO will then distribute national budgeting based on data from the system.”

The integration of performance metrics with resource allocation creates new institutional pressures and accountability relationships. Focus group 5 participants highlighted the mechanistic linkages between performance metrics and resource distribution:

“P1: I cannot fail the database report because the local office is unable to meet the criteria. Both the budget and the project for the following year would be impacted.

P4: Yes, the way we perform this year has a direct impact on the resources we receive next year. If our performance metrics are strong, we can expect a more favourable budget allocation. But if we fall short, it becomes harder to justify the same level of funding.”

These connections between quantitative metrics and resource distribution generate the patterns of organisational adaptation. Executive 5 observed how this shapes managerial attention and priorities:

“As it affects the budget, I must pay more attention to the data than it was in the past. In the present day, a district office may face insufficient budget allocation if they [Local health practitioners] were not knowledgeable of datafication metrics.”

The transformation also reveals fundamental tensions between centralised performance frameworks and local operational realities. Focus Group 5 explained this disconnect:

“P2: Currently, the majority of the new performance indicators do not correspond to our most recent work. The indicators in the central government system have nothing to do with the local area’s identity.”

This misalignment between centralised metrics and local needs illustrates how datafication initiatives generate complex patterns of institutional adaptation and resistance within resource-constrained healthcare environments. The resulting hybrid practices reflect ongoing negotiations between technological imperatives and local operational realities.

### ***New governance and accountability structures***

The implementation of datafication initiatives catalyses the reconfigurations of governance mechanisms and accountability relationships within Thailand’s healthcare system. A fundamental challenge emerges in maintaining data integrity within these new digital systems.

Executive 2 articulated this ongoing concern:

“I employ the output data in the final phase for the development of policies; thus, I pay serious attention to the data from the local collection. There are consistent errors present in the information. That is, the fake data.”

In response to these data quality concerns, organisations develop verification protocols that bridge digital and manual systems. Accountant 1 explained the strategic value of maintaining parallel verification processes:

“The manual verification process, while time-consuming, is worth maintaining because it reduces data entry errors. Besides, when volunteers submit manual forms, we can verify data accuracy before entering it into the system. It takes extra time but leads to more accurate reporting.”

The transformation establishes new temporal rhythms in organisational oversight, creating more immediate accountability pressures. Manager 2 described these evolving monitoring requirements:

“Actually, it is necessary to submit all the data daily in real time. These are connected to the budget and rules. However, just in case, I give them an extra day or two.”

These new monitoring capabilities reshape institutional power dynamics by enabling more direct oversight:

“They [Local health practitioners] are scared of top leaders because the leaders can utilise datafication supported by the IT team to monitor performance.”

The impact on resource allocation patterns reveals complex and sometimes counterintuitive institutional implications. Executive 1 observed unexpected disparities in funding distribution:

“The district board are upset about the budget allocation from pre-examining activities since the smaller hospital in the smaller sub-district receives more funding than the larger one... Hospital 3 [size-Large, more than 7,000 patients]: The current budget is 60,000 Thai Baht... Hospital 7 [size-Small, less than 3,000 patients]: 200,000 Thai Baht is the current budget.”

These emerging governance structures demonstrate how datafication initiatives generate patterns of institutional reconfiguration, characterised by complex interactions between technological capabilities, organisational practices, and resource allocation mechanisms.

### ***Data-driven decision-making processes***

The implementation of data-driven budgeting practices reveals patterns of institutional adaptation as organisations navigate new technological requirements. The transformation begins with fundamental operational challenges, as Manager 2 articulated:

“The information that is typically supplied to me accomplishes the objectives... My problem, though, is that they [Community hospitals] sometimes are unable to provide me with the data before the deadline. As a result, I must give them a longer deadline, and I must work through midnight each time.”

This temporal friction illustrates how technological implementation reshapes organisational workflows and professional responsibilities, creating new patterns of work intensification and adaptation.

The evolution of analytical frameworks creates new hierarchies of oversight and accountability. Executive 5 described how digital platforms reshape management structures:

“Usually, in the Health Data Centre, I use the system dashboard for planning, especially investing and budgeting. The hospital director and other accountable officials oversee monitoring and must be accountable for the outcomes of reporting and feedback procedures.”

The complexity of these new systems becomes evident in their accounting implications. Auditor 2 elaborated on the detailed integration requirements, referencing both digital versions on her computer and physical documents stored in paper cabinets during the interview:

“The Ministry of Finance uses a standardised 400-account chart of accounts system. The district office manages this accounting system, but the community hospitals only get involved when the data enters the General Ledger. They need to maintain detailed records of funding sources, and this information integrates with the hospital’s overall cost accounting system.”

However, the proliferation of digital systems creates its own challenges. IT Officer 1 highlighted the emerging burden of data management:

“There is too much data to handle, and the programs are overwhelming. The system should be more integrated and streamlined.”

These technological constraints demonstrate how material limitations shape organisational practices and decision-making processes within resource-constrained environments.

### ***Evolution of conditions and controls***

The transformation of budgetary control mechanisms through datafication reveals patterns of institutional adaptation and resistance that extend beyond mere technological implementation. Material and infrastructural constraints fundamentally influence how organisations implement digital controls. IT Officer 3 described how resource limitations necessitate informal adaptation strategies:

“There are times when we need to use our own money to keep things running. Despite these challenges, the overall digital system has been working effectively, and operations are generally smooth.”

These resource constraints intersect with broader infrastructural challenges that affect system reliability. GP 1 articulated how basic utility limitations impact digital operations:

“Electricity shortages are a relatively recent issue. Many of our modern tools are connected to the internet and data. As such, the existing ecology for power is insufficient for all tools. To address this problem, the hospital installed an expensive new solar cell system on the rooftop. However, the electrical providers - both state-owned businesses and public corporations - do not permit the hospital to use it because of legal requirements.”

The transformation generates intensified performance pressures within institutional frameworks. Executive 5 demonstrated this through escalating performance expectations:

“Every hospital has an overall performance indicator, which includes high indicators and awards. As an illustration, suppose the system requests that they pass at 80%. I intend to ask for ninety percent, if not hundred percent.”

These pressures operate within increasingly rigid institutional structures. Executive 2 highlighted the challenge of adapting local practices and performance measures within the centralised system:

“It is more difficult and nearly impossible to change the procedures and indicators when the accounting and reporting originate from the central government through the data system. Since the first day I started working, all my job duties have been reported to

the systems. Yet compared to before, it is harder to meet the KPIs [Key Performance Indicators].”

The implementation of digital controls generates the patterns of resistance across organisational levels. Doctor 2 articulated significant community-level opposition:

“There was much resistance, especially in communities that valued traditional, face-to-face practices... Some felt the system changes were meant to prioritise bureaucracy over real patient care.”

This resistance manifests through generational tensions within organisations, as Accountant 2 revealed:

“Older employees tend to get rewarded for doing less while the younger ones bear the brunt of the workload... Newer employees don’t dare make changes, and we’re all stuck following the same old patterns.”

Organisations develop the adaptation strategies in response to these institutional pressures. Focus Group 5 participants demonstrated the emergence of creative responses to performance requirements:

“P1: I cannot fail the big data report because the local office is unable to meet the criteria. Both the budget and the project for the following year would be impacted.

P4: Yes, this year’s performance will determine next year’s budget.

P2: Without a doubt, we must fulfil all requirements.

P3: For this reason, the system must have the pretend information entered.

P5: For me as well, the made-up data.”

The transformation extends to financial incentive structures that enforce digital adoption, as Volunteer 9 observed:

“The app must be downloaded and used by everyone on their smartphones. You won’t be able to get paid if you don’t utilise the app for work.”

These evolving control mechanisms demonstrate how datafication initiatives generate sophisticated patterns of resistance and adaptation within healthcare organisations. The transformation reflects the complex relationship between technological innovation and organisational practice in resource-constrained environments, where material limitations, institutional pressures, and professional resistance collectively shape the evolution of budgetary control systems.

### **3.6 DISCUSSION**

The transformation of budgeting practices through datafication within Thailand's public healthcare system, as detailed in the above findings, yields both significant advancements and considerable challenges, revealing complex patterns of sociomaterial entanglement. Our key findings show that digital initiatives created hybrid budgeting systems rather than fully replacing older practices; amplified existing resource inequalities between facilities; and led to unintended consequences such as increased administrative complexity and sophisticated workaround strategies, including entering fictional information to meet centrally imposed targets. These findings reveal that datafication is not a neutral process but a complex sociomaterial phenomenon that reshapes budgeting practices through the interplay of technological affordances, institutional pressures, and local adaptations. Our analysis, framed by sociomateriality and ANT, explores these dynamics by first examining the translation and enactment of digitalisation policies, and second, the resultant reshaping of budgeting practices.

The empirical findings underscore that the entanglement of social and material elements fundamentally drives organisational transformation, moving beyond simple technological determinism or social constructivism (Orlikowski and Scott, 2008; Quattrone and Hopper, 2001). This process is not one of simple diffusion but of active 'translation', where centrally mandated policies are reshaped, resisted, and adapted as they travel into local contexts.

Applying ANT's symmetrical perspective (Latour, 2005), we observe how networks comprising human actors (administrators, healthcare professionals, patients) and non-human actors (digital platforms, algorithms, policies, infrastructure) collaboratively reshape practices through ongoing interaction and reciprocal influence. This approach answers Lowe's (2001) call for accounting research to adopt a symmetrical analysis, giving due prominence to the constitutive role of non-human actants in shaping organisational reality, while also aligning with observations that such imposed changes are not passively accepted but are actively resisted or adapted by organisations to protect their core normative values (Broadbent *et al.*, 2001).

This entanglement produces both enabling and constraining effects. While digitalisation enhances service delivery metrics (e.g., increased home visits), it simultaneously generates resistance rooted in its very materiality. Practitioners' express concerns about technology potentially prioritising bureaucratic processes over genuine patient care, a tension evidenced by increased time spent on data entry which detracts from direct patient interaction. This requirement to mediate patient care through digital documentation creates what practitioners perceive as an artificial barrier, transforming care interactions into data collection points. This resonates with Orlikowski's (2007) sociomateriality perspective, demonstrating that implementation involves complex negotiations between technological capabilities and institutional constraints, particularly acute when digital efficiency goals conflict with established professional caregiving values.

The findings also expand on the dynamics of organisational change in healthcare, where the introduction of new control systems often leads to the emergence of hybrid operational models. For example, Jones (1999) found that the imposition of rigid financial structures in the NHS threatened the cooperative, network-style functioning essential for clinical work, resulting in a

system where formal hierarchies coexisted with informal clinical networks. Similarly, our analysis aligns with Leotta and Ruggeri's (2017) demonstration that a new system's implementation is a process of translation that must enrol actors distributed across time and space. The emergence of parallel operational systems in Thai healthcare, where manual and digital practices become intertwined, is a prime example of this. From an ANT perspective, the persistent paper-based approvals are not merely signs of inefficiency but are powerful non-human actants from a previous systems package that must be enrolled into the new network (Leotta and Ruggeri, 2017). Managers confirmed the persistence of paper-based approvals alongside digital workflows, explaining that physical paperwork remains necessary even when digital files are preserved. This finding resonates with the work of Preston *et al.* (1992), who demonstrated that new budgeting systems are not simply implemented but are fabricated through a contested process of local negotiation and adaptation. The resulting hybrid system in our study, much like in the NHS, represents a fragile construction that differs significantly from the top-down blueprint, reflecting a negotiated settlement between central policy and local realities.

Infrastructure limitations, a common feature in emerging economies, generate distinctive sociomaterial practices and accountability challenges. Healthcare professionals actively adapt to these constraints, reshaping technological implementations. For instance, unreliable electricity supply directly impacted the usability of digital tools, necessitating workarounds. More profoundly, material and systemic constraints – such as pressure to meet digital targets despite operational difficulties or inadequate systems – can lead to the inputting of what participants termed fictional information or made-up data. This occurs when the demands of the digital system clash with on-the-ground capabilities, compelling staff to develop creative, albeit problematic, responses to maintain appearances and secure funding. This can be seen as

a form of dissidence in Callon's (1986) terms, where enrolled actors betray the network's goals because their interests were not successfully stabilised during the *interessement* phase. These findings highlight how material constraints in emerging economies necessitate the creation of hybrid, sometimes compromised, solutions that attempt to bridge mandated technological requirements with operational and infrastructural realities.

The datafication of budgeting profoundly reshapes resource allocation and accountability, extending insights from previous studies on post-COVID budgeting transformations (Anessi-Pessina *et al.*, 2020) but also revealing complex challenges specific to this emerging economy context. Crucially, the implementation of digital budgeting systems, intended perhaps to standardise and equalise, can paradoxically produce and even exacerbate institutional disparities. This echoes findings by Broadbent *et al.* (2001), who observed how new financial mechanisms in public healthcare could lead to inequities. This is starkly evident in the differing capacities and subsequent resource attraction between smaller and larger hospitals. As illustrated in Appendix 1 - Figure 3-7, smaller hospitals with basic infrastructure struggle with limited technological capabilities, while Figure 3-8 shows how larger hospitals with advanced digital infrastructure create more sophisticated service delivery networks. An IT officer from a smaller facility articulated how limited patient numbers mean less eligibility for funding, hindering investment in the advanced digital systems available to larger counterparts, creating a widening gap. This disparity reportedly drives patients and staff towards better-resourced facilities. Such challenges assumptions that digitalisation inherently reduces inequality; instead, it reveals how technology can become entangled with existing resource allocation mechanisms to create self-reinforcing cycles of disparity. This resonates with observations where top-down reforms can reinforce existing power dynamics, leading to a prioritisation of hierarchical control over collaborative engagement. The control aspect of accountability, as

described by Cordery *et al.* (2010), appears to manifest here as larger, better-resourced facilities, aligned with central digital mandates, further consolidate their position. The implications of datafication on budgeting practices are thus not merely technical, but deeply embedded in these socio-material dynamics, influencing resource allocation, accountability, and professional roles.

Resource constraints also foster distinctive forms of professional adaptation within budgeting practices. Echoing the concept of a 'hybrid professional ethos' (Kurunmäki, 2004), practitioners actively translate top-down technological requirements into locally workable practices. This includes creating custom tracking systems and supplementing institutional resources personally. Such active translation empirically demonstrates the argument made by Justesen and Mouritsen (2011) that accounting technologies are never merely implemented but are constantly being modified and reshaped as they engage with new networks of actors. This extends van Helden and Uddin's (2016) framework by illustrating how resource scarcity in emerging economies actively shapes the hybridisation of professional roles and practices in response to digitalisation mandates.

The shift towards data-driven accountability also generates unexpected organisational responses. The intense pressure to meet digital metrics, coupled with operational realities and the parallel systems mentioned earlier, leads to sophisticated legitimacy management strategies. This dynamic is reminiscent of the findings from Jones (1999), where clinicians, faced with accounting information they deemed inaccurate or irrelevant, developed ways to distance themselves from it or challenge its validity, while operational control remained grounded in more immediate, non-financial measures. In our study, this manifests in the inputting of fictional information to satisfy system requirements, a form of resistance born from the clash between top-down data demands and on-the-ground realities. Regulatory

requirements necessitated maintaining dual paper and digital records, which increases workload and operational complexity, reflecting Law's (1992) description of dynamic network formation. This persistence of traditional documentation alongside digital systems highlights how organisational practices evolve through ongoing, complex negotiations between established accountability norms and new technological imperatives.

Finally, these dynamics can be understood through the lens of Latour's distinction between matters of fact and matters of concern, a concept highlighted by Justesen and Mouritsen (2011) as a crucial direction for ANT research. The datafication initiative attempts to establish new matters of fact - quantifiable metrics, performance targets, and digital records. However, these often clash with the matters of concern for practitioners: the quality of patient care, professional autonomy, workload manageability. The emergence of workarounds and creative compliance can be seen as a direct consequence of this tension, as practitioners navigate the fragile entanglement between the system's-imposed reality and the things they genuinely care for. The proposed theoretical framework helped us analyse these complex dynamics, offering a nuanced understanding of how public sector organisations in resource-constrained settings navigate digital transformation while striving to maintain essential service delivery commitments.

### 3.7 CONCLUSION

This study investigated the transformation of budgeting practices through datafication in Thailand's public healthcare system. Our findings reveal a complex picture: while digital transformation initiatives yielded significant improvements in terms of operational efficiency, monitoring, and potentially resource allocation through predictive analytics, these advancements were inextricably intertwined with challenging sociomaterial entanglements. Enhanced service delivery and community engagement occurred alongside the emergence of hybrid practices, increased operational tensions, sophisticated user adaptations, and the reinforcement, rather than reduction of institutional disparities. Building on these empirical observations, our study makes the following theoretical contributions. First, we demonstrate how digital initiatives in the emerging economies generate patterns of translation and resistance that transcend simple technological adoption. By showing how practitioners actively fabricate hybrid systems in response to local constraints, our study empirically extends the theoretical arguments of scholars who call for a more nuanced understanding of public sector accounting in emerging economies (e.g., van Helden and Uddin, 2016) and provides a contemporary data-focused case that reinforces classic ANT findings on the contested nature of budget implementation (e.g., Preston *et al.*, 1992; Leotta and Ruggeri, 2017). Second, we illustrate how datafication initiatives, contrary to their intended equalising effects, can reinforce institutional disparities through self-reinforcing cycles where technological capabilities and resource allocation become mutually constitutive. This provides a critical counter-narrative to the often-optimistic discourse on digital transformation (e.g., Mergel *et al.*, 2019) and shows how the introduction of new financial controls can produce unintended two-tier effects, a risk identified in earlier critical healthcare accounting studies (Broadbent *et al.*, 2001; Jones, 1999; Rautiainen *et al.*, 2022). Third, our findings also shed further lights on how cultural values and

professional identities become entangled with digital practices, creating distinctive forms of organisational adaptation specific to Thailand's healthcare context, which provides a rich, culturally specific dimension to the sociomaterial perspective (Adhikari *et al.*, 2023; Orlikowski, 2007) and answers the calls for research to understand how local contextual factors shape accounting and control systems in the context of developing countries (Hopper *et al.*, 2017).

Our empirical findings also highlight several critical challenges accompanying these digital initiatives. The coexistence of traditional and digital systems creates significant operational tensions, demanding parallel documentation systems that increase workload and complexity. This duality can contribute to the community-level resistance, particularly where stakeholders perceive digital systems as prioritising bureaucratic efficiency over patient care quality. For example, one general practitioner expressed frustration at having to input data while simultaneously treating patients, noting that this administrative burden reduces time available for direct care. Furthermore, implementing digital controls reveals important power dynamics that reshape organisational relationships, while smaller healthcare facilities face systematic disadvantages due to resource limitations, creating self-reinforcing cycles of disparity. These challenges are compounded by generational tensions in technological adoption, illustrating how digital transformation interacts with the existing organisational hierarchies and professional relationships.

The findings of our study also have some implications for policy and practice, especially in the context of emerging economies. The empirical evidence indicates that successful digitalisation requires context-sensitive strategies that attend closely to the existing social structures, cultural norms, and material constraints, moving beyond purely technological solutions. More specifically, policymakers should critically assess how digital initiatives might inadvertently

exacerbate resource disparities between the healthcare facilities. Developing targeted interventions to support smaller or less-resourced organisations in building capacity and maintaining competitive service delivery capabilities appears to be another crucial factor for ensuring equitable outcomes.

Despite having important theoretical and practical implications, this study also has some limitations, which provide directions for future research. While our ethnographic approach provided rich, micro-level insights into organisational practices and sociomaterial relationships, its main focus has limited our ability to fully capture the broader institutional dynamics. Future comparative studies could examine how varying institutional arrangements across different emerging economies influence datafication outcomes. Additionally, our analysis reveals a complex pattern of accountability and control that warrant further investigation, particularly on how digital transformation can reshape the management accounting controls and accountability relationships within the broader healthcare settings (e.g., central government level).

Future studies can also apply alternative theoretical frameworks (e.g., institutional logics or institutional theory) to explore how competing professional and technological imperatives shape organisational adaptation. Deeper investigation into the hybrid professional ethos observed in the healthcare settings – exploring how practitioners navigate fused clinical, managerial, and technological roles – represents a particularly promising avenue. This could extend to how hybrid identities influence accountability and management accounting controls. Moreover, as smart governance incorporates more advanced Artificial intelligence (AI), future research should examine how these emerging technologies reshape the public sector budgeting and accountability. By illuminating the complex sociomaterial entanglements involved in the healthcare digitalisation, this study provides a foundation for understanding how public

organisations navigate technological change while maintaining essential service commitments. Building on these insights, future studies can apply more nuanced theoretical frameworks to analyse the digital transformation process in the context of emerging economies, ultimately contributing to the design and implementation of more effective and equitable healthcare delivery systems.

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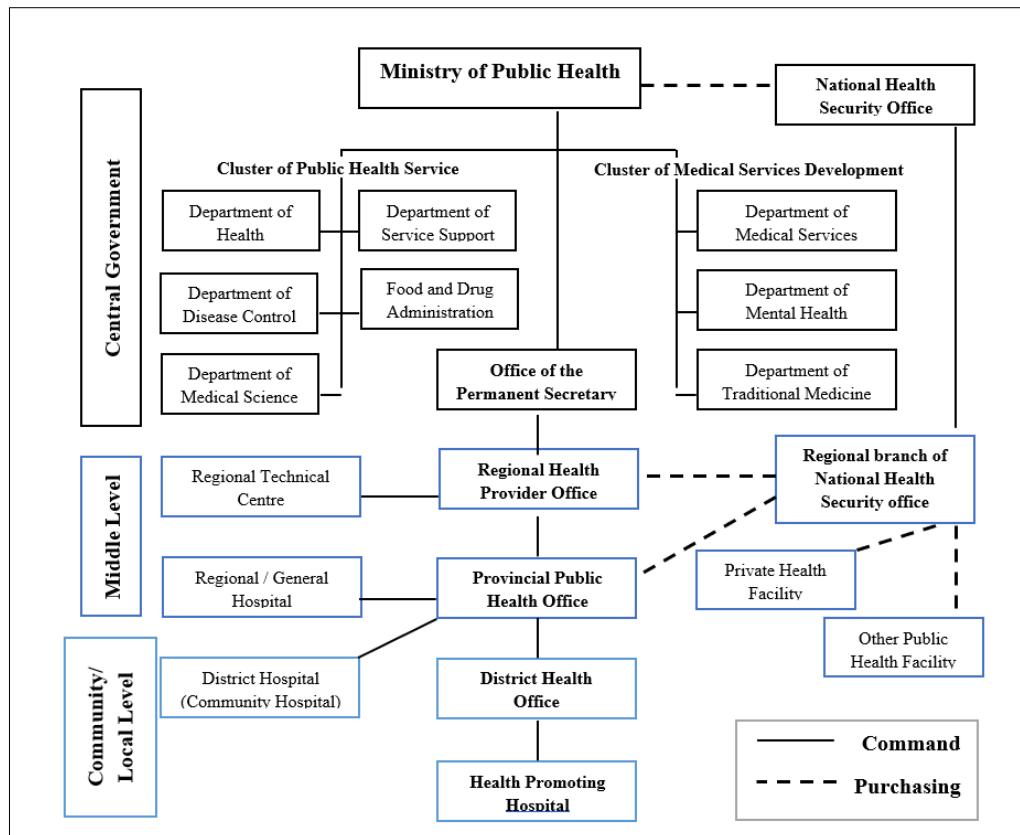
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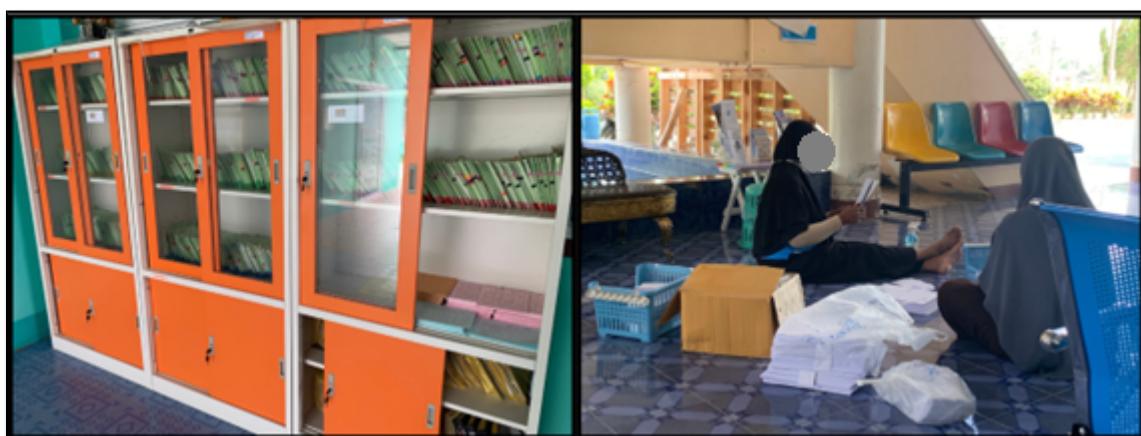
## APPENDIX 1:

**Figure 3-3** Thai national health service: Institutional and governance framework

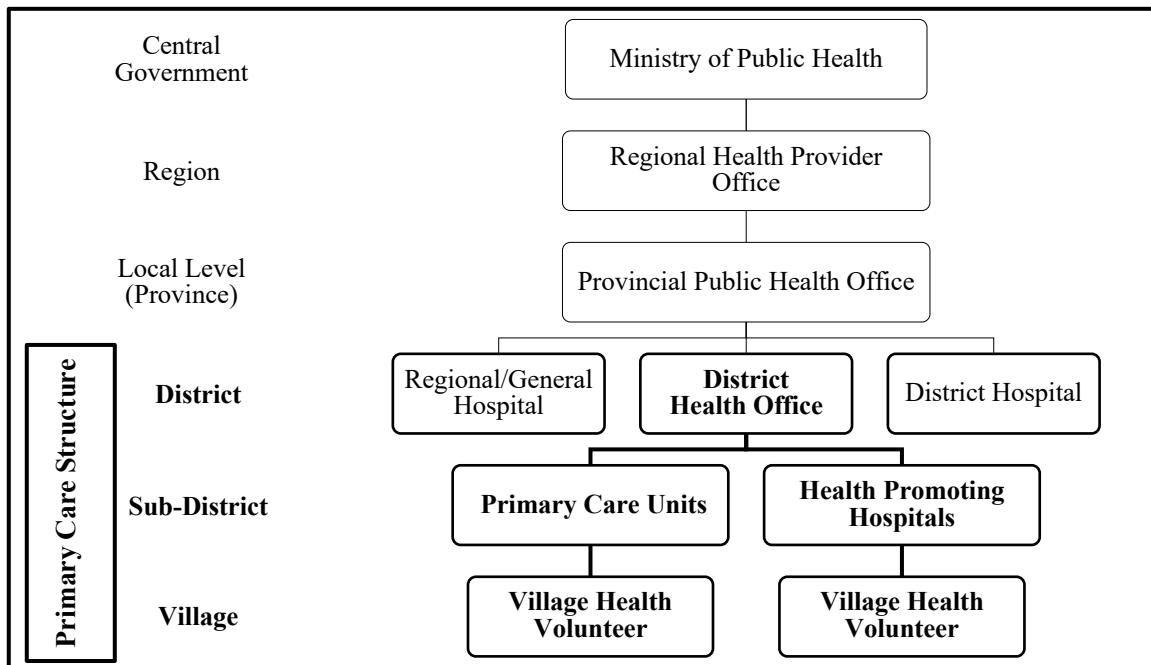


*Source: WHO (2015, p. 23)*

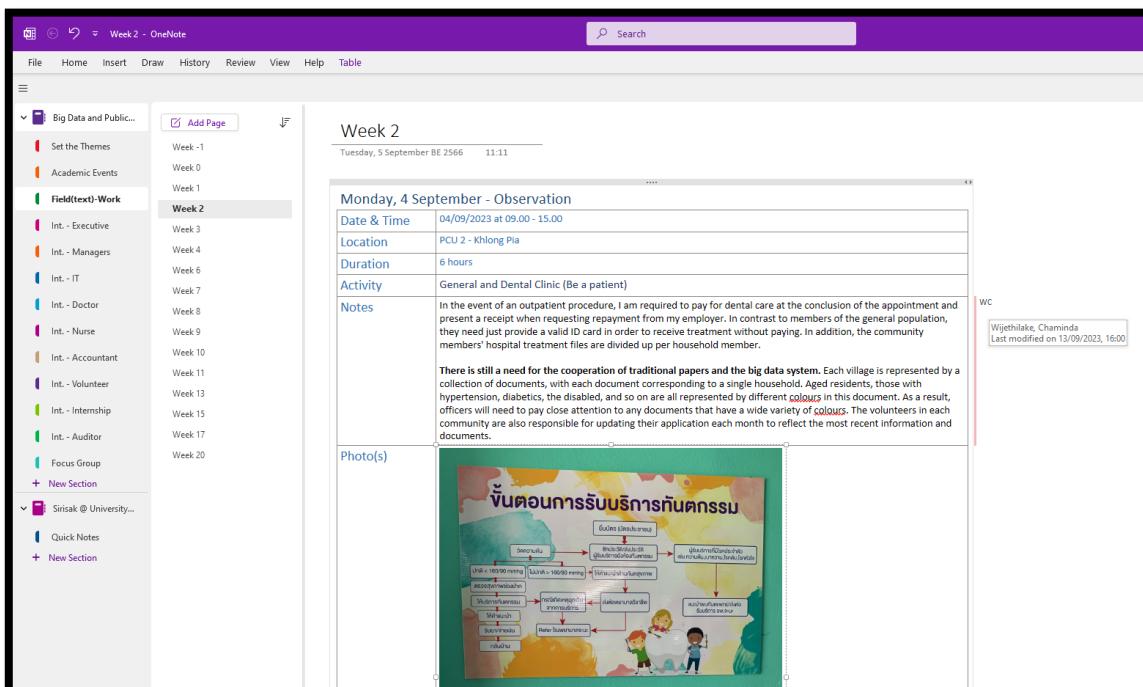
**Figure 3-4** Paper records in a file cabinet at community hospitals



**Figure 3-5** A primary care structure of a district health office



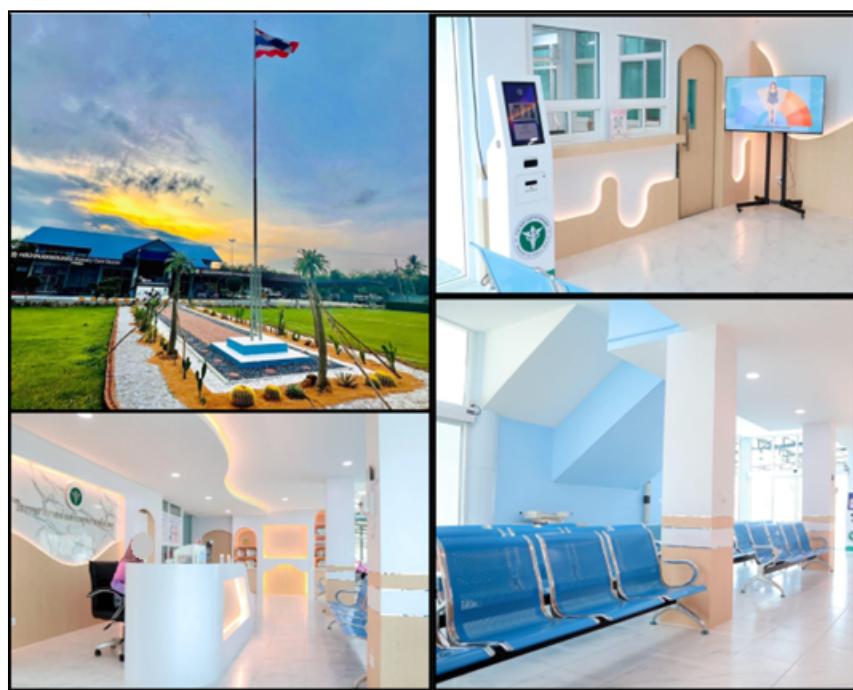
**Figure 3-6** An online shared field diary



**Figure 3-7** The small-sized hospitals (Accountable for fewer than 3,000 patients)



**Figure 3-8** The Large-sized hospital (Accountable for over 7,000 patients)



## APPENDIX 2:

**Table 3-3** Description of the interview

| No. | Code        | Function /Area   | Length (H:M) | No. | Code         | Function /Area   | Length (H:M) |
|-----|-------------|------------------|--------------|-----|--------------|------------------|--------------|
| 1   | Executive 1 | Director         | 0:54         | 26  | GP 7         | Public relations | 0:39         |
| 2   | Executive 2 | Programmer       | 1:30         | 27  | GP 8         | Public relations | 0:32         |
| 3   | Executive 3 | Programmer       | 0:40         | 28  | GP 9         | Epidemiology     | 0:38         |
| 4   | Executive 4 | Director         | 1:09         | 29  | GP 10        | Accounting       | 0:41         |
| 5   | Executive 5 | Director         | 2:00         | 30  | Accountant 1 | Accounting       | 0:43         |
| 6   | Manager 1   | Data Management  | 0:45         | 31  | Accountant 2 | Accounting       | 0:35         |
| 7   | Manager 2   | Public relations | 0:55         | 32  | Accountant 3 | Accounting       | 0:30         |
| 8   | Manager 3   | NCD              | 0:39         | 33  | Volunteer 1  | Village No. 02   | 0:24         |
| 9   | Manager 4   | Accountability   | 0:35         | 34  | Volunteer 2  | Village No. 01   | 0:40         |
| 10  | Manager 5   | Epidemiology     | 0:51         | 35  | Volunteer 3  | Village No. 03   | 0:16         |
| 11  | ITO 1       | IT-Officer       | 1:00         | 36  | Volunteer 4  | Village No. 08   | 0:25         |
| 12  | ITO 2       | IT-Officer       | 0:57         | 37  | Volunteer 5  | Village No. 08   | 0:27         |
| 13  | ITO 3       | IT-Officer       | 1:05         | 38  | Volunteer 6  | Village No. 04   | 0:41         |
| 14  | ITO 4       | IT-Officer       | 0:36         | 39  | Volunteer 7  | Village No. 09   | 0:40         |
| 15  | Doctor 1    | General Clinic   | 0:58         | 40  | Volunteer 8  | Village No. 05   | 0:33         |
| 16  | Doctor 2    | Dental Care      | 0:52         | 41  | Volunteer 9  | Village No. 05   | 0:22         |
| 17  | Doctor 3    | General Clinic   | 0:47         | 42  | Volunteer 10 | Village No. 04   | 0:32         |
| 18  | Doctor 4    | Dental Care      | 0:42         | 43  | Trainee 1    | Internship       | 0:49         |
| 19  | Doctor 5    | General Clinic   | 0:36         | 44  | Trainee 2    | Internship       | 0:25         |
| 20  | GP 1        | Antenatal Care   | 0:50         | 45  | Trainee 3    | Internship       | 0:28         |
| 21  | GP 2        | General Clinic   | 0:43         | 46  | Trainee 4    | Internship       | 0:43         |
| 22  | GP 3        | Public relations | 0:48         | 47  | Trainee 5    | Internship       | 0:28         |
| 23  | GP 4        | General Clinic   | 0:32         | 48  | Auditor 1    | Auditing         | 1:09         |
| 24  | GP 5        | Data Management  | 0:34         | 49  | Auditor 2    | Auditing         | 0:30         |
| 25  | GP 6        | NCD              | 0:39         | 50  | Auditor 3    | Auditing         | 0:30         |

\* GP includes Healthcare Practitioners and Nurses

**Table 3-4** Description of the focus group

| No. | Members | Function / Area | Length (H:M) | No. | Members | Function / Area   | Length (H:M) |
|-----|---------|-----------------|--------------|-----|---------|-------------------|--------------|
| 1   | 5       | Patients        | 0:36         | 4   | 5       | Volunteers        | 0:35         |
| 2   | 3       | Patients        | 0:37         | 5   | 5       | Local Government  | 1:10         |
| 3   | 3       | Patients        | 0:33         | 6   | 3       | Doctor and Nurses | 0:46         |

## CHAPTER FOUR: PAPER TWO

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### **Digitalisation, Co-production and Mediating Accountability: Evidence from Thailand's Primary Healthcare <sup>7</sup>**

#### **ABSTRACT**

While digitalisation is often seen as a solution, an ongoing debate persists about its implementation in the public healthcare setting, especially in the context of emerging economies. The purpose of this study is to explore how digital tools and technologies are implemented in Thailand's Primary Healthcare system to improve the quality of community healthcare, and how implementation challenges are addressed at the local level. This ethnographic study, using actor-network theory, reveals how village (rural) health volunteers, patients, and practitioners navigate tensions between formal technological demands and informal socio-cultural norms, leading to the emergence of multiform accountability. Amid pressures to "do more with less", village health volunteers are seen as the main actors to bridge the gap between technology implementation issues and improving the quality of community healthcare. In other words,

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<sup>7</sup> 1. This research paper was presented at the 17th CIGAR workshop conference in Udine, Italy (A copy of the presentation certificate is provided in Appendix G of the thesis).

2. The research paper was revised into a manuscript, which has been submitted to *Public Administration Review* and is currently under review.

accountability is not simply imposed by technology but is actively co-constructed through the interplay of human and non-human actors.

*Keywords: Digital Co-production, Public Sector Accountability, Public Healthcare, Multiform Accountability, Actor-Network Theory, Emerging Economies*

## 4.1 INTRODUCTION

*“The government wants us to record all data and report our performance in the system [formally], while the community expects us to provide services in an informal way. How can we formally report ‘TikTok’ videos and short clips?”*

—A General Practitioner working in a Southern Thailand Hospital

The above quote from a general practitioner (GP) working in a local hospital in Thailand highlights the fundamental dilemma confronting the healthcare sector in the emerging economy context and issues related to digital shift in the public service (healthcare in this case) delivery.

While digitalisation is often seen as a solution to a range of problems related to public service delivery, creating public value and engaging with citizens, its implementation often comes with some inherent and complex challenges (Agostino *et al.*, 2022b). For example, a recent report of UNESCO (2019) shows that nearly half of the population in the developing countries have poor internet access, while other studies highlight challenges such as high rates of digital illiteracy and the limited access and resources that can prevent communities from benefiting from new technologies (Adhikari *et al.*, 2023). The ongoing debate on the benefits of digitalisation and some inherent and complex challenges it comes with (Agostino *et al.*, 2022b) has been further intensified especially during and after the Covid-19 pandemic in the public

healthcare sector (Argento *et al.*, 2025). These challenges have also exposed the vulnerabilities of public service providers around the world (Ahn and Wickramasinghe, 2021).

The global push towards digitalisation and datafication is rapidly reshaping public sector accountability. Adhikari *et al.* (2023) argue that this digital transformation has fundamentally altered how public sector organisations operate and discharge their accountability relationships. This may be partly because it creates a clash between formal, data-driven reporting/accountability demands and the informal/relational expectations (e.g., socio-cultural and religious norms and values) of the local communities (van Helden and Uddin, 2016). There is also some evidence to suggest that public sector officials in the emerging economies often face some unique challenges, where rapid and often top-down implementation of digital reforms intersects with an intricate interplay of legacy systems, unique socio-cultural norms and significant resource constraints (Arun *et al.*, 2021; Lino *et al.*, 2022). For example, in Thailand, some recent national policies like the '100-days quick-win project' have mandated swift digital health integration in primary care, intensifying the pressures of datafication.

However, imposing standardised digital solutions in such contexts could conflict with deeply embedded community practices, raising the risk of new digital divides and other unaccounted effects of digital transformation (Argento *et al.*, 2025). In addition, the difficulty of governing through complex networks rather than simple hierarchies has long been a central concern in public administration (O'Toole Jr, 1997), and the digital transformation of public services - where conventional top-down strategies often prove inadequate - has only intensified this issue (Nielsen *et al.*, 2024). It can be argued that the conventional accountability mechanisms designed for stable government structures where accounts are rendered by power-holders also appear to be increasingly inadequate in recent times (Roberts, 1991; 2009). This also raises questions on the relevance and effectiveness of the conventional accountability frameworks.

While a number of prior studies have discussed the issues related to digital transformation and enhanced our understanding of the process and practices, most of these studies are related to the private sector organisations based on the Western countries context and “*... far less attention has been devoted to the accounting and accountability implications connected with the adoption and usage of digital technologies in governments*” (Agostino *et al.*, 2022a, p. 146). Therefore, this study aims to explore how digital tools and technologies are adopted and implemented in the public healthcare setting to improve the quality of community healthcare, and how implementation challenges are addressed at the local level. More specifically, this study draws on Actor-Network Theory (ANT) to explore the following two research questions:

RQ. 1 How the involvement of diverse human and non-human actors (re)shapes accountability?

RQ 2. How do socio-cultural and institutional contexts influence the interplay between formal and informal accountability practices during healthcare digitalisation?

The remainder of this article is structured as follows. We first develop the theoretical framework, drawing on the concepts of digital co-production and multiform accountability. We then outline our ethnographic methodology, present our empirical findings, and conclude by discussing the theoretical and practical implications of our research.

## **4.2 BACKGROUND LITERATURE AND THEORETICAL FRAMEWORK**

### ***4.2.1 Digital co-production and the transformation of accountability relationships***

#### ***Conceptualising digital co-production and accountability transformation***

Digital co-production represents a paradigmatic transformation in the conceptualisation and delivery of public healthcare services, transcending traditional service relationships to

encompass complex socio-technical networks of interactions between providers, patients, citizens, and technological platforms (Agostino *et al.*, 2022b; Argento *et al.*, 2025). Understanding how these complex interactions succeed requires looking inside the ‘black box’ of collaboration to analyse the underlying processes of trust-building, shared motivation, and governance that allow diverse actors to work together (Latour, 2005; Thomson and Perry, 2006). Osborne *et al.* (2016, p. 640) defined co-production as “the voluntary or involuntary involvement of public service users in any of the design, management, delivery and/or evaluation of public services.” Significantly, they acknowledged that co-production extends beyond direct service users to encompass broader citizen involvement - a distinction particularly salient in the healthcare contexts where community networks function as critical intermediaries in service delivery and accountability processes (Bovaird, 2007). The concept of co-production also resonates with the imperative to do more with less, especially in resource-constrained public sectors (Arun *et al.*, 2021; Nabatchi *et al.*, 2017).

The duality of voluntary and involuntary co-production manifests distinctively in digital healthcare environments. Voluntary co-production emerges through deliberate engagement with digital platforms, where patients and community members actively contribute to healthcare delivery through information sharing, feedback provision, and participation in virtual communities (Dinh and O’Leary, 2025). Simultaneously, involuntary co-production operates through passive data generation, algorithmic processing, and automated monitoring systems that embed co-productive elements within service interactions independent of conscious participation (Palumbo, 2016). This complex interplay between active and passive co-production fundamentally disrupts conventional accountability mechanisms by redistributing agency across heterogeneous actor-networks (Agostino *et al.*, 2022b).

Conventional accountability mechanisms have traditionally operated through hierarchical structures with clearly delineated roles between account holders and power holders (Roberts, 1991). The proliferation of digital platforms creates inherent complexities in these established accountability relationships, potentially generating accountability gaps where traditional oversight mechanisms prove inadequate for capturing the multidirectional, network-based exchanges that characterise digital healthcare delivery (Agostino *et al.*, 2022b; Argento *et al.*, 2025). As Steccolini (2019) argued, this necessitates re-considering ‘publicness’ in accounting research, moving beyond conventional notions of accountability that are tied to static hierarchies and clearly defined roles. Specifically, it requires examining how public sector accounting can effectively account for co-production where services are collaboratively created by users and providers while simultaneously safeguarding democratic accountability, which involves ensuring that public services remain responsive to citizens’ needs and that decisions are made through inclusive and participatory processes.

The conceptual foundations for understanding this transformation were further enhanced by Osborne and Strakosch’s (2013) influential typology, which distinguishes between consumer co-production at the operational level and participative co-production at the strategic level. Their framework posits that when these modes combine, they create enhanced co-production that can lead to transformative innovation. This perspective is particularly important for exploring how, in this context, primary healthcare providers and citizens integrate operational service delivery with strategic knowledge creation through digital platforms. Such conceptual distinction enables more detailed analysis of how different forms of co-production reshape accountability relationships at multiple organisational levels.

The interdependent relationship between account holders (patients and citizens) and power holders (healthcare providers) fundamentally shapes and reshapes how accounts are given and

received in digital healthcare environments. These transformed accountability relationships manifest through new forms of account-giving that can transcend traditional periodic reporting structures (Agostino *et al.*, 2021). Healthcare providers must now potentially formally account for their actions through digital platforms that enable simultaneous monitoring and response, while maintaining traditional community relationships that operate through culturally embedded trust mechanisms. This re-conceptualisation of accountability involves addressing the challenges of fragmented authority and blurred boundaries of responsibility, ensuring that accountability systems remain transparent, inclusive, and adaptable to the evolving digital landscape (Agostino *et al.*, 2022b; Argento *et al.*, 2025).

The dynamic interplay between formal and informal accountability becomes particularly pronounced in emerging economies where sociocultural and institutional contexts create distinctive patterns of adapting digital healthcare innovations (Arun *et al.*, 2021; Lino *et al.*, 2022). This is particularly evident in contexts with strong community health worker programs. In Thailand's primary healthcare system, for instance, the long-standing Village Health Volunteer network can be understood as a form of 'enhanced co-production' (Osborne and Strokosch, 2013). The established role of these volunteers in both service delivery and community engagement positions them as crucial intermediaries between formal healthcare systems and local communities (WHO, 2020). Therefore, this context provides a theoretically significant setting to explore how such actors navigate the introduction of digital tools and mediate between formal institutional requirements and informal community expectations.

### ***Dimensions of digital co-production and accountability translation***

Drawing from established theoretical frameworks in public governance literature, co-production encompasses four distinct yet interdependent dimensions through which citizen

participation reconfigures accountability relationships in digital environments. These dimensions - co-commissioning, co-design, co-delivery, and co-assessment - have been extensively conceptualised across public administration scholarship (Bovaird, 2007; Bovaird and Loeffler, 2013; Nabatchi *et al.*, 2017; Voorberg *et al.*, 2015), providing a comprehensive analytical framework for examining how these activities transform accountability relationships throughout the public service cycle. While these authors provide a strong foundation, it is important to consider a broader range of literature to fully capture the nuances of co-production in diverse settings. When examined through an Actor-Network Theory (ANT) perspective, these dimensions illuminate how heterogeneous actors transform traditional accountability mechanisms through complex translation processes:

***Co-commissioning of priority outcomes:*** This dimension encompasses deliberative mechanisms for establishing strategic priorities and resource allocation frameworks in healthcare systems. Bovaird and Loeffler (2013) elucidated how strategic commissioning processes can incorporate citizen voice through structured engagement mechanisms such as participatory budgeting and representation on commissioning bodies. Digital platforms enable community participation in setting healthcare priorities, creating new accountability mechanisms where decision-makers must justify strategic choices to broader stakeholder networks through continuous digital engagement. These arrangements transform what Loeffler and Bovaird (2019) characterised as traditional macro-level planning into citizen-responsive decision-making processes that may formalise previously informal community consultations.

***Co-design of improved pathways to outcomes:*** The co-design dimension engages service users in designing service delivery mechanisms through customer journey mapping, service design laboratories, or participatory design methodologies that translate lived experience into service specifications. Voorberg *et al.* (2015) demonstrated, this positions citizens as co-designers

rather than mere service recipients. Digital interfaces facilitate collaborative development between service users and providers, generating accountability relationships where service designers must demonstrate responsiveness to user feedback through iterative design processes documented on digital platforms. This process corresponds to what Loeffler and Bovaird (2019) identified as micro-level planning, where service specifications emerge from direct user engagement and can become formalised standards against which providers become accountable.

***Co-delivery of pathways to outcomes:*** Co-delivery: Co-delivery involves what Voorberg *et al.* (2015) classified as citizen-as-co-implementer arrangements, wherein service users actively participate in service implementation. This dimension is exemplified by peer support networks (such as expert patients), community health volunteers, and collaborative care planning between professionals and patients. This arrangement exemplifies Bovaird and Loeffler's (2013) conceptualisation of co-production as professionals and citizens making better use of each other's assets, resources and contributions to achieve improved outcomes or efficiency.

***Co-assessment of services and outcomes:*** The final dimension incorporates service users into monitoring and evaluation frameworks. As Loeffler and Bovaird (2019) articulated, this may include citizen satisfaction surveys and more intensive contributions such as user inspections and peer reviews, and community-based quality monitoring systems. Digital platforms facilitate continuous evaluation and feedback from multiple stakeholders, transforming traditional assessment models into dynamic accountability relationships characterised by real-time performance monitoring and multidirectional feedback loops (Yusuff *et al.*, 2025). These digital assessment networks transform hierarchical accountability structures into more fluid arrangements where performance metrics can emerge from community experiences rather than predefined institutional indicators.

These dimensions collectively demonstrate how digital co-production transforms accountability from hierarchical structures into network-based arrangements. The transformation reflects Bovaird and Loeffler's (2013) core principle of co-production - recognising citizens as asset-holders with diverse capabilities that complement professional expertise in creating public value. Each dimension represents a specific domain where digital technologies enable the mediation and potential integration of previously informal accountability dynamics into more formalised structures, creating new forms of giving and demanding accounts that transcend conventional hierarchical structures.

#### ***4.2.2 Accountability transformation through digital healthcare networks***

##### ***The epistemological reconfiguration of accountability through co-productive practices***

The digital transformation of healthcare services requires a fundamental reconceptualisation of how accountability relationships are constituted and enacted within contemporary public service environments. Roberts' (1991) seminal distinction between hierarchical and socialising forms of accountability provides a foundational theoretical framework for examining this transformation. Hierarchical accountability - characterised by formalised reporting structures, standardised performance metrics, and clearly delineated authority relationships (for relevant studies in healthcare contexts, see Jacobs (2012); Malmrose (2019) - has traditionally dominated healthcare governance systems. However, as Roberts (2009) subsequently argued, this form of accountability often generates instrumental compliance rather than substantive engagement, potentially leading to what he termed 'ethical violence' when transparency is pursued as an unexamined ideal. The publicness of these services demands accountability extend beyond mere compliance, encompassing responsiveness to diverse public values and democratic participation (Steccolini, 2019).

Digital co-production fundamentally reconfigures these conventional accountability relationships by redistributing agency across heterogeneous networks of stakeholders and technological platforms (Agostino *et al.*, 2022b). This shift, which aligns with long-standing calls to take networks seriously as a central feature of modern governance (O'Toole Jr, 1997), enables more interactive, dynamic, and citizen-initiated forms of accountability that transcend traditional institutional boundaries (Schillemans *et al.*, 2013; Virtanen *et al.*, 2018). This reconfiguration is particularly significant in emerging economies where informal, socialising forms of accountability - operating through community networks and cultural institutions - have historically existed alongside formal hierarchical mechanisms (Hopper *et al.*, 2017; van Helden and Uddin, 2016). The proliferation of digital platforms creates complex dynamics in these established relationships, generating what this study identifies as a critical accountability gap. Here, traditional oversight mechanisms prove inadequate for capturing the multidirectional, network-based exchanges that characterise digital healthcare delivery (Agostino *et al.*, 2022b; Argento *et al.*, 2025). Addressing this gap is central to this paper and directly informs our research questions, which explore how digital co-production reshapes accountability relationships and how socio-cultural contexts in emerging economies influence that transformation. These digitally mediated interactions also transform the nature of publicness by creating new spaces for public engagement and new forms of public value co-creation (Bovaird, 2007), though not without potential for new exclusions (O'Flynn, 2021).

These technologically mediated interactions generate multidimensional forms of engagement that transcend traditional clinical encounters, enabling enhanced monitoring capabilities, facilitating sustained dialogic interaction between healthcare service providers and patients (Dinh and O'Leary, 2025; Yusuff *et al.*, 2025), and creating opportunities for proactive healthcare intervention strategies. Indeed, a growing body of work emphasises the potential of

dialogic accountability in fostering more meaningful engagement. For instance, this involves moving away from a single, authoritative (monologic) viewpoint toward a multi-perspective process that takes pluralism and ideological conflict seriously (Brown, 2009). It also calls for a shift from simply disclosing what traditional, financially oriented systems can capture (accounting-based accountability) to designing accounting systems that respond directly to the needs of diverse constituencies (accountability-based accounting) (Dillard and Vinnari, 2019). This approach contrasts sharply with passive information dissemination (Dobija *et al.*, 2023).

Drawing on Butler's (2005) work, Roberts (2009) suggests that more intelligent forms of accountability must acknowledge the inherent limitations of complete transparency while fostering dialogic engagement grounded in humility and mutual recognition. This perspective becomes particularly salient in digital healthcare environments where technological capabilities for monitoring and quantification often outpace the development of meaningful interpretive frameworks. Prior studies (e.g. Agostino *et al.* (2022a); Agostino *et al.* (2022b) highlight how the increasing digitalisation of public services creates inherent complexities between different types of accountabilities at macro (societal), meso (organisational), and micro (individual) levels. These complexities manifest through what Grossi *et al.* (2024) identify as competing accountability imperatives that often operate simultaneously within healthcare organisations - creating complex situations where providers must navigate between professional, managerial, and community expectations while utilising digital platforms that fundamentally reshape how accounts are given and received. This navigation between competing formal and informal demands thus represents a central challenge for digital-era accountability.

The datafication of healthcare services represents a socio-technical assemblage that has been particularly accelerated by exogenous challenges such as the COVID-19 pandemic (Ahn and

Wickramasinghe, 2021; O'Flynn, 2021). Begkos *et al.* (2024) have delineated how healthcare organisations progress through distinctive evolutionary stages from digitisation (technical conversion of analogue information to digital formats) through digitalisation (strategic application of digital technologies to modify business processes) to datafication (systematic transformation of social action into quantified data for real-time analysis). This progression fundamentally reconfigures accountability relationships by transforming how evidence is constituted, evaluated, and legitimised within professional practice, introducing algorithmic governance structures, predictive analytics-based decision frameworks, and automated performance monitoring systems that operate beyond conventional human-centred accountability parameters. Understanding this progression is therefore critical, as it sets the stage for the central problem explored in this study: how actors on the ground mediate and adapt these powerful data-driven imperatives, leading to the emergence of multiform accountability.

### ***The dialectic of formal-informal accountability mechanisms in emerging economies***

The interplay between formal and informal accountability becomes particularly pronounced in digital healthcare environments where technological systems simultaneously enable standardisation through data protocols while creating new possibilities for dialogic engagement and the functional co-existence of informal practices within formal structures (Lino *et al.*, 2022). Roberts and Scapens (1985) provided essential theoretical insight into this dynamic, demonstrating how formal accounting systems often diverge from the actual accountability relationships that operate through daily organisational practices. This divergence becomes amplified in digital environments where the capacity to record and measure healthcare activities increases exponentially while potentially disconnecting from the dialogic processes through which meaningful accountability emerges.

Formal accountability mechanisms in the healthcare contexts traditionally operated through hierarchical reporting structures that emphasised standardised performance metrics, regulatory compliance, and vertical oversight relationships (Roberts, 1991). These mechanisms manifest through institutional arrangements including documented policies, standardised reporting templates, performance evaluation frameworks, and regulatory requirements that structure how healthcare providers account for their actions to governmental authorities, funding agencies, and professional bodies. However, recently, digital platforms have transformed these formal mechanisms by enabling real-time monitoring, automated data analysis, and continuous performance tracking (Dobija *et al.*, 2023). These advancements intensify oversight while potentially reducing it to the algorithmic processes disconnected from meaningful dialogue.

In a similar vein, informal accountability operates through what Roberts (1991) termed socialising forms that emphasise interdependence, dialogue, and mutual understanding rather than hierarchical control. These informal mechanisms manifest through community networks, professional relationships, and cultural institutions that shape how healthcare providers account for their actions to patients, community members, and colleagues through daily interactions rather than standardised reports. In this case, digital platforms create new possibilities for these informal accountability relationships by enabling direct communication, continuous feedback, and virtual communities that transcend geographical and institutional boundaries while potentially mediating and integrating previously informal interactions with technological systems. This dynamic interaction between formal digital systems and enduring informal practices highlights a key aspect of how publicness is enacted and perceived legitimacy is constructed, particularly in contexts where this blend is essential for public trust (Steccolini, 2019).

The integration of digital systems in emerging economies creates distinctive accountability patterns shaped by local institutional contexts. As van Helden *et al.* (2021) and Hopper *et al.* (2017) have emphasised, accounting practices in such settings are not universally applied but are embedded within specific institutional and cultural arrangements. This often leads to localised adaptations in accountability practices, where formal oversight mechanisms evolve to accommodate both technological advancements and institutional constraints. Arun *et al.* (2020) further illustrate challenges in the context of emerging economies where imposed accountability reforms may falter without a corresponding emphasis on learning accountability and the unlearning of entrenched traditional practices.

In addition, institutional factors also play a crucial role in shaping the effectiveness of digital accountability mechanisms. van Helden and Uddin (2016) demonstrated how governance structures, infrastructure limitations, and resource constraints influence oversight capabilities and access to information. Such constraints often mean that top-down digital reforms cannot be fully implemented as intended, necessitating hybrid approaches that integrate new digital tools with traditional practices (Lino *et al.*, 2022). In response, organisations in emerging economies adapt by blending formal digital oversight with informal, community-driven mechanisms to ensure service delivery while embracing technological advancements.

Beyond institutional adaptations, digital healthcare co-production raises critical concerns about accessibility, equity, and digital disparities. While technological infrastructures and e-government have long been seen as providing users with unprecedented opportunities for participation and transformed service delivery (Dunleavy *et al.*, 2006; West, 2004), these advancements also risk excluding populations with limited digital literacy or access, exacerbating existing inequalities (Agostino *et al.*, 2022b; O'Flynn, 2021). This risk of creating

new digital divides represents a key problem that this study investigates, questioning how co-productive practices can mitigate or exacerbate these challenges in the pursuit of accountability. UNESCO (2011) underscored the need for effective e-governance to improve service delivery, enhance citizen participation, and strengthen government accountability. Addressing digital stratification is essential to ensuring that technological advancements do not reinforce inequities but instead empower diverse communities.

While resource constraints in emerging economies often hinder the full implementation of digital accountability systems, they also drive innovative adaptations that integrate formal and informal mechanisms. These challenges necessitate contextually relevant frameworks that combine community engagement, local governance structures, and flexible technological solutions. Rather than entirely replacing informal mechanisms, digital tools can enhance transparency, real-time monitoring, and participatory governance by complementing established practices. This hybrid approach acknowledges the limitations of technological infrastructure while striving to bridge the gaps in accountability through adaptive and locally informed solutions.

#### ***4.2.3 Actor-network theory***

To understand how digital co-production facilitates the aforementioned transformations in accountability, particularly the interplay between formal and informal mechanisms and the emergence of multiform accountability, Actor-Network Theory (ANT) is employed as a suitable theoretical framework. This approach allows for an examination of how digital co-production and the resultant multiform accountability emerge through dynamic networks of human and non-human actors in healthcare settings (Jacobs, 2012). Moving beyond conventional theoretical approaches that separate technological artifacts from social processes, ANT conceptualises networks as dynamic assemblages where agency is distributed across

heterogeneous actors (Latour, 2005). This perspective is particularly valuable for understanding how multiform accountability emerges through the interdependent relationships between human and non-human actors in digitally mediated healthcare environments.

Drawing on Latour's (2005) conceptualisation, this research views networks not as static structures but as fluid and dynamic processes of association and translation that shape and reshape accountability relationships. The principle of generalised symmetry, first introduced by Latour's (1979), advocates for treating human and non-human actors with the same analytical lens. This symmetrical approach is crucial for this study because it rejects hierarchical distinctions between technological systems and human actors, or between formal and informal accountability practices, instead recognising how each contributes to the emergent networks through which accounts are given and received.

In addition, the concept of 'flattened ontology' represents a fundamental epistemological shift, positing that all entities - whether human actors, technological systems, or institutional processes - exist on the same ontological plane and possess agency in shaping social reality and accountability networks (Latour, 2005). This theoretical construct is central to our study, as it allows us to move beyond simplistic human-centric or technology-deterministic perspectives to analyse how technological platforms, data systems, and practitioners collectively constitute dynamic accountability networks.

The translation process, central to ANT analysis (Latour, 1987), is what allows us to understand this dynamic. Our study employs Callon's (1986) influential framework of translation, which provides analytical precision for examining how actors reconstitute accountability relationships through their co-productive interactions. This process is a critical construct for understanding the transformation of accountability mechanisms in digital healthcare, as

demonstrated by Bracci *et al.* (2023) in their work on citizen-centred financial reporting. The translation process consists of four phases:

- **Problematisation:** This is where actors define issues and establish themselves as ‘obligatory passage points’ in addressing those challenges. In our research, this manifests when technological platforms and healthcare administrators identify inefficiencies in traditional accountability systems and position digital solutions as essential for improvement.
- **Interessement:** This phase involves strategies to stabilise actors’ identities and roles within the emerging network. This is evident when digital platforms are introduced with specific accountability functions that redefine the responsibilities of healthcare providers, patients, and volunteers.
- **Enrolment:** This phase follows as actors accept and actively engage with these new roles, transforming traditional accountability practices through their participation in digital networks.
- **Mobilisation:** The final phase occurs when certain actors emerge as legitimate representatives of broader collectives. Village health volunteers, for example, increasingly speak for community interests within digital accountability frameworks while simultaneously representing institutional imperatives to those communities. This dynamic interplay illustrates the politics of translation, where actors negotiate meanings and relationships.

By using the translation process as a conceptual lens, this study can illuminate how multiple forms of accountability emerge as traditional practices become entangled with digital innovation in healthcare delivery. This manifests through the continuous interactions between what Latour (2005) identified as ‘quasi-subjects’ - healthcare facilities, community networks,

technological platforms, and regulatory institutions - that collectively transform how accounts are given and received. Through these translations, the healthcare network develops a flattened ontology that avoids privileging either formal or informal mechanisms, instead recognising how both become reconfigured through digital co-production.

Building upon these ontological foundations, our analysis will trace the socio-technical assemblages through which accountability relationships are reconfigured in Thailand's primary healthcare context. Digital co-production, viewed through this lens, functions as the central mediating process that catalyses accountability transformation by creating obligatory passage points that reconfigure how accounts are given and received. The analysis will demonstrate how traditional accountability tools (e.g., paper documentation, face-to-face supervision) undergo translation, evolving and integrating with digital tools (e.g., real-time monitoring, automated analysis). The convergence of these processes generates the multiform accountability practices that are the focus of this study - hybrid arrangements reflecting the distributed agency inherent in these complex socio-technical networks. A key focus will be on the village health volunteers, who function as what Latour (2005) identifies as crucial 'mediators' - actors who transform, translate, and modify meaning as they navigate between formal institutional requirements and informal community expectations.

### 4.3 RESEARCH METHODS

#### *4.3.1 Ethnographic approach and data collection*

Our empirical investigation employed an extended ethnographic engagement in the district over six months (August 2023-January 2024), supplemented by the first author's professional experience in the region (2020-2022). This approach was chosen for its strength in capturing the nuanced, in-situ practices and socially constructed meanings that characterise the transformation of accountability relationships through digital co-production. This longitudinal

perspective enabled systematic observation of the progressive transformation from traditional volunteer-based accountability practices in early 2020, through initial datafication efforts during pandemic control measures, to the structured adoption of digital accountability systems by 2021. This temporal dimension provided crucial insights into how accountability relationships evolved through distinct phases of digital co-production implementation.

The formal research phase comprised comprehensive embedded fieldwork incorporating multiple data collection approaches specifically designed to capture the translation processes through which accountability relationships are transformed. Data was collected from multiple sources, including 50 in-depth interviews with participants across the healthcare network (see Table 4-1), 6 focus group sessions with key stakeholder groups (see Table 4-2), observations of board and sub-committee meetings (total: 87 hours), and systematic participant observation of co-productive practices (total: 80 hours). To ensure the representativeness of these interview participants, a stratified purposive recruitment strategy was combined with snowball sampling (Saunders *et al.*, 2019). This approach allowed access to a diverse range of actors - from executive directors to village volunteers - mitigating selection bias by capturing voices beyond just those recommended by management (O'Reilly, 2012). This multilayered approach enabled us to trace how different dimensions of co-production - from co-commissioning and co-design to co-delivery and co-assessment - reshape accountability relationships through the process of translation within actor-networks

The methodological framework employed include multiple ethnographic techniques grounded in ANT's epistemological foundations. Drawing on Latour's (1987) concept of the accumulation cycle, which emphasises that understanding emerges through repeated encounters with phenomena, our approach prioritised prolonged engagement with the research setting (Hammersley and Atkinson, 2019). This iterative engagement facilitated the

identification of subtle accountability transformations that might remain obscured in shorter research encounters. As Latour notes (1987), “the first time we encounter an event, we are unaware of it; we start knowing it at least the second time, when it becomes familiar to us.” The prolonged fieldwork period, therefore, significantly enhanced the reliability of our findings through systematic data verification and conceptual refinement.

**Table 4-1** Description of the interview

| No. | Code        | Function /Area   | Duration (minutes) | No. | Code         | Function /Area   | Duration (minutes) |
|-----|-------------|------------------|--------------------|-----|--------------|------------------|--------------------|
| 1   | Executive 1 | Director         | 54                 | 26  | GP 7         | Public relations | 39                 |
| 2   | Executive 2 | Programmer       | 90                 | 27  | GP 8         | Public relations | 32                 |
| 3   | Executive 3 | Programmer       | 40                 | 28  | GP 9         | Epidemiology     | 38                 |
| 4   | Executive 4 | Director         | 69                 | 29  | GP 10        | Accounting       | 41                 |
| 5   | Executive 5 | Director         | 120                | 30  | Accountant 1 | Accounting       | 43                 |
| 6   | Manager 1   | Data Management  | 45                 | 31  | Accountant 2 | Accounting       | 35                 |
| 7   | Manager 2   | Public relations | 55                 | 32  | Accountant 3 | Accounting       | 30                 |
| 8   | Manager 3   | NCD              | 39                 | 33  | Volunteer 1  | Village No. 02   | 24                 |
| 9   | Manager 4   | Accountability   | 35                 | 34  | Volunteer 2  | Village No. 01   | 40                 |
| 10  | Manager 5   | Epidemiology     | 51                 | 35  | Volunteer 3  | Village No. 03   | 16                 |
| 11  | ITO 1       | IT-Officer       | 60                 | 36  | Volunteer 4  | Village No. 08   | 25                 |
| 12  | ITO 2       | IT-Officer       | 57                 | 37  | Volunteer 5  | Village No. 08   | 27                 |
| 13  | ITO 3       | IT-Officer       | 65                 | 38  | Volunteer 6  | Village No. 04   | 41                 |
| 14  | ITO 4       | IT-Officer       | 36                 | 39  | Volunteer 7  | Village No. 09   | 40                 |
| 15  | Doctor 1    | General Clinic   | 58                 | 40  | Volunteer 8  | Village No. 05   | 33                 |
| 16  | Doctor 2    | Dental Care      | 52                 | 41  | Volunteer 9  | Village No. 05   | 22                 |
| 17  | Doctor 3    | General Clinic   | 47                 | 42  | Volunteer 10 | Village No. 04   | 32                 |
| 18  | Doctor 4    | Dental Care      | 42                 | 43  | Trainee 1    | Internship       | 49                 |
| 19  | Doctor 5    | General Clinic   | 36                 | 44  | Trainee 2    | Internship       | 25                 |
| 20  | GP 1        | Antenatal Care   | 50                 | 45  | Trainee 3    | Internship       | 28                 |
| 21  | GP 2        | General Clinic   | 43                 | 46  | Trainee 4    | Internship       | 43                 |
| 22  | GP 3        | Public relations | 48                 | 47  | Trainee 5    | Internship       | 28                 |
| 23  | GP 4        | General Clinic   | 32                 | 48  | Auditor 1    | Auditing         | 69                 |
| 24  | GP 5        | Data Management  | 34                 | 49  | Auditor 2    | Auditing         | 30                 |
| 25  | GP 6        | NCD              | 39                 | 50  | Auditor 3    | Auditing         | 30                 |

**Table 4-2** Description of the focus groups

| No. | Members | Function / Area | Duration (minutes) |
|-----|---------|-----------------|--------------------|
| 1   | 5       | Patients        | 36                 |
| 2   | 3       | Patients        | 37                 |

| No. | Members | Function / Area   | Duration (minutes) |
|-----|---------|-------------------|--------------------|
| 3   | 3       | Patients          | 33                 |
| 4   | 5       | Volunteers        | 35                 |
| 5   | 5       | Local Government  | 70                 |
| 6   | 3       | Doctor and Nurses | 46                 |

Our data collection strategy incorporated comprehensive documentation of sociotechnical artifacts that mediate accountability relationships within actor-networks. This included systematic analysis of digital platforms that enable co-productive practices, official policy documents that establish formal accountability requirements, meeting minutes, internal operational records that demonstrate accountability adaptations, and public communications. Participants also supplemented these materials with additional documentation that illuminated the translation processes through which digital co-production reshapes accountability.

This multi-method approach was a deliberate strategy to achieve triangulation, a validity procedure that seeks to form credible findings by seeking convergence across different information sources (Creswell and Miller, 2000). We achieved this by gathering data from diverse participants (practitioners, volunteers, and patients) and by using varied methods (interviews, observations, and document analysis), which provided corroborating evidence for our analysis. This process, combined with our extended engagement at the research site, was crucial for developing a deep understanding of how digital co-production enables the evolution and hybridisation of formal and informal accountability practices.

#### ***4.3.2 Data analysis process***

The data analysis process was inherently iterative, beginning during the previously described six-month ethnographic fieldwork and continuing throughout the writing of this paper (Dinh and O'Leary, 2025; Hammersley and Atkinson, 2019). As all fieldwork data - including interviews, focus groups, and observational notes - was collected in Thai, significant attention

was given to the transcription and translation protocols. All relevant data was transcribed verbatim and then translated into English, with a rigorous back-translation and verification check performed by a professional linguist to ensure cultural nuances were not lost. Concurrently, following Brewer's (2000) emphasis on analytical reflexivity, the first author maintained a digital field diary, which was regularly shared with the co-authors to support the analytical process, aligning with contemporary ethnographic methodologies in accounting research (Bamber and Tekathen, 2023).

For the formal analysis, we used MAXQDA 24 software to manage the dataset, aligning with established practices for computer-assisted qualitative data analysis (CAQDAS) (Rädiker and Kuckartz, 2020). We employed systematic coding cycles following the framework of Miles *et al.* (2020). The initial coding phase involved implementing In-Vivo coding to preserve participants' authentic linguistic expressions in Thai, a technique crucial for capturing the distinctive cultural and institutional characteristics of the research context (Miles *et al.*, 2020). These In-Vivo codes, alongside descriptive open coding, contributed to a broad set of initial codes. Figure 4-1 provides a detailed summary of this analytical process, showing the development from initial codes to the revised codes and final themes.

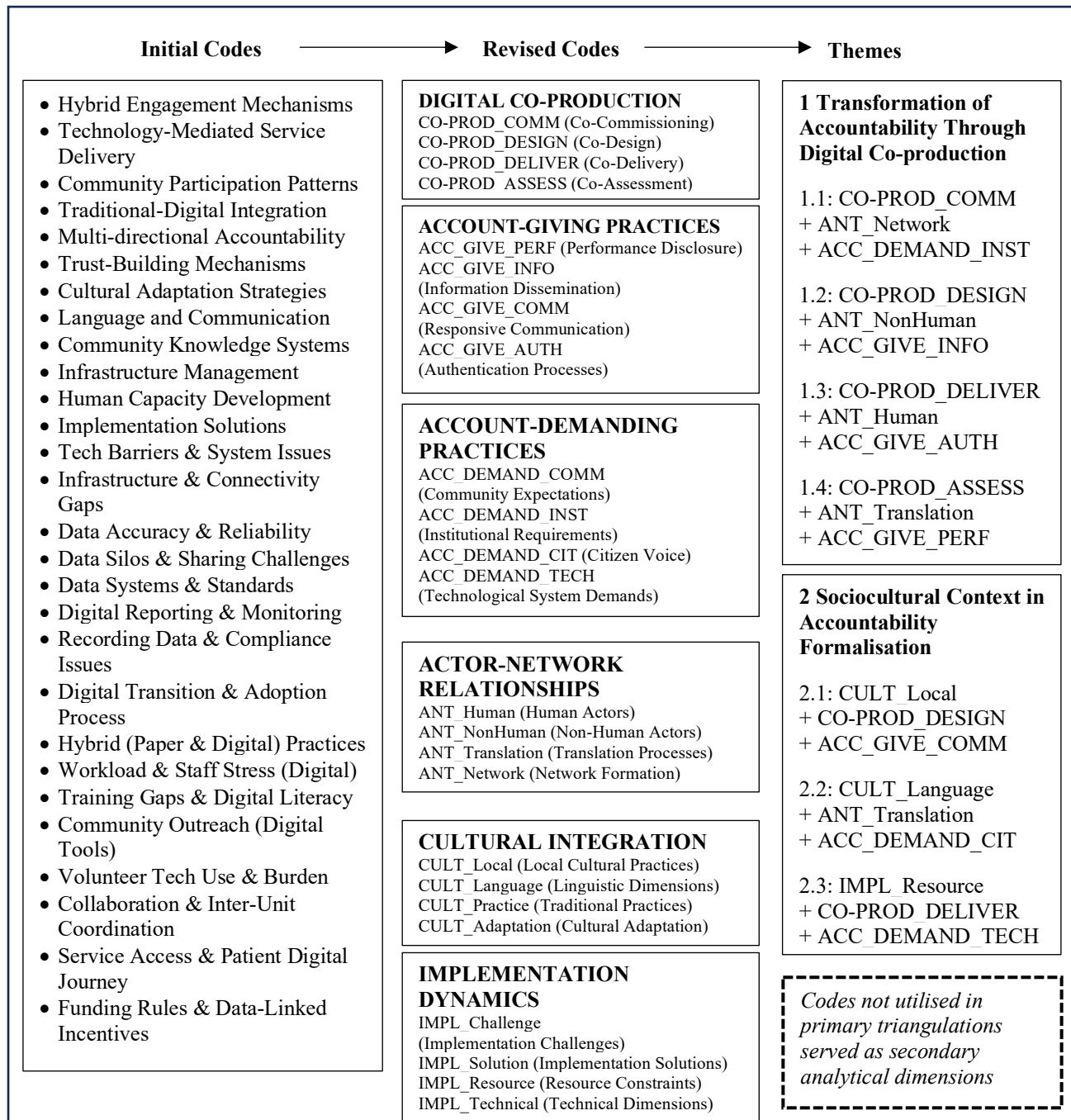
Following this initial, empirically grounded coding, we developed a more refined coding framework, guided by the relevant literature and theoretical frameworks of this study. The Code System within MAXQDA was actively managed to compare, contrast, and group initial codes. This involved merging conceptually similar codes, sorting them, and structuring them into hierarchies with parent codes and subcodes to build conceptual density and develop more abstract and theoretically informed categories. Code memos were systematically used to elaborate on the properties and dimensions of these emerging categories. For example, initial codes related to collaborative activities in service provision were systematically grouped and

further conceptualised as Digital Co-production [CO-PROD]. This category was revised to align with established theoretical taxonomies (e.g. Bovaird and Loeffler, 2013; Nabatchi *et al.*, 2017), distinguishing between co-commissioning, co-design, co-delivery, and co-assessment dimensions. Subsequently, initial codes concerning accountability were systematically refined to distinguish between account-giving practices [ACC\_GIVE] and account-demanding practices [ACC\_DEMAND], enabling a more nuanced analysis of the bidirectional nature of accountability relationships in digital environments, reflecting insights from contemporary theoretical frameworks (e.g. Roberts, 2009; Steccolini, 2019). Other initial codes related to the interplay of different actors and technological elements were consolidated under categories such as Actor-Network Relationships [ANT], Cultural Integration [CULT], and Implementation Dynamics [IMPL]. This theory-informed refinement enhanced analytical precision while establishing stronger connections to conceptual frameworks in public management and accountability literature.

Through further iterative analysis of these coded segments and categories, we identified broader thematic structures. This involved systematically comparing and contrasting coded data to discern overarching patterns and relationships, which were then organised around two primary themes directly aligned with our research questions (Miles *et al.*, 2020). Each subtheme integrated a primary code configuration comprising three strategically selected codes that collectively established a conceptual lens for examining specific aspects of accountability transformation, as shown in Figure 4-1. For instance, the analysis of co-delivery processes (Subtheme 1.3) employed the configuration CO-PROD\_DELIVER with ANT\_Human with ACC\_GIVE\_AUTH to examine how volunteer-mediated service implementation reshapes authentication practices. These primary configurations were methodologically enriched through secondary analytical dimensions that provided contextual depth and theoretical

complexity. For Subtheme 1.3, the secondary dimensions of ANT\_Translation and ACC\_DEMAND\_COMM enabled nuanced examination of how translation processes interacted with community expectations to shape volunteer-mediated authentication practices within healthcare delivery networks. Such a multilayered analytical approach, operationalised through MAXQDA's complex coding query and retrieval functionalities, facilitated systematic identification of empirical patterns while enabling theoretical interpretation that transcended descriptive categorisation.

Analytically, ANT was employed to trace the specific moments where accountability was negotiated. Following Callon (1986), the analysis tracked the translation of digital mandates as they moved from policy documents to village health volunteers. Crucially, this tracing revealed that accountability is not a static imposition but a dynamic process of co-production. By following the actors, the study observed how nurses and volunteers did not simply report data; they actively interpreted and modified it to fit local realities. Thus, ANT provided the analytical lens to see how the final accountability structure was effectively co-produced through these daily interactions between human agents and digital non-human actors, resulting in the multiform accountability discussed in the findings.

**Figure 4-1** Summary of Initial and Revised Codes and Themes

## 4.4 Overview of the research context

Thailand, an upper-middle-income country in Southeast Asia with a population of 71 million (UN, 2025), presents a distinctive context for examining public sector digitalisation. Its public healthcare system, in particular, constitutes a theoretically significant setting for this study. The

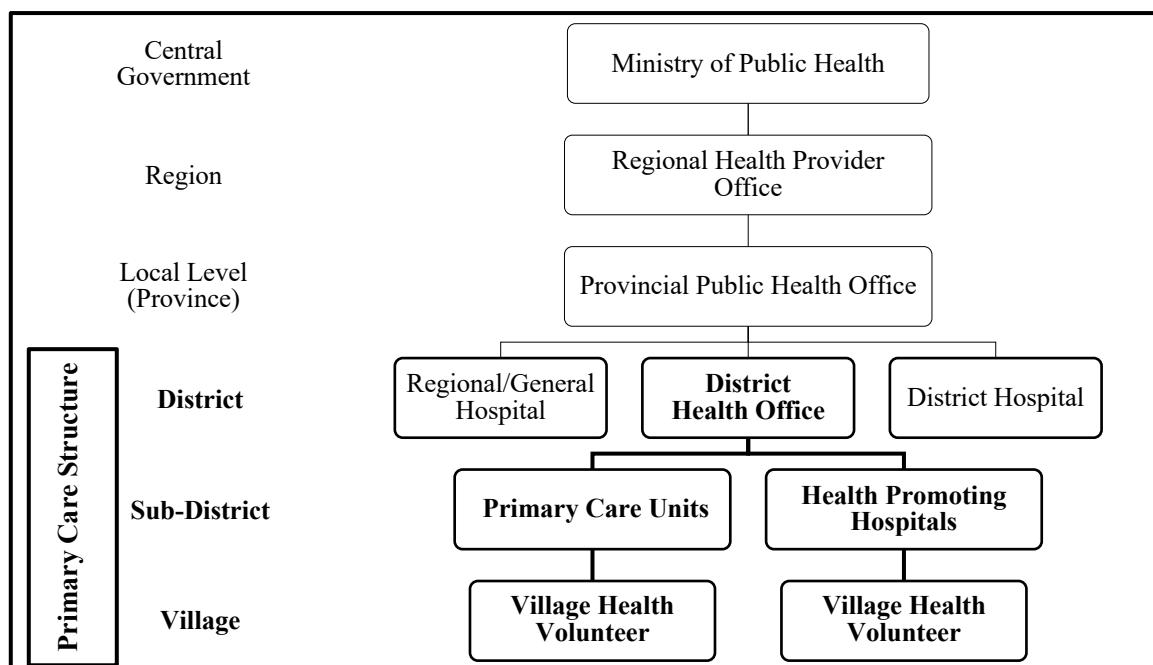
system operates through what Latour (2005) characterised as a dynamic network of human and non-human actors, where formal hierarchical structures intersect with deeply embedded community practices. These practices are often informed by core Thai cultural values such as '*Kreng-Jai*' (consideration for others' feelings, often leading to indirectness or a non-confrontational attitude), respect for elders and authority, and a strong sense of community interdependence (Holmes, 2005). While the Ministry of Public Health enforces hierarchical forms of accountability through standardised reporting, this formal oversight operates alongside informal accountability mechanisms embedded in community networks.

The traditional accountability structure, as illustrated in Figure 4-2, establishes a comprehensive hierarchical framework extending from central government supervision through 12 Regional Health Provider Offices and 77 Provincial Public Health Offices to local-level service delivery. However, this formal accountability mechanism has faced significant implementation challenges, including inefficiencies in monitoring, a degree of inflexibility in adapting to local needs, and limited parliamentary oversight (World Bank, 2009). These challenges, which highlight the tension between central mandates and local realities, were particularly evident during the COVID-19 pandemic, which tested the agility of such formal systems (O'Flynn, 2021).

A distinctive feature of Thailand's healthcare system is its primary healthcare structure centred on the Village Health Volunteer program. Established in the 1960s as one of the world's earliest community health worker initiatives (Kowitt *et al.*, 2015), this program exemplifies the complex evolution of co-production in public services (Bovaird, 2007). The deep-rooted tradition of community participation and mutual help embodied by the volunteers - known locally as '*Aor-Sor-Mor*' - suggests that co-productive practices in this setting are not merely

a recent import of Western public management ideas (Osborne *et al.*, 2016) but have long been an intrinsic part of service delivery.

**Figure 4-2** Thai national health service: Institutional and governance framework



This indigenous form of co-production, culturally embedded for centuries, offers a valuable counterpoint to contemporary framings of co-production as a novel managerial tool and is a key aspect this study seeks to theorise. Initially, these volunteers represented what Osborne *et al.* (2016) categorised as voluntary co-production - characterised by unpaid community service driven primarily by altruistic motivations and social reciprocity. However, the intensification of datafication requirements, particularly during the COVID-19 pandemic, has transformed this arrangement toward a more formalised system with compensation structures. This transition illustrates the evolution from purely voluntary co-production toward more institutionalised arrangements where participation becomes partially remunerated and systematically integrated into formal healthcare delivery systems.

The WHO (2020) specifically highlighted Thailand's volunteer network as a critical factor in the country's pandemic response, emphasising its effectiveness in co-producing healthcare services through digital innovation. This extensive network creates patterns of informal accountability through culturally embedded trust relationships with local communities while simultaneously maintaining formalised connections with institutional healthcare providers. The hybrid nature of this co-production arrangement - combining elements of both voluntary engagement and formal institutionalisation - provides a suitable context for examining how accountability relationships are transformed through digital mediation in emerging economies (van Helden and Uddin, 2016; Hopper *et al.*, 2017).

Our ethnographic investigation focused on a District Health Office located in Southern Thailand, particularly within the primary healthcare system (as illustrated in Figure 4-2). Southern Thailand is home to a rich multicultural environment where diverse ethnic and religious groups, including Thai Buddhists and Malay Muslims, coexist. It is argued that this multicultural context influences social interactions and preferences for formality or informality in engaging with public services, with some communities potentially preferring less direct inclusion in formal digital systems for various cultural or historical reasons.

The case organisation functions as a local health management unit, coordinating with community networks to provide comprehensive public health services free of charge. The service portfolio includes emergency care, dental services, traditional Thai therapeutic interventions, paediatric healthcare, and community-based outpatient services. Situated under a Provincial Public Health Office in Southern Thailand and its corresponding Regional Health Provider Office, the organisation exhibits a multi-level institutional structure. The operational scope includes five Primary Care Units, staffed by multidisciplinary healthcare professionals, and sixteen Sub-district Health Promoting Hospitals. The district serves a population of over

91,211 and employs 131 healthcare professionals, including 16 physicians, alongside a network of 1,391 village health volunteers (Department of Health Service Support, 2024). This organisational structure creates what Law (1992) termed a ‘heterogeneous network’, where traditional community practices, digital platforms, and institutional requirements become constitutively entangled.

The choice of this district as the case site is justified by its exemplary implementation of digital co-production initiatives. In a recent year, one of its hospitals received a prestigious national award for excellence from Thailand’s Ministry of Health, placing it among the top-ranked healthcare facilities in the country. This distinction reflects the organisation’s innovative integration of co-productive datafication initiatives that transcend conventional digitalisation approaches. The selection of this district was further enhanced by the first author’s position as a researcher within the local academic community. This positionality, combined with formal access agreements, facilitated deep access to organisational processes and participant experiences (Hammersley and Atkinson, 2019; O'Reilly, 2012). The author’s pre-existing understanding of the local institutional context and established trust relationships align with the principles of ethnographic research in accounting, which emphasise the value of such embedded access (Bamber and Tekathen, 2023). The following sections below present our case findings in detail.

## 4.5 FINDINGS

### *4.5.1 Transformation of accountability through digital co-production*

#### *Co-commissioning: reconfiguring strategic accountability through actor-networks*

Our empirical findings reveal that digital co-commissioning processes fundamentally reconfigure accountability relationships through a cascading translation of strategic priorities

across interconnected institutional levels. This vertical integration of accountability mechanisms - from national policy frameworks through executive implementation to community-level engagement - creates dynamic networks where traditional hierarchical reporting structures evolve into multidirectional accountability relationships mediated by technological platforms.

#### *National and executive-level accountability transformation*

At the governmental policy level, digital co-commissioning manifests through strategic initiatives that establish new accountability parameters while reconfiguring relationships between central authorities and local healthcare providers. In 2024, the implementation of Thailand's 100-days quick-win project in primary healthcare represented a significant obligatory passage point through which national digital health strategies cascade into local implementation networks. This national policy initiative, introduced in early 2024, mandated the rapid implementation of digital health integration across primary care settings (Ministry of Public Health, 2023). It set specific datafication targets and performance metrics that local healthcare providers were compelled to achieve quickly, creating strong incentives for technological adoption. While this directive aimed to reshape accountability by imposing non-negotiable digital reporting requirements, its rollout created immediate on-the-ground challenges. District-level managers, functioning as crucial intermediaries, were tasked with translating these rigid, top-down policy directives into locally workable implementation frameworks. This translation was not merely administrative; it introduced significant tensions between centralised technological mandates and the practical realities of local healthcare delivery. These digital platforms, therefore, became non-negotiable mediators that fundamentally altered account-giving and account-receiving relationships, often in ways that policymakers had not fully anticipated.

The translation of these policy mandates at the executive and managerial level further transforms accountability mechanisms through the integration of digital analytics into strategic decision-making processes. This transformation manifests through socio-technical assemblages where dashboards and visualisation interfaces function as non-human actants that actively shape healthcare priorities while generating new accountability obligations. During deliberative meetings between district managers and hospital directors, these digital platforms mediate complex decision-making processes by reconfiguring how performance data is visualised, interpreted, and translated into strategic initiatives. For example, during a meeting observed by the first author, one hospital director noted:

“The HDC dashboard gives us a clear picture of our targets for the 100-days project, but we must ensure our local data input is consistently accurate for it to be truly useful for our planning.”

The centralised dashboard systems - populated with aggregated community-level data collected through the hierarchical network of local healthcare providers and volunteers - create novel accountability interfaces that fundamentally reshape how strategic priorities emerge through collective interpretation of datafication healthcare indicators (see Appendix, Figure 4-4).

The HDC (Health Data Centre) dashboard and JHCIS (Java Health Centre Information System) datafication represents a paradigmatic exemplar of technologically mediated accountability transformation in healthcare governance. As an advanced socio-technical system, the HDC dashboard integrates heterogeneous data streams from multiple institutional sources into a unified analytical framework that fundamentally reconfigures decision-making processes. Besides, the JHCIS establishes direct material connections between micro-level clinical data collection activities and macro-level resource allocation decisions, as the National Health Security Office systematically distributes budgetary resources based on the aggregated algorithmic outputs from this system. The resulting technical-financial nexus creates powerful

incentive structures that not only reinforce particular forms of data collection and reporting activities but fundamentally reconstitute accountability relationships through the establishment of formalised computational resource allocation mechanisms. This datafication process transforms traditional deliberative accountability into algorithmically mediated governance arrangements. For instance, where a hospital might have previously justified its budget through annual reports and face-to-face negotiations, funding is now directly tied to the quantifiable, algorithmic outputs of the JHCIS system. This shift means performance metrics become constitutive rather than merely representative of healthcare priorities, thereby institutionalising new forms of data-driven accountability that operate across previously discrete organisational boundaries and hierarchical levels.

#### *Community-level accountability mechanisms*

The translation of national policy mandates into local community contexts represents a critical vertical integration of accountability relationships within Thailand's primary healthcare ecosystem. While executive-level accountability mechanisms operate through visualisation interfaces and dashboard analytics as elucidated in the preceding section, community-level accountability manifests through distinctly different socio-technical assemblages that maintain vertical integration while accommodating contextual particularities. These multilevel accountability configurations demonstrate the heterogeneous networks wherein macro-level strategic imperatives become operationalised through micro-level socio-technical interactions that collectively constitute healthcare governance systems.

The integration of community-level accountability mechanisms with national strategic initiatives manifests through the 'Three Doctors' policy, which seeks to create comprehensive

accountability networks connecting clinical specialists with community-based volunteers. GP 9 elaborated on this approach:

“The Three Doctors system will integrate data from three sources - volunteers, primary care system, and secondary hospital - allowing us to share patient information.”

This datafication initiative demonstrates how previously disparate accountability channels become integrated through technological platforms, creating more comprehensive oversight mechanisms. The Three Doctors system exemplifies the obligatory passage point - a node through which information must flow to be legitimised within the healthcare network. By integrating data from volunteers, primary care systems, and secondary hospitals, this approach transforms traditional hierarchical reporting into a networked accountability arrangement where multiple stakeholders simultaneously contribute to and access health information. This creates a system of mutual accountability; for instance, the shared digital record allows a hospital specialist to see a patient's community-level data, holding the primary care unit accountable for pre-visit data collection. Conversely, it ensures the primary care team and volunteers are accountable for implementing post-discharge plans prescribed by the hospital. This closes accountability gaps that were common in the previously fragmented, paper-based system.

Building upon this datafication foundation, healthcare administrators are extending these accountability networks through further digital integration. As Manager 3 noted during training sessions:

“We currently have the three doctors project, and we are now in the process of constructing the fourth one - an extended family doctor approach. This extension is being implemented by providing the fourth doctor with additional information through the LINE application, particularly focusing on NCD [Non-Communicable Disease] management, including maternal health for pregnant women.”

The LINE application, a widely adopted messaging platform in Southeast Asia with features facilitating group communication and information sharing, serves as the primary technological infrastructure supporting the aforementioned centralised dashboard systems (Steinberg, 2020). It enables a critical bidirectional information flow: patient-generated health data and volunteer observations travel upward from the community to the healthcare system, while health education, official announcements, and targeted advice travel downward from practitioners back to the community. This flow creates a vertical integration between macro-level strategic analytics and micro-level community engagement, establishing the translation chains that connect disparate institutional levels through technological mediation. In the Thai healthcare context, LINE transcends its basic messaging functionality to operate as an innovative co-production platform through which heterogeneous actors collectively generate, exchange, and validate health-related accounts that subsequently populate the centralised dashboard systems utilised in executive decision-making processes.

The implementation of these central level policies at the operational level is evident in Manager 2's approach:

“I’m creating a network of volunteers, health officers, and local government officials across 20 zones. I set up a ‘Line group,’ which includes several ‘short video clips’ about evening exercises and activities. This group makes it easier for us [government officers] and local people to interact and communicate.”

By establishing formalised communication channels that incorporate diverse stakeholders - volunteers, health officers, and local government officials - the healthcare system creates socio-technical networks that facilitate multidirectional account-giving. The inclusion short video clips demonstrate how non-human actors mediate these accountability relationships, creating visual accounts that bridge formal institutional requirements with informal community expectations. The LINE application functions as an obligatory passage point through which

diverse accounts - clinical observations, health management practices, and patient feedback - must flow to be legitimised within the healthcare system. This integration creates hybrid accountability mechanisms where formal institutional oversight becomes entangled with community-based monitoring through technological mediation, ultimately creating a comprehensive accountability network that spans from centralised dashboard analytics to community-level engagement practices.

### ***Co-design: translating user experience into accountability mechanisms***

The co-design dimension of digital co-production reconfigured accountability by involving users in shaping service pathways, a process which began to formalise previously informal feedback loops. This transformation manifested through technological interfaces that acted as mediating actors, embodying specific accountability expectations and creating new socio-technical assemblages where user experience directly shaped how accounts were given and received. Drawing on the translation framework, the evidence in this section shows how the initial phases of problematisation and interessement emerged, as different human and non-human actors negotiated their roles within the evolving accountability network.

*Local administrators as mediators in accountability translation*

Our findings illustrate how local administrators function as critical mediators, translating institutional accountability requirements into technological systems. This mediation manifested particularly through a programmer's active translation of institutional hierarchies into differentiated user interfaces. During our fieldwork at the District Health Office, this programmer demonstrated various big data applications designed with stratified interfaces for different user levels - from executive dashboards to officer-level cooperative tools. The programmer explained this stratification was essential, as different personnel require specific data and lack the time to sort through the entire central database. This practical design choice is a key moment of translation; it represents a socio-material entanglement where professional expertise shapes the technology to embed institutional hierarchies directly into the system, pre-configuring how information flows and how accountability is enacted at different organisational levels.

This socio-material entanglement between professional expertise and technological affordances demonstrates how accountability mechanisms emerge through continuous negotiation between clinical knowledge and digital constraints. By developing differentiated interfaces for various user levels, the programmer reconfigures institutional accountability relationships through technological specifications, creating more innovative forms of accountability that acknowledge the varying information needs of different stakeholders. The stratification of information access represents a significant translation process where technological platforms serve as mediating artifacts, embedding institutional hierarchies within user interfaces that determine how information flows between different organisational levels. This reflects how central-level policies or institutional requirements are interpreted and operationalised by local administrators.

In addition, local healthcare providers actively engage in experimental approaches to identify optimal digital engagement channels that may lead to the formalisation of previously informal accountability practices. As Accountant 1 detailed their approach:

“We’re starting to integrate platforms like Facebook, TikTok, and LINE to raise health awareness and engage with the community. It’s still in the early stages, but we’re testing it out with topics like disease prevention and sharing what we’ve been doing. I’m very, very surprised that elderly people here use TikTok so much, even more than we do.”

This reflective experimentation reveals unexpected patterns of digital platform adoption that challenge conventional assumptions about elderly technology usage. The integration of multiple digital platforms demonstrates how non-human actors exhibit distinctive agentic capacities in shaping accountability relationships - TikTok facilitates visual engagement through short-form videos, Facebook enables broader community visibility, and LINE supports immediate messaging and group formation. The unexpected adoption of TikTok by elderly community members illustrates how technological platforms can disrupt conventional assumptions about user engagement, creating new possibilities for accountability relationships that transcend traditional age-based digital divides.

#### *Local practitioner-led accountability solutions and hybrid documentation practices*

Local healthcare practitioners frequently develop practitioner-led solutions that formalise previously informal oversight mechanisms through digital mediation. Executive 2 demonstrated this adaptation:

“I created a Google Spreadsheet to coordinate various aspects of the problem among local practitioners during the COVID-19 pandemic, including the number of patients, healthcare workers, vaccines, medications, and more.”

This practitioner-initiated solution represents a significant translation process where institutional accountability requirements become embedded within technological

infrastructure. The development of customised data collection tools exemplifies what the translation framework identified as the enrolment phase of translation, where actors accept and actively engage with new roles in emerging networks. The spreadsheet becomes an actant within the accountability network, structuring how patient information is collected, organised, and interpreted in ways that shape clinical decision-making processes.

Despite these technological innovations, healthcare providers maintain hybrid documentation practices that integrate digital systems with traditional approaches. Consider Manager 1's approach to documentation:

“At the very community level, such as in small villages, I take notes to track where each document needs to go because the central system doesn’t provide that information. It doesn’t indicate who needs to sign the document or specify its delivery destination. As a result, we must communicate that information directly to the appropriate individuals.”

This persistence of paper-based notetaking alongside digital record-keeping reveals how accountability mechanisms emerge through complex negotiations between technological affordances and operational requirements. The manager’s practice demonstrates how digital systems often fail to fully capture the informal knowledge required for effective accountability. This limitation necessitates hybrid accountability practices where paper notes supplement electronic records, creating redundant documentation that ensures institutional requirements are met while addressing the practical demands of everyday healthcare management. This careful balancing act reflects a pragmatic approach to accountability, ensuring both compliance and operational effectiveness.

#### *Patient engagement in co-designing accountability networks*

For patients and community members, co-design processes create unprecedented opportunities to formalise previously marginalised perspectives within healthcare accountability systems. Unlike traditional accountability mechanisms that position patients as passive recipients of

care, digital platforms enable active participation in system design that fundamentally reshapes how accounts are given and received. For example, one patient in Focus Group 1 stated:

“Being able to give feedback directly through the hospital’s LINE Official Account makes me feel like my opinion on the service actually matters now, whereas before I wouldn’t have known who to tell”

Healthcare organisations strategically select communication platforms based on existing community usage patterns, creating accountability interfaces that formalise existing social relationships rather than imposing entirely new interaction patterns. As IT Officer 3 explained:

“There is a specific LINE group for official hospital notifications. We use a LINE Official Account (Line OA), which is different from public groups, to manage formal notifications and communicate with the public efficiently. The LINE OA offers more advanced features, such as appointment reservations, feedback collection, and detailed analytics.”

The strategic adoption of the LINE Official Account represents a significant evolution in formal accountability, transforming previously paper-based announcements into digitally mediated accountability artifacts. The transition to digital notifications reconfigured the temporal and spatial dimensions of institutional communication, creating new patterns of information dissemination that aligned with community engagement while maintaining official authority. In this formalisation process, the LINE platform became a constitutive element in the accountability network, not just a communication channel. The integration of advanced features like appointment reservations and feedback collection created bidirectional accountability interfaces, moving beyond traditional one-way communication and enabling more interactive forms of account-giving and receiving.

Trainee 1 further elaborated on platform selection based on community engagement patterns:

“We primarily communicate with the community through Line and occasionally TikTok. Line is the most accessible platform, but for certain types of posts, Facebook is also effective. Villagers often see the posts even if they don’t respond. For instance,

people frequently view Facebook posts without actively engaging with them. On Facebook, we can also track the number of views and access detailed analytics.”

The strategic integration of these platforms within healthcare communication networks reflects how non-human actors actively mediate between institutional accountability requirements and community engagement preferences. The observation that community members see the posts even if they do not always respond reveals how digital platforms create passive accountability mechanisms where information delivery occurs even without explicit interaction, fundamentally transforming how healthcare organisations discharge their informational accountability obligations to community stakeholders. The capacity to track views and access detailed analytics represents a significant technical advancement in accountability measurement, creating sophisticated verification mechanisms that enable healthcare providers to monitor information dissemination without requiring active acknowledgment from recipients. This data can be crucial for informing policy implications regarding communication strategies and resource allocation for health promotion.

#### *Multiform accountability integration through co-design*

The dynamic interplay between healthcare practitioners and patients within co-design processes generates multiform accountability mechanisms that synthesise institutional imperatives with community expectations. This integration manifests through technological interfaces that simultaneously fulfil formal reporting obligations while maintaining contextual relevance for effective community engagement. As one local government representative from Focus Group 5 articulated:

“Big data is relevant to my work. I have a public relations role focused on informing the community about our activities. My job is relatively straightforward since I don’t have to maintain the data systems. I simply upload photos, write engaging captions, and post them to the official website, LINE OA, and Facebook page. Afterward, I compile

the comments and reactions from the posts and present them at board meetings. The board uses this data to help design policies.”

This empirical account reveals how co-design processes facilitate the translation of formal accountability obligations into community-accessible formats through digital platforms. The practitioner’s description of crafting visual and textual content for multiple digital channels demonstrates how institutional accountability requirements become reconstituted into culturally resonant communications, establishing contextually sensitive adaptations in resource-constrained environments. This reconfiguration exemplifies the evolution from hierarchical accountability toward more dialogic forms that acknowledge the interdependence between healthcare authorities and citizens while maintaining institutional legitimacy.

In addition, the implementation challenges in this co-design process illuminate significant practical considerations between technical standardisation and contextual adaptation. Focus Group 4 volunteers articulated several recommendations for system enhancement:

“Participant 2: Increasing one-on-one consultations with health professionals via LINE would be beneficial.

Participant 3: Incorporating more visual aids, such as videos or infographics, could enhance the clarity of the information.

Participant 5: Extending the duration of digital activities, such as health-promoting programs or related events, would provide more time to establish sustainable habits.”

These recommendations illuminate how accountability mechanisms emerge through continuous negotiation between institutional capabilities and community expectations. The suggestion for one-on-one consultations demonstrates how patients envision technological platforms as enabling more personalised accountability relationships that transcend standardised communication formats. Similarly, the recommendation for visual aids reflects how community members recognise the importance of cognitive accessibility in effective

accountability, compelling healthcare providers to adapt their communication strategies to better align with diverse information processing capabilities.

The empirical evidence demonstrates how co-design processes fundamentally reconfigure accountability relationships by translating diverse user experiences into formalised technological systems. Through these translation processes, informal expectations and practices become embedded within digital interfaces that structure how accounts are given and received across Thailand's primary healthcare system. The resulting accountability mechanisms reflect the complex socio-technical entanglements characteristic of digital healthcare networks, where human and non-human actors collectively reshape institutional practices through continuous processes of negotiation and adaptation.

### ***Co-delivery: volunteer-mediated translation in accountability networks***

The co-delivery dimension of digital co-production manifests through socio-technical assemblages where village health volunteers function as critical mediators in the transformation of accountability relationships. These volunteers epitomise what ANT conceptualises as translators/agents - actors who transform meaning as they operate across network boundaries - creating multiform accountability mechanisms that fundamentally reconfigure how accounts are given and received.

Importantly, village health volunteers play a crucial intermediary role in these service delivery networks, bridging digital systems with local communities. Their participation is structured through regular interactions that combine training with operational updates, creating formalised accountability pathways between institutional requirements and community practices. As GP 3 explained:

“A monthly meeting is held on the 25<sup>th</sup> [of every month], where we [local health practitioners] and managers from the sub-district health office introduce new missions and train volunteers on how to use new mobile application features.”

This structured engagement demonstrates how voluntary co-production becomes formalised through regularised accountability mechanisms, transforming previously informal community relationships into structured pathways for account-giving and account-receiving.

*Intergenerational collaboration and hybrid accountability mechanisms in co-delivery*

Village health volunteers function as critical mediators/agents in the transformation of accountability relationships. The empirical evidence reveals patterns of intergenerational collaboration that redistribute verification responsibilities across heterogeneous actor-networks. ITO 3 described this dynamic:

“The new generation and the older generation of health practitioners are working together. The older folks, like her [a nurse], collaborate with village health volunteers, to gather information from the community through the ‘Smart Volunteer’ application. Meanwhile, the younger generation, like us [IT Officers], deals with the complexities of big data software and new functions.

This collaborative arrangement demonstrates how distinct generational competencies become integrated through technological mediation, creating complementary accountability mechanisms that transcend conventional hierarchical structures. Elder practitioners and volunteers maintain traditional community trust relationships essential for data collection, while younger staff members transform this information into formalised digital accounts through technological platforms. The resulting socio-technical assemblage creates translation processes, where community knowledge becomes progressively formalised through multiple transformations as it moves through the healthcare network.

However, this translation was not frictionless and created challenges from multiple directions. The increased digital workload placed considerable stress on volunteers, with one reporting

that some had even quit because of it. At the same time, the technology itself was often insufficient. A manager, for example, explained they still had to maintain separate paper notes to track crucial details like document routing, as the formal system could not accommodate this informal, practical knowledge. This reveals a persistent gap between the digital system and the nuanced local practices required to make accountability work.

Despite these frictions, the translation of informal community knowledge into formalised institutional accounts manifests through systematic engagement with digital platforms. As Volunteer 10 explained:

“Every month, I gather community data and enter it into the app. I also regularly visit the hospital’s front desk to verify the identities of village residents and track any changes in residency. Additionally, we are required to participate in volunteer data activities for government departments during our free time.

This account-giving process transforms previously tacit community knowledge into structured data formats that satisfy formal institutional requirements. The volunteer app functions as an obligatory passage point through which community health information must flow to be recognised within formal healthcare accountability systems. This transformation fundamentally reshapes the epistemological foundations of how valid accounts are constituted, as informal observations become legitimate institutional knowledge through volunteer-mediated digital practices.

Significantly, these digital co-delivery practices have not replaced traditional documentation but rather created hybrid accountability mechanisms that integrate both approaches. The blend of voluntary community work by volunteers with practical field necessities often underpins this hybridity, illustrating how informal community engagement intersects with formal digital reporting demands. As Volunteers 3 and Volunteer 4 described:

“There is still a need to combine traditional paperwork with the mobile system. Each village keeps a collection of documents, with each one representing a single household. Volunteers in each community are responsible for updating the application every month to ensure the latest information and documents are recorded.”

This hybrid accountability approach reflects the practical necessity for adaptable systems where purely digital processes might be insufficient. Healthcare organisations have developed adaptive responses that maintain traditional documentation alongside digital records, creating redundant verification paths that enhance reliability while accommodating infrastructural and practical constraints. Accountant 1 elaborated on the strategic advantages of this hybrid approach:

“We’re considering a hybrid approach where volunteers can use both digital and paper methods to submit their reports, especially for those who prefer writing. This flexibility would help them feel more comfortable and reduce entry errors.”

This dual-system approach not only enhances data accuracy but also facilitates a gradual, culturally sensitive transition towards comprehensive digital accountability. It demonstrates how technological and manual processes coexist to create more resilient healthcare account-giving mechanisms while maintaining essential community relationships.

#### *Authentication processes in digital co-delivery*

Authentication represents a critical accountability mechanism fundamentally transformed by volunteer-mediated co-delivery. This process is a pivotal obligation, as hospitals cannot input data into central systems for service claims without it. This dependency is explicitly linked to the national funding framework, where the National Health Security Office uses these electronic records to calculate and allocate budgets to providers. Consequently, any failure in authentication directly impedes the hospital’s ability to secure its funding. As such, the involvement of village health volunteers in supporting these protocols - often stepping in to resolve technical failures or assist patients - becomes an obligatory passage point. This

interdependence between volunteer-led authentication and resource allocation is a clear example of how actor-networks must navigate socio-technical hurdles to maintain operational and financial legitimacy.

Within community contexts, field observations documented verification procedures where nurses coordinated with community health volunteers to conduct comprehensive screenings, which involved tangible tasks like measuring blood pressure, weight, height, and age. This authentication protocol manifested as a temporally distributed accountability process: volunteers temporarily retained citizens' national identification cards, performed data authentication during evening hours by inputting the health data into the hospital database, and subsequently returned the ID cards to patients the following day. Through this structured procedure, volunteers effectively translated these physical health observations into formalised digital records, a process that satisfied institutional verification requirements while maintaining essential community relationships.

At the hospital, the authentication practices reveal complex socio-technical entanglements where volunteers play a critical role in maintaining accountability despite technological limitations. Field observations revealed frequent instances where malfunctioning ID card readers significantly impeded authentication workflows. To address these disruptions, IT officers trained volunteers to implement alternative data input methodologies by either using mobile devices to scan QR codes or manually recording patients' names and inputting them into the system later along with the ID card. This socio-technical adaptation demonstrates the distributed agency that characterises ANT's conceptualisation of network resilience, wherein technological disruptions are accommodated through the enrolment of volunteers who maintain system integrity despite infrastructure limitations. GP 5 further elaborated on the hybrid verification approaches facilitated by volunteers:

“Given the frequent issues with ID card readers, volunteers assist by either using mobile devices to scan QR codes or manually recording patients’ names and temporarily holding their national ID cards. This backup method remains essential, especially with older patients, and ensures that authentication continues smoothly even when technological systems are unreliable”

This adaptation demonstrates how technological actants actively shaped accountability practices, revealing a distributed agency across the network. When the ID card readers malfunctioned, institutional practices adapted through the enrolment of volunteers. This created a resilient verification network that maintained accountability functions despite the technological limitations, showing how both human and non-human actors were integral to sustaining the system.

*Reciprocal accountability through collaborative networks*

The co-delivery of services also generated reciprocal accountability that transcended conventional hierarchical oversight. This was not a formal reporting structure but one built on a clear sense of mutual support and interdependence between nurses and volunteers, who assisted each other whenever help was needed. Digital platforms helped formalise these previously informal interactions by creating persistent communication channels, without diminishing their relational character.

Ultimately, the evidence from the co-delivery process shows how volunteer-mediated authentication functioned to formalise informal community health work into legitimised institutional data. However, this formalisation process was challenged by issues of integrity and fragility. The findings, for instance, highlighted significant concerns about the risk of fraud; one executive noted instances where documents had been falsified for patients who had never actually received screening services. Furthermore, the process was often undermined by fragile technology; field observations frequently noted that malfunctioning ID card readers

would halt authentication procedures entirely, requiring workarounds to maintain the flow of data. This transformation, therefore, created an adaptive arrangement where the formalisation of data constantly navigated both the risk of human manipulation and the reality of unreliable hardware.

***Co-assessment: emergent multidirectional accountability through digital feedback***

The co-assessment dimension of digital co-production fundamentally reconfigures accountability relationships through the emergence of multidirectional, network-based mechanisms. This transformation manifests particularly through the LINE application, which functions as a significant non-human actor mediating between healthcare providers and community members. Unlike conventional accountability practices characterised by periodic formal reporting, these digital platforms enable continuous, visual documentation that redistributes responsibilities across heterogeneous actors.

***Patients' use of digital co-assessment in disease management***

The emergence of innovative monitoring activities through LINE application groups represents a paradigmatic example of digital co-assessment. These digital monitoring initiatives emerged through co-productive processes between healthcare practitioners (general practitioners, nurses, and physicians) and patients with non-communicable diseases (NCDs). The LINE groups function as socio-technical assemblages that fundamentally transform traditional accountability mechanisms by enabling continuous, visually mediated health monitoring that transcends conventional clinical encounters.

These innovative monitoring platforms represent a significant evolution from episodic clinical assessment toward continuous, community-embedded health evaluation. Structurally, the LINE groups integrate multiple co-assessment activities including dietary monitoring, physical

activity documentation, and psychosocial support - creating comprehensive accountability mechanisms that operate beyond institutional boundaries. Healthcare practitioners establish specific protocols for visual documentation (e.g., photographing meals), data sharing (e.g., blood pressure readings), and community feedback (e.g., peer evaluation of health behaviours), thereby formalising previously informal accountability practices through technological mediation.

Focus group 1 participants, comprising non-communicable disease patients, articulated this transformation:

“Participant 3: The LINE group made it so much easier to share pictures of my meals, keep track of my health, and get feedback (see Appendix, Figure 4-5). Plus, it kept me on track because other people were watching and helping each other.”

Participant 5: The group was supporting for asking questions about my treatment and getting advice from both doctors and other patients. It felt like a little community where we could all share tips and help one another.”

Building on these observations, Focus Group 3 participants elaborated on the specific activities that enhanced this collaborative experience, such as meal-sharing, exercise demonstrations, and stress management tips. These activities promoted both self-assessment and mutual learning:

“Participant 1: The meal-sharing activity was eye-opening for me. Seeing others’ healthy meals inspired me to try new recipes and reduce salt in my cooking.”

“Participant 2: I liked the exercise demonstrations. They showed simple workouts I could do at home without equipment, which fit perfectly into my daily routine.”

“Participant 3: For me, the stress management tips were the most helpful. The guided breathing exercises shared on the LINE app really helped me relax and control my blood pressure.”

This empirical evidence reveals three significant transformations in accountability practices facilitated through digital co-assessment mechanisms. First, patients transition from passive

recipients to active account-givers by documenting their health behaviours through visual evidence (meal photographs and exercise videos) - a form of health data previously inaccessible to formal healthcare monitoring systems. Second, accountability relationships undergo temporal reconfiguration, evolving from episodic, appointment-based interactions to continuous, real-time engagement characterised by immediate feedback loops. Third, oversight responsibility becomes distributed across a heterogeneous actor-network where healthcare professionals and community members simultaneously exercise different forms of oversight, creating an intricate socio-technical accountability assemblage.

The technological mediation of these accountability relationships manifests through multistakeholder communication channels that healthcare administrators continuously adapt.

As Manager\_02 elaborated:

“All community hospitals are required to have their own LINE [App] groups, including OA [Official Account] Group, Department Group, Special Events, and Patients Group, to communicate with those involved in activities. Smaller, more specific groups like these make patients feel more comfortable participating.”

This proliferation of specialised communication channels generates nuanced accountability configurations that transcend traditional hierarchical structures. The LINE groups constitute obligatory passage points through which accountability practices must flow, fundamentally reconfiguring how patients and healthcare providers negotiate responsibility for health management outcomes. Through these digital platforms, previously informal community health practices become formalised into structured feedback mechanisms without losing their cultural resonance and interpersonal dynamics.

#### *Healthcare practitioners' adaptation to digital co-assessment*

The implementation of these digital co-assessment mechanisms required substantial adaptation from both healthcare providers and patients. According to healthcare providers (Focus Group

6), most patients adapted quickly to using digital platforms like LINE, often enjoying interactive features such as sharing photos and commenting on posts. While some older patients initially needed assistance from family members, they typically became active participants with time. The providers also observed that encouragement from both the healthcare team and the peer-support dynamic of the group helped initially hesitant patients to become more engaged.

While patients were adapting at the community level, healthcare administrators are actively working to formalise these co-assessment practices through systematic integration with institutional performance metrics. As Executive 5 explained:

“The district evaluates the overall use of big data in hospitals. Every hospital has a big data target system with high indicators and rewards. Since workers are expected to meet the overall target if someone fails, the entire system fails, and the district will hold the hospital directors responsible for the failure. Staff do not want their directors to be blamed, so they are committed to this system. This is the nature of Thai people”

While patients gradually adapted to these digital co-assessment platforms, healthcare practitioners faced the more complex challenge of integrating these informal digital interactions into formal accountability systems. As informal community engagement practices through LINE, TikTok, and other platforms became more established, they created a perceptible challenge in reconciling these with institutional requirements for standardised reporting and performance metrics. This tension is particularly evident in how healthcare administrators attempt to formalise previously informal practices while maintaining their effectiveness in the resource-constrained Thai healthcare context.

The resulting accountability configurations manifest as complex socio-technical assemblages where healthcare practitioners must navigate competing demands from multiple stakeholders. This empirical observation illuminates the complex interplay between formalised institutional accountability requirements and informal community-based accountability practices. The

practitioner's reference to digital engagement modalities highlights the fundamental challenge in translating informal community interactions into structured accountability frameworks. Ultimately, this ongoing translation demonstrates the critical difficulty in bridging the gap between informal, community-driven digital evidence and the rigid structures of formal institutional accountability.

#### ***4.5.2 Sociocultural context in accountability formalisation***

##### ***Cultural intermediaries in accountability formalisation***

###### *Religious and community leaders as account-giving mediators*

A key finding of this study is the essential role of cultural intermediaries, particularly religious and community leaders, in translating accountability between institutional systems and local networks. In contrast to many Western contexts where accountability often flows through direct, formal channels, the Thai healthcare system relies on these mediators to transform institutional requirements into culturally resonant communication. In doing so, they do not just pass on information; they fundamentally reshape what accountability means and how it is practiced on the ground, reflecting the distinctive sociocultural dynamics of an emerging economy.

Executive 2 articulated how religious authorities serve as pivotal account-giving intermediaries:

“We should engage with the community through its leaders, such as the imam or monks, because religious leaders are highly respected. I regularly send health data to the community [members] via these leaders on the LINE app and ask them to translate the information and share it through personal communication.”

This pattern demonstrates how sociocultural contexts in emerging economies necessitate adaptive account-giving strategies that incorporate pre-existing authority structures. The

executive's reference to translation processes illuminates how accountability information undergoes substantial transformation as it traverses institutional boundaries, becoming reconstituted within cultural frameworks that enhance its legitimacy and comprehensibility. The executive further emphasised the institutional reality of this cultural mediation, offering a powerful insight:

“Leaders in the community and in religion have a greater influence on culture than does the state.”

This observation - that state authority is often secondary to local cultural structures - is a critical finding. It resonates with broader research on public sector reform in emerging economies, which highlights that formal, state-driven initiatives are frequently mediated by pre-existing local and religious authority structures that hold greater legitimacy and trust within the community. In this context, accountability is not simply imposed by the state but must be translated through these trusted cultural figures to be considered legitimate and effective.

This translation from formal policy to culturally resonant practice is clearly visible in the complete information pathway. Formal health data, originating from hospital executives and general practitioners, is first digitised and transmitted to volunteers through the LINE app. The volunteers, acting as essential intermediaries, then translate this digital message by delivering it to a trusted cultural figure - the imam. Finally, the imam completes the translation by making a public announcement to the community over the mosque's large speaker. This entire sequence demonstrates a powerful socio-technical translation in action: a formal, digital requirement is transformed through human and cultural mediation into a trusted, oral announcement. It shows how accountability pathways are actively constructed, blending modern technology with traditional communication channels to ensure information is not only delivered but also accepted by the community.

IT Officer 3 further articulated how these religious adaptations manifested in implementation strategies:

“When implementing new digital health tracking systems, we discovered that information dissemination through religious networks increased community adoption by approximately 70%. The mosque’s communication infrastructure has become an essential component of our formal notification system despite being initially overlooked in implementation protocols.”

This observation illuminates that, instead of imposing standardised technological solutions that might marginalise important cultural intermediaries, healthcare organisations maintain hybrid accountability arrangements that acknowledge the continued importance of traditional community leaders in information legitimisation processes.

*Community expectations and cultural dimensions of account-demanding*

The formalisation of informal accountability practices through digital networks is significantly shaped by distinct sociocultural contexts in Thailand’s healthcare system. These contexts create unique patterns in how accounts are demanded by communities and responded to by healthcare providers, revealing the interplay between technological affordances and cultural expectations in emerging economies.

Regional cultural variations fundamentally reshape how account-demanding practices emerge through digital co-production. Doctor 2 highlighted how these regional differences create complexities between centralised accountability requirements and local medical practices:

“I started in Bangkok [The capital of Thailand] and later moved to a hospital in the South. The people in the South have a strong respect for local medicine and beliefs, some of which conflict with the data in the central system. At times, I’m unable to record all the treatment processes. I felt a sense of duty to respect these cultural practices while also introducing digital systems.”

This observation reveals how region-specific cultural contexts generate distinctive patterns of accountability formalisation. The practitioner's acknowledgment of being unable to record all the treatment processes illustrates a situation where digital systems, in practice, accommodate a degree of culture-sensitive informality. This finding is particularly interesting as it contrasts with common assumptions that digitalisation primarily enforces strict formalisation, especially in Western contexts. This circumstance creates translation challenges where healthcare providers must navigate between formal institutional requirements for standardised documentation and informal community expectations for cultural recognition.

Cultural contexts further created distinctive account-demanding patterns that shape how digital co-production evolves. Manager 3 articulated these variations with particular reference to specific communities:

“In my village, it’s difficult to work... It’s especially hard in some communities... but some groups are easy to work with..., it really depends on the person.”

This reflection demonstrates the heterogeneous nature of account-demanding practices even within similar cultural contexts. The observation that engagement “really depends on the person” highlights how individual relationships function as critical mediators in accountability networks - a dimension often overlooked in technology-centred models of healthcare transformation. These relationship-based accountability mechanisms reflect what ANT conceptualises as obligatory passage points, where trust relationships become essential nodes through which information must flow to be legitimised within healthcare networks.

Cultural conceptions of trustworthiness fundamentally reshape account-demanding practices in Thailand's healthcare system, particularly through intergenerational dynamics. GP 6 explained:

“While older volunteers may seem less needed in the age of big data, they are still very important because they offer trust. The community generally trusts the opinions of older members more. For example, a volunteer with over 40 years of experience in Muslim and Buddhist communities is more likely to be welcomed into people’s homes to collect health information, like blood pressure and diabetes data, compared to younger volunteers.”

This observation reveals how elder community members function as legitimising agents in accountability networks, enabling the collection of health data through trusted relationships that technological systems alone cannot establish. From an ANT perspective, these elder volunteers operate as crucial mediators who transform how account-demanding practices function by translating institutional requirements into culturally resonant interactions that maintain essential community relationships. This cultural mediation creates distinctive patterns where digital data collection becomes socially embedded through intergenerational trust relationships that technological systems alone cannot replicate.

Furthermore, the way accountability demands are expressed reveals a stark contrast between new digital channels and traditional forms of community recourse. While administrators attempt to formalise feedback, communities may still rely on more direct, collective actions to voice their dissatisfaction. As Executive 5 explains, this is a form of local, direct action that patients find more effective: In addition, the way accountability demands are expressed and feedback is provided shows the continued relevance of traditional mechanisms alongside digital ones. Executive 5 articulated this challenge:

“I am seeking formal patient feedback through LINE OA, but I haven’t received any yet. Patients still prefer to protest in the traditional way - it’s easier for them. ... Just last month, villagers protested and drove out a nurse for repeatedly providing poor service. This shows how urgent it is to establish a reliable feedback system.

This observation demonstrates how power holders recognise the limitations of conventional accountability mechanisms and are actively reconstructing them through digital platforms. The

persistence of traditional protest methods alongside emergent digital feedback systems reveals the complex reconfiguration of account-demanding practices in emerging economies. This hybrid arrangement creates what ANT identifies as heterogeneous networks where multiple accountability mechanisms operate simultaneously, creating overlapping verification systems that reflect both institutional requirements and cultural expectations.

### ***Language and communication in accountability translation***

#### *Linguistic barriers as ontological discontinuities in accountability networks*

The ethnographic investigation reveals how language operates as a non-human actant that actively shapes network formation within Thailand's multilingual healthcare context. GP 3 articulated a critical epistemological barrier that emerges within minority language communities:

“Language is a priority issue because some villagers speak *Yawi* [local dialect], which makes cooperation more difficult. We can't send official data in *Yawi* via the LINE app, creating a barrier.”

This observation illuminates how linguistic diversity functions not merely as a contextual factor but as a fundamental discontinuity in actor-networks where translation processes break down due to incompatible ontological frameworks. The inability to transmit official institutional information through standardised digital platforms creates accountability gaps that necessitate innovative adaptations in how healthcare organisations discharge their obligations to linguistically diverse communities.

During participant observation of telemedicine consultations in representative community hospitals in the province, it became evident how linguistic barriers intersect with multiple socio-technical dimensions to create compound challenges in accountability translation. Substantiating this observation, GP 9 disclosed that factors such as specialised health language,

local accents, age differences, and religious beliefs make it difficult for pharmacists and specialists to interact effectively with patients. This finding illuminates how such specialised language functions as an exclusionary barrier in healthcare networks. While it enables precise communication among practitioners, it simultaneously creates obstacles for patient engagement. These linguistic stratifications ultimately reconfigure power dynamics by establishing differential access to accountability mechanisms based on linguistic competencies.

*Socio-technical adaptations in accountability translation*

In response to linguistic barriers and age differences, healthcare practitioners have developed translation mechanisms that utilise visual communication to bridge institutional requirements with community expectations. GP\_03 explained these socio-technical adaptations:

“The usage of graphics (see Appendix, Figure 4-6) is the solution to this problem because many people, particularly the elderly and Muslims who speak their own language, are unable to communicate in Thai.”

These visual adaptations function as boundary objects that inhabit multiple social worlds while satisfying the informational requirements of each. Graphics operate as stable representational forms that can traverse diverse linguistic contexts while maintaining essential meaning, creating alternative pathways for accountability information to flow across linguistic boundaries. This adaptation represents a significant innovation in account-giving practices, enabling formal institutional knowledge to be translated into contextually appropriate formats without requiring standardised linguistic capabilities.

The ethnographic evidence further reveals how these visual translation practices create hybrid accountability mechanisms that integrate formal institutional requirements with contextualised communication strategies. Through these adaptations, healthcare practitioners develop

contextually sensitive forms of account-giving that acknowledge the limitations of standardised transparency while enabling meaningful communication across diverse stakeholders.

*Distributed learning networks in accountability translation*

The socio-technical reconfiguration of accountability mechanisms also manifests through intricate distributed learning networks that fundamentally transcend conventional institutional hierarchies. These heterogeneous knowledge-transfer assemblages demonstrate a distinctive pattern of enrolment where diverse actors - spanning institutional, familial, and community domains - assume complementary roles within evolving accountability networks. As Volunteer 4 articulated, the learning process is highly distributed:

“Some volunteers are taught by the health officer, others by their children, and some ask others to teach them.”

This distributed learning arrangement reveals how accountability knowledge circulates through non-hierarchical networks rather than through traditional bureaucratic channels. The intergenerational knowledge transfer - where children teach older volunteers digital literacy skills - represents a particularly noteworthy inversion of traditional authority relationships.

These knowledge transfer mechanisms operate through temporally extended adaptations rather than immediate transformations. The implementation timeline described by Volunteer 2 provided empirical evidence of this protracted translation process:

“The app was introduced in 2017, but we didn’t officially start using it until 2022. Before that, the district organised two-day training sessions for us.”

This five-year implementation gap illustrates contextually sensitive adaptations in emerging economies, where resource constraints and varying technological capacities necessitate extended periods of capacity building before digital accountability mechanisms can be fully operationalised. The gradual formalisation of previously informal accountability practices

through technological platforms requires sustained engagement across multiple institutional levels, as further evidenced by GP\_02's observation:

“In the past, staff were sent for training on how to use the health big data software, and now we continue with regular online training to stay updated. However, learning some new tasks is challenging, as they cannot be fully taught through computers, making it difficult to quickly develop the necessary skills.”

This empirical observation reveals the inadequacy of conventional training methodologies in digital healthcare contexts, demonstrating how accountability formalisation requires more sophisticated learning networks that integrate both technical instruction and experiential knowledge development.

Further exemplifying these distributed learning networks, GP\_01 described a pattern of intergenerational knowledge transfer characterised by strategic negotiation between self-directed learning and targeted collaboration:

“I try to learn on my own. I think it shouldn't be beyond my capabilities, but if I hit a dead end, I ask for help from the younger ones. For things I can handle, I do them myself because I don't want to burden anyone. The younger staff members are quick and skilled; they understand easily, but I need to keep practising.”

This empirical account reveals how accountability knowledge circulates through horizontal pathways rather than through formalised hierarchical structures within healthcare organisations undergoing digital transformation. The practitioner's deliberate balancing of autonomous learning with selective engagement of expertise from younger colleagues demonstrates how traditional professional hierarchies become reconfigured through digital co-production processes.

The co-productive nature of these learning networks fundamentally reshapes accountability relationships by distributing responsibility for knowledge transfer across heterogeneous actors rather than concentrating it within formal institutional hierarchies. This distributed agency

exemplifies multiform accountability - hybrid arrangements that simultaneously satisfy formal institutional requirements while maintaining cultural embeddedness through socio-technical assemblages of human and non-human actors.

### ***Resource constraints and hybrid accountability adaptations***

The empirical investigation reveals how resource constraints in the Thai healthcare system catalyse innovative but challenging accountability adaptations. Rather than a simple lack of resources hindering digitalisation, the constraints force the creation of durable hybrid systems where formal requirements and informal solutions coexist. This is evident first in the infrastructure itself. The limitations of centralised technological infrastructure compel local adaptations that transform how accounts are given and received throughout the healthcare network. As ITO 1 and ITO 02 explained:

“In the era of big data, every hospital needs its own database because the central government’s common database has several issues, including slow download speeds, limited internet access, and weak cybersecurity. … This is why we have developed our own big database system.”

This fragmentation leads directly to a significant operational consequence: a dual burden on staff. While digitalisation is often promoted with the promise of efficiency, the reality during this extended transition is a system that demands more work. As participants from Focus Group 5, comprising local government representatives engaged in healthcare accounting, elaborated:

“Participant 1: The rules and regulations still require accounting and financial paperwork to be completed in physical form. Because of this, even though we use digital systems, we still must manage traditional documents.

Participant 2: The rise of big data has increased our workload. Now, we must process both digital and paper documents, which takes more time and effort.”

This dual workload is a key finding. It shows staff are forced to service two competing accountability networks simultaneously: the new digital system and the legacy paper-based

one, which remains mandated by formal regulations. This situation exemplifies the task overload and contradicts the simple narrative that digital tools automatically increase efficiency.

Instead of this being a problem that will likely resolve itself, findings show it persists due to deep-seated issues of risk and trust. The regulatory requirement for dual documentation is not just bureaucratic inertia; it is a deliberate risk-mitigation strategy.

Auditor 1 further elucidated the institutional rationale behind this documentation duplication:

“It’s because of regulations. The data storage systems aren’t stable, and if they get hacked, everything could be lost. That’s why the Comptroller General’s Department requires both web and paper documentation for supervisory approval.

This powerful insight reframes the dual system as a necessary, ongoing adaptation to an environment where the digital infrastructure is not yet fully trusted or considered reliable. It is a persistent challenge, not a temporary phase, reflecting institutional uncertainty and shaping how accountability is practiced on the ground.

These persistent challenges lead to pragmatic, community-centred accountability adaptations. Practitioners must often revert to traditional methods to accommodate technological and resource constraints, as GP 5 noted:

“For many reasons - including the volunteers’ experience (most are older), the lack of an internet connection, and the poor quality of mobile phones - using paper is often the better option when traveling to villages.”

This ground-level reality is mirrored by a deliberate, high-level strategy of progressive hybridisation. Rather than forcing an abrupt digital transition, leadership opts for a measured approach that maintains stability. Executive 5 articulated this:

“Due to varying technological proficiency levels among staff and the limited digital literacy among community elders, I continue to emphasise bureaucratic and

hierarchical relationships. These traditional accountability structures remain vital to organisational functioning while we gradually introduce digital systems.”

This strategy reflects a deep understanding of the evolutionary nature of accountability transformation. By intentionally maintaining traditional mechanisms during the transition, the organisation creates stability, preserves essential trust relationships, and allows for the gradual development of the socio-technical competencies necessary for effective digital accountability.

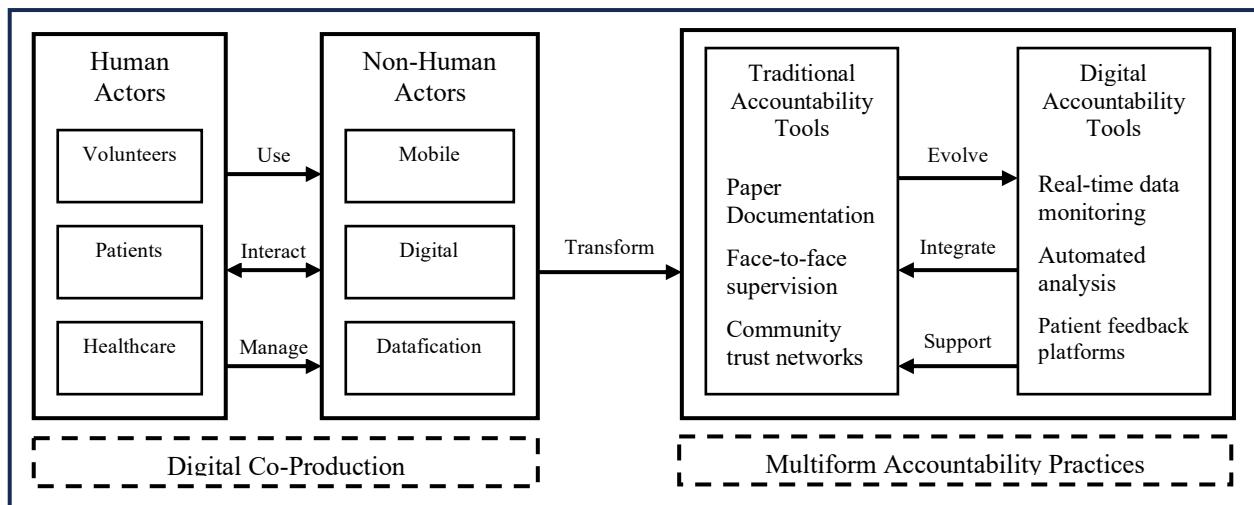
## 4.6 DISCUSSION

Our ethnographic investigation offers significant insights into the socio-technical transformations through which digital co-production reconfigures accountability relationships in Thailand’s primary healthcare system. Drawing on ANT as an analytical framework (Latour, 2005), we have traced how the distributed agency across heterogeneous actors collectively constitutes multiform accountability through complex processes of translation (Bracci *et al.*, 2023; Callon, 1986). This discussion synthesises our empirical findings to advance the understanding of accountability transformation in digitally mediated healthcare environments. Our discussion revolves around the conceptual model presented in Figure 4-3, which illustrates how the interaction between the actors involved in digital co-production transforms traditional accountability tools leading to the emergence of multiform accountability practices.

As our conceptual model (Figure 4-3) illustrates, digital co-production in Thai healthcare is driven by a dynamic interplay between human actors (providers, volunteers, patients) and non-human actors (applications, platforms, datafication). This process of mutual shaping is best understood through the ANT concept of translation, where actors constantly negotiate roles and meanings. For instance, our findings show how digital platforms like the Health Data Centre dashboard became obligatory passage points in the network, transforming deliberative

accountability into algorithmically mediated governance - a complexity that resonates with recent literature on digitalisation in public services (Agostino *et al.*, 2022b).

**Figure 4-3** The process of accountability transformation through digital co-production



A prime example of this model in action is the “Three Doctors system” in which the human actors (practitioners and volunteers) use and manage non-human actors (the LINE application and hospital databases) to synthesise previously fragmented data. This transforms previously separate, paper-based accountability records into a unified and transparent digital network, creating a system of mutual oversight that directly links national policy to on-the-ground practice. The success of this network hinges on the collaborative processes that are crucial for effective governance (Thomson and Perry, 2006); the shared motivation to improve patient outcomes and the capacity for joint action, demonstrated by the structured data sharing, are what allow this socio-technical interplay to function. The LINE application, in particular, emerged as a key non-human actor, enabling the bidirectional data flow that established the translation chains linking these disparate institutional levels.

Functioning as critical mediators, village health volunteers translated informal community knowledge into formalised institutional accounts. This process empirically illustrates the

divergence between formal accounting systems and the informal accountability relationships that operate in daily practice (Roberts and Scapens, 1985). Our findings extend this scholarly conversation by demonstrating how digital tools mediate the gap between formal accounting systems and informal, practice-based accountability. Second, authentication process appears to be a pivotal mechanism where volunteers play an essential role in sustaining institutional legitimacy, creating resilient verification networks despite technological limitations. This adaptation reflects the evolutionary progression from digitisation to datafication (Begkos *et al.*, 2024), and our findings demonstrate how this progression manifests through distinctive socio-technical arrangements in emerging economies.

The evolution of accountability is powerfully illustrated by the co-assessment dimension. The use of LINE groups transformed traditional accountability relationships in three significant ways: patients transitioned from passive recipients to active account-givers, accountability relationships underwent temporal reconfiguration from episodic to continuous engagement, and oversight responsibility became distributed across heterogeneous networks. This shift towards more interactive and citizen-initiated forms of accountability (Schillemans *et al.*, 2013) directly contributes to improved community healthcare by fostering greater patient ownership and creating real-time feedback loops for chronic disease management.

However, this evolution also created significant practical challenges. As mentioned in the beginning of the paper (e.g., a medical practitioner's dilemma - how can the medical practitioners formally report TikTok videos and short clips?), a fundamental challenge emerged in translating these rich, informal community interactions into structured accountability (required formal reporting) frameworks. This difficulty exemplifies the complex interplay between standardisation imperatives and contextual adaptation in digital accountability, reflecting the narrative challenge inherent in leading digital change. To bridge this gap,

managers must constantly produce stories to make sense of new, informal practices (Nielsen *et al.*, 2024), a situation that also highlights the inherent limitations of traditional, transparency-focused accountability (Roberts, 2009). Furthermore, our findings show how technological mediation in emerging economies creates distinctive translation challenges, particularly where informal, culturally-embedded accountability practices persist.

In addition, our findings provide a nuanced empirical case on the interplay between formal and informal accountability in shaping the publicness of services (Steccolini, 2019). Our contribution here is to demonstrate the particular nature of functional hybridity in an emerging economy. Rather than a simple formalisation of the informal, our findings show a process of mutual adaptation where formal digital systems and informal, culturally rooted practices co-exist. This was most evident in the role of trust, where religious leaders in both Buddhist and Muslim communities, alongside older, experienced volunteers, functioned as essential legitimizing agents whose cultural authority was necessary for the community to accept digitalised healthcare practices. The unique role of elder volunteers as legitimizing agents, whose trust outweighs technological prowess, extends perspectives on public sector management in emerging economies by demonstrating how cultural practices reshape what constitutes legitimate health information - without which proposed digital healthcare initiatives risk failure due to a lack of community acceptance (Hopper *et al.*, 2017; van Helden and Uddin, 2016).

This adaptive hybridity was also seen in how the community helped overcome practical challenges. For instance, distributed learning networks emerged to reshape accountability relationships outside of formal training structures. The intergenerational knowledge transfer pattern - where children teach older volunteers digital literacy skills - represented a particularly noteworthy inversion of traditional authority, further illustrating how communities adapt to

make digital systems work in practice. Similarly, language itself functioned as a non-human actant that actively shaped the network by creating barriers and discontinuities where translation between actors failed. In response, practitioners developed visual communication as boundary objects to create alternative pathways for accountability information to flow across linguistic boundaries (Star and Griesemer, 1989). These finding sheds further light on the conceptualisation of non-human actants by demonstrating how language operates not merely as a contextual factor but as an active agent (Latour, 2005).

Finally, a key consequence of this hybrid system is the task overload resulting from resource constraints. The regulatory requirement for physical documentation alongside digital systems created a dual accountability burden on staff. While this reflects issues of task overload and ceremonial compliance often found in compulsory digital transformations (Lino *et al.*, 2022), our findings contribute by showing this is not just a temporary phase but a durable, risk-averse strategy. This challenges the efficiency narrative of “doing more with less” (Nabatchi *et al.*, 2017) by revealing how digital systems can, in practice, add to, rather than replace, existing workloads.

Regarding the scope of these findings, it is important to distinguish between the specific cultural manifestations of accountability and the broader phenomenon of multiform accountability itself. While this study is situated in the Thai public sector, where specific cultural norms such as **‘Kreng-jai’ (deference/consideration)** and patron-client relationships shape how accountability is negotiated, the underlying mechanism is generalisable to other settings. The emergence of multiform accountability - where actors split their reporting behaviour between rigid digital mandates and flexible social obligations - is not unique to Thailand. Rather, it is likely to occur in any hierarchical public sector context (particularly in emerging economies) where top-down digital reforms clash with entrenched local practices

(Alawattage *et al.*, 2017; van Helden & Uddin, 2016). Thus, while the forms may vary across cultures, the multiform nature of accountability as a coping strategy for digital disruption offers a useful analytical lens for scholars studying public sector digitalisation globally.

#### **4.7 CONCLUSION**

This study explored how digital co-production reshapes accountability relationships in Thailand's primary healthcare system and how that transformation is shaped by the country's unique socio-cultural and institutional context. The findings demonstrate that accountability is not simply imposed by technology but is actively co-constructed through the interplay of human and non-human actors. A key finding is the critical role of village health volunteers as cultural mediators who navigate the tensions between formal digital systems and informal community practices. Consequently, conventional hierarchical accountability is shown to be inadequate, leading to the emergence of multiform accountability - a functional, hybrid arrangement emerged from the intricate translation between institutional demands and local norms.

The findings of this study make two significant contributions. First, we contribute to the co-production literature by providing a detailed, empirical account of how its dimensions are not just implemented but actively translated on the ground in a non-Western context. Using an ANT lens, we demonstrate the critical role of village health volunteers as cultural mediators who navigate the tensions between formal digital systems and informal community practices. Operating at obligatory passage points, they translate institutional requirements into culturally legitimate actions - a process involving intergenerational collaboration, localised authentication practices, and hybrid documentation. These findings enhance our understanding of how accountability is negotiated in resource-constrained contexts.

Second, building on foundational accountability scholarship (Roberts, 1991), this study advances the concept of multiform accountability. We demonstrate how technological mediation in an emerging economy produces not a replacement of the informal by the formal, but a durable, adaptive hybridity where both systems co-exist and mutually shape one another. This functional duality, driven by cultural dynamics and institutional realities, is a key insight for understanding the publicness of services in the digital age.

These findings have some practical implications for the public sector officials, administrators and policymakers. For example, this study found that routing official health information from a digital platform like the LINE application through trusted cultural intermediaries, such as a local imam, demonstrably increased community adoption of and trust in the new system. This shows that successful digital transformation requires governance frameworks that move beyond one-size-fits-all technological solutions and instead support hybrid accountability arrangements that integrate digital innovation with established community practices. Crucially, public managers must recognise and address the sustainability of staff roles, as the dual burden of managing parallel paper and digital systems creates a significant and lasting workload. As public services worldwide continue to digitise - a trend accelerated by the COVID-19 pandemic - understanding these dynamics is critical for ensuring equitable, effective, and culturally sensitive service delivery.

While this ethnographic study provides rich and contextualised insights, it is subject to certain limitations which provide further directions for future research. For example, researchers could examine how these micro-level adaptations scale across broader institutional contexts or compare these dynamics across different emerging economies. Further studies could also explore the epistemological challenge of how to formally value and report informal digital evidence - such as community engagement on social media - which currently sits outside

traditional frameworks. Additionally, given the findings on hidden work, there is a need to investigate the long-term impact of increased workloads on staff well-being and organisational efficiency.

Ultimately, this article demonstrates that effective digital transformation depends not just on technology, but on how diverse actors negotiate between established practices and new digital frameworks while preserving vital community relationships. The future of public service delivery hinges on our ability to build systems that are not only efficient but also legitimate in the eyes of the communities they serve.

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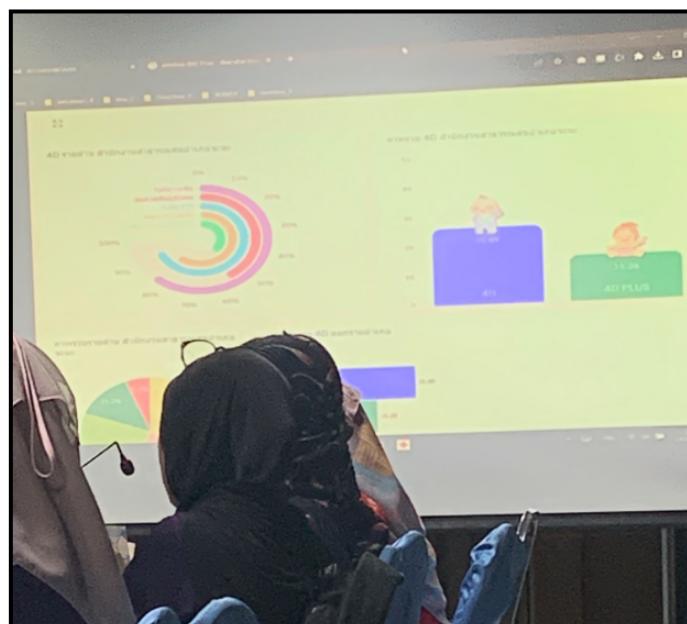
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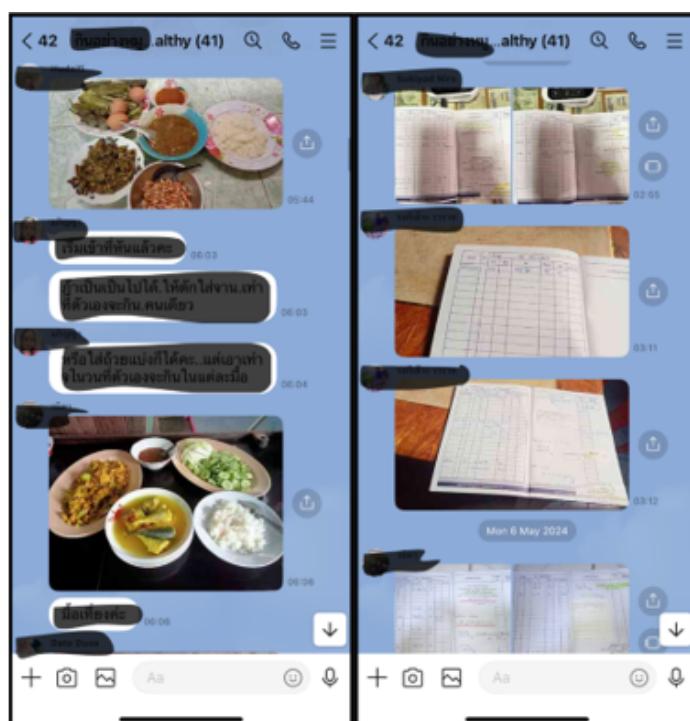
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## APPENDIX:

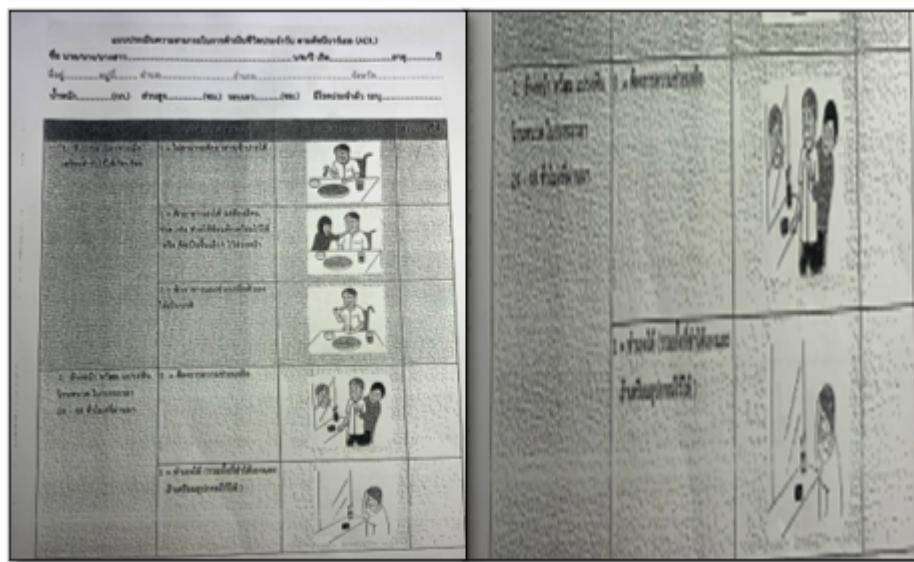
**Figure 4-4** A Strategic performance dashboard: Data visualisation for healthcare governance



**Figure 4-5** The LINE Group for sharing pictures of meals, health records, and feedback



**Figure 4-6** Using graphics to overcome language barriers in communication



## CHAPTER FIVE: PAPER THREE

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### **Adapting to Digitalisation: Diffusion, Translation, and Emergent Professional Practices in Thailand's Primary Healthcare <sup>8</sup>**

#### **ABSTRACT**

This study investigates how public healthcare organisations adapt to mandated digital management accounting controls (MACs) in resource-constrained public sectors. Prior research often applies Diffusion of Innovation theory or Sociology of Translation perspectives in isolation, resulting in incomplete explanations for these complex adaptation dynamics. Drawing on an extended six-month ethnographic study (between August 2023 and January 2024) in Thailand's primary healthcare network, this paper analyses the interplay between mandated diffusion, situated translation, and the emergent professional practices that enable organisational adaptation. Our findings reveal that organisational adaptation to digital MACs is not a linear adoption but rather an emergent outcome of intertwined diffusion and translation dynamics. This process is critically shaped by the essential mediation of intermediaries (like unique hybrid

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<sup>8</sup> 1. This research paper was presented at the 9th ICBE International Conference (Online), Indonesia (A copy of the presentation certificate is provided in Appendix G of the thesis).

2. This paper has been accepted for presentation at the Essex Business School Research Conference 2025 (UK), scheduled to take place on September 25 - 26, 2025. After receiving the feedback from the conference, the paper will be submitted to the *British Accounting Review*.

IT specialists) and necessitates the emergence of adaptive professional practices, such as the formation of hybrid professional identities and the undertaking of significant hidden work, for the organisation to effectively navigate and function within the institutional limitations of a hierarchy. As a key contribution, this study develops an empirically grounded conceptual model integrating Diffusion of Innovation and Sociology of Translation to illuminate this complex adaptation process. This model offers a nuanced understanding of the co-evolution of technology, practice, and organisation, highlighting how innovations are actively shaped and adapted through translation, rather than merely diffused, within public sector bureaucracies. Insights inform more responsive implementation approaches for digital systems in emerging economies, particularly for policymakers navigating resource-constrained environments.

**Keywords:** *Diffusion of Innovation, Sociology of Translation, Management control, Digitalisation, Public Healthcare, Hybrid professional identity, Hidden work, Emerging Economies*

## 5.1 INTRODUCTION

The implementation of digital management accounting controls (MACs) is increasingly reshaping public sector organisations, driven by pursuits of enhanced efficiency, transparency, and accountability, particularly within complex bureaucratic settings (Agostino *et al.*, 2021; Mergel *et al.*, 2019). This trend reflects a broader transformation where the proliferation of internet-related technologies is fundamentally altering the landscape of accounting work and the management accounting profession itself (Moll and Yigitbasioglu, 2019; van Slooten *et al.*, 2024). These transformations are especially pronounced, yet uniquely challenging, within

resource-constrained environments such as public healthcare systems in emerging economies (van Helden and Uddin, 2016). Indeed, the impact of organisational changes on management accounting practices in public healthcare settings, such as the NHS, has been previously noted (Smith *et al.*, 2005), and the challenges of digitalisation in similar resource-limited contexts, like NGOs in developing nations, further underscore the complex sociomaterial entanglements of technology and practice (Adhikari *et al.*, 2023). The dynamic and pragmatic nature of public services, particularly highlighted in the aftermath of the COVID-19 pandemic, has accelerated these digitalisation imperatives, creating a fertile ground for examining adaptation in real-time. While digital MACs promise significant benefits, their assimilation into organisational practice rarely follows a linear trajectory, often revealing a complex interplay between centrally mandated directives and the situated realities of local operations. This paper empirically investigates how public healthcare organisations in a resource-constrained context adapt to these digital innovations.

Existing theoretical frameworks commonly employed to study innovation adoption, notably the Diffusion of Innovation (DoI) theory (Rogers, 2003) and Translation Sociology (SoT) (Callon, 1986; Latour, 1987), provide valuable but often incomplete explanations when applied in isolation to capture the full scope of organisational adaptation. DoI maps the stages and patterns of innovation spread, while SoT highlights the active processes of negotiation, adaptation, and network-building (problematisation, interessement, enrolment, and mobilisation) through which innovations are reshaped (Callon, 1986). However, a critical gap persists in understanding the dynamic interplay between mandated diffusion (often reflecting ‘forced selection’ mechanisms in public sector hierarchies (Malmi, 1999)), the bottom-up, situated translation practices enacted by organisational members, and the crucial role of emergent professional practices in enabling overall organisational adaptation. This gap

becomes particularly pronounce as digitalisation prompts adaptations in established role templates for management accountants. For instance, digital MACs, through processes of accounting technologies, introduce new forms of visibility and control (Begkos and Antonopoulou, 2022). These mechanisms fundamentally alter work practices and power relations, especially within rigid structures that offer limited formal agency or opportunities for modification (Grossi *et al.*, 2017; Quattrone and Hopper, 2001; van Helden and Uddin, 2016). Consequently, such changes can generate conflicting or ambiguous expectations, necessitating new forms of professional engagement.

Recent scholarship has begun to explore the complexities of digital transformation in public healthcare. For instance, Begkos *et al.* (2024) provide crucial insights through their processual view of digital transformation, demonstrating how multiple accounting technologies and widespread datafication practices transform public healthcare organisations through both evolutionary and revolutionary change mechanisms. Their analysis reveals how datafication simultaneously centralises control while empowering diverse actors, creating inter-organisational tensions that reshape implementation trajectories. Our research builds upon and extends this line of inquiry by exploring the interplay between these two theoretical perspectives. More specifically, we employ an integrated theoretical lens, synthesising DoI and SoT with an analysis of emergent professional practices, to examine and theorise the dynamics of constrained adaptation within the unique setting of Thailand's hierarchical primary healthcare system.

The implementation of digital MACs in institutionally rigid and resource-limited public sectors presents significant challenges, particularly when accelerated by crises like the COVID-19 pandemic (Agostino *et al.*, 2021). During such periods, top-down decision-making often intensifies, and consultation is minimised under implementation pressure (Ahn and

Wickramasinghe, 2021), driving rapid technological diffusion. Such crisis-driven situations often challenge formally accepted bureaucratic procedures, leading to the emergence of alternative processes and practices that exist in parallel to, and sometimes in tension with, formally accepted procedures. However, achieving sustainable integration and genuine functionality for these systems requires more than this initial, often forceful, adoption; it necessitates a protracted and negotiated process of translation. This involves practitioners actively reshaping technology and work practices to align with specific local contexts and constraints, a dynamic evident even in crisis responses where immediate contextual adaptations prove vital for operational success (e.g., Jayasinghe *et al.*, 2022). These resource-constrained environments can, paradoxically, provide a negotiable space for actors to contest and bargain in deciding their priorities, often influenced by internal politics and local cultural values. Understanding the interplay between imposed diffusion and situated translation is therefore crucial for explaining how enduring organisational change is achieved.

To investigate these dynamics, this paper addresses the following research question:

*RQ: How does the interplay between the Diffusion of Innovation and the Sociology of Translation enable the adaptation to mandated digital Management Accounting Controls in public healthcare in emerging economies?*

This paper develops and justifies the argument that adaptation is not merely a passive reception or a simple modification of technology, but an active, ongoing process of mutual shaping between the innovation and the organisational context. This mutual shaping is driven by the complex interplay between top-down diffusion pressures, bottom-up translation efforts, and the evolution of professional practices which themselves become mechanisms of adaptation. Indeed, while prior work has illuminated how professionals develop a ‘hybrid professional

ethos' by incorporating managerial competencies (Kurunmäki, 2004), a similar strand of literature has revealed the complexity of balancing visible data-driven tasks with often undocumented 'hidden' care duties (Barnard *et al.*, 2024). This investigation theoretically integrates these insights to explain the role of emergent professional practices in organisational adaptation. These practices include new forms of authority and expertise which develop alongside significant hidden work. They become integral components of the organisation's broader adaptive response to digital MACs, particularly within hierarchical structures that offer limited formal opportunities for modification. The imperative for management accountants to adapt to the digital age to maintain their relevance is intensified by current technological advancements that reshape their roles and responsibilities (Möller *et al.*, 2020).

This paper is based on an extended ethnographic study and employs an inductive, theory-building approach to analyse the adaptation process. A key contribution of this empirical work is the development of an integrated conceptual model that reframes digital MAC implementation as a process of organisational adaptation. This model is built upon our findings and provides a theoretical articulation of how, in constrained environments, successful adaptation emerges from complex, interacting forces rather than from simple adoption. Our analysis reveals several key dynamics. First, adaptation involves the intertwining of centrally mandated diffusion with situated translation activities across various hierarchical strata, a process critically shaped by temporal pressures and non-human actors. Second, strategically positioned intermediaries, particularly the unique hybrid IT teams, perform an essential mediating function by adapting technical systems and translating directives. Third, this leads to the emergence of adaptive mechanisms by practitioners - including the formation of hybrid professional identities and the undertaking of significant hidden work - which are crucial for the organisation to function within its bureaucratic and institutional limitations.

Methodologically, this study draws upon an extended ethnographic investigation conducted within the District Health Office network in Southern Thailand, a site chosen for its representativeness of the national hierarchical structure but also for its unique, distributed IT support system which provides a rich context for examining mediation and adaptation processes. Data collection involved interviews, focus groups, extensive participant observation, and documentary analysis, allowing for an in-depth, processual understanding of adaptation dynamics. The remainder of this paper is structured as follows: Section 2 elaborates on the integrated theoretical framework synthesising DoI, SoT, and concepts related to professional practice and adaptation. Section 3 details the ethnographic methodology with the use of MAXQDA software. Section 4 presents the rich empirical findings from our fieldwork, demonstrating how public healthcare organisations adapt. Building on this empirical foundation, Section 5 presents the conceptual model that arises from our analysis (depicted in Figure 3), which we highlight as a core contribution of this study. This section explains the model in detail and discusses its broader theoretical implications and significance. Finally, Section 6 offers concluding remarks, acknowledges the study's limitations, and outlines potential directions for future research.

## 5.2 THEORETICAL FRAMEWORKS

### 5.2.1 *Theoretical approach: from diffusion pathways to negotiated translations*

The increasing digitalisation of MACs presents both opportunities and significant challenges for public sector organisations, particularly within hierarchical and resource-constrained environments such as the Thai public healthcare system. Understanding how these complex digital innovations are introduced, adopted, and ultimately integrated into established organisational practices requires a robust theoretical framework. While traditional perspectives, notably DoI theory (Rogers, 2003), offer valuable insights into the patterns of

technology spread, communication channels, and adopter characteristics, they may not always fully capture the intricate, situated, and often contested processes through which such innovations are actively shaped and reshaped by organisational actors. The dynamic and pragmatic nature of public services, particularly highlighted in the aftermath of the COVID-19 pandemic, has accelerated these digitalisation imperatives, creating a fertile ground for examining adaptation in real-time. Indeed, the profound impact of digital technologies on accountants' work underscores the need for alternative theoretical approaches that can grasp these ongoing transformations (Moll and Yigitbasioglu, 2019).

The journey of a digital MAC from a centrally mandated initiative to a locally embedded and functional tool is rarely a straightforward transfer or passive reception of a pre-defined technological artefact. As Quattrone and Hopper (2001) have highlighted in the context of management accounting innovations, conventional diffusion models can sometimes be insufficient to account for the complex sociomaterial dynamics and the active reinterpretation that occur within specific organisational settings. This suggests a need to look beyond models that primarily emphasise the attributes of the innovation or the characteristics of adopters, towards approaches that foreground the ongoing processes of negotiation, context-specific adaptation, and social construction. This resonates with sociomaterial perspectives that emphasise the constitutive entanglement of digital technologies in organisational life, as observed in other resource-constrained, public-facing sectors (Adhikari *et al.*, 2023).

It is in this context that the concept of translation, as articulated within ANT (Callon, 1986; Latour, 1987), becomes particularly salient. McMaster *et al.* (1997) critically contrasted the diffusion metaphor with translation, arguing that the former often fails to adequately address the situated and intensely practical nature of the mechanisms involved in technology transfer. A translation perspective reframes technology implementation not as the dissemination of a

fixed object, but as a dynamic and pragmatic process where the innovation and its context are co-constructed through the efforts of a heterogeneous network of human and non-human actors. The technology itself is seen as malleable, its meaning and form evolving as it is enrolled into new settings within which various stakeholders who tend to contest and negotiate the adaptation practices (Latour, 1987).

Therefore, to develop a comprehensive understanding of digital MAC adaptation in the Thai public healthcare system, this study integrates both perspectives. Relying on DoI alone would restrict the analysis to adoption rates and adopter characteristics, failing to explain how the digital tools were fundamentally altered during implementation (McMaster *et al.*, 1997). Conversely, using only the Sociology of Translation might obscure the structural, coercive diffusion pressures unique to the government mandate. By combining them, this thesis captures the complete trajectory: DoI explains the macro-structural propagation of the mandate, while the Sociology of Translation provides the analytical tools to trace the micro-political displacement and negotiation of these mandates into practice. This integration is necessary to interpret findings where adoption was not a passive acceptance, but a complex co-production between central policy and local reality.

### ***Diffusion of innovation and translation sociology in the context of digital MACs***

#### ***Diffusion of innovation (DoI) theory: Illuminating patterns of adoption***

DoI theory, as systematically developed by Rogers (2003), provides a foundational framework for analysing how new ideas, practices, or objects - innovations - are communicated via specific channels, over time, among members of a social system. In this research, the primary innovation pertains to digital MACs. These are often not monolithic entities but rather technology clusters, comprising interconnected performance measurement architectures, data

management infrastructures, and reconfigured accountability frameworks (Ax and Bjørnenak, 2005) that aim to reshape organisational practices through complex sociotechnical interactions. The array of digital technologies transforming accounting, such as cloud services, big data analytics, and AI (Moll and Yigitbasioglu, 2019), constitutes such innovations that become integral to digital MACs.

Central to DoI theory is the *Innovation-Decision Process* (Rogers, 2003), which outlines several stages individuals typically navigate when encountering an innovation. The process commences with *Knowledge*, where an individual first becomes aware of an innovation and seeks to understand its function. This initial stage often highlights significant power asymmetries within organisational settings such as public healthcare; for instance, administrative stakeholders may possess prior system exposure, while clinical professionals might encounter complex technical requirements with limited preparation. The supply-side dimension of how innovation information is presented, and by whom, critically influences this phase (Ax and Bjørnenak, 2005, 2007), often positioning IT specialists or other designated actors as crucial knowledge gatekeepers who can shape how digital systems are initially interpreted and understood by intended users.

Following knowledge acquisition is *Persuasion*, during which an individual forms a favourable or unfavourable attitude towards the innovation. This stage constitutes a critical juncture where existing power relationships and divergent interpretations can fundamentally shape subsequent implementation trajectories. Competing perspectives often emerge during this stage. Administrative proponents may highlight anticipated efficiency gains and enhanced oversight capabilities enabled by new digital controls, whereas clinical professionals are more likely to assess these systems based on their impact on patient care pathways and professional autonomy. This divergence can create a fundamental tension between the technical capabilities

of an innovation and established professional priorities, a dynamic particularly pronounced in public healthcare organisations where diverse stakeholder groups apply varied evaluation criteria to innovation assessment (Kurunmäki, 2004). Such competing interpretations can necessitate active translation processes to reconcile these views, fundamentally reshaping how management accounting controls are conceptualised and operationalised within specific healthcare contexts.

Subsequently, the *Decision* stage involves engaging in activities that lead to a choice to adopt or reject the innovation. It is crucial to note that in public healthcare settings, as highlighted by the pressures for organisational change within the NHS (Smith et al., 2005), this phase frequently diverges from Rogers' (2003) model of voluntary adoption. Instead, it often reflects forced selection - hierarchical mandates compelling implementation irrespective of practitioner preferences. Governmental influence plays a particularly decisive role in such contexts, creating diffusion patterns markedly different from those observed in private sector organisations (Lapsley and Wright, 2004). During critical periods like the COVID-19 pandemic, these top-down decision processes were further accelerated and intensified. Crisis conditions often minimise consultation while maximising implementation pressure, and heightened public apprehension fundamentally reconfigure accountability relationships, with an increased willingness among individuals to accept intensified surveillance via data analytics in response to significant public health threats (Ahn and Wickramasinghe, 2021).

The *Implementation* stage sees the innovation put into active use. This phase highlights the critical nexus between organisational characteristics (such as existing infrastructure, resource availability, and institutional capacity) and the organisation's adoption capabilities (Glenngård and Ellegård, 2024). For instance, larger, better-resourced facilities might demonstrate more comprehensive implementation, while smaller units may adopt more selective approaches

focused on minimum compliance. This stage often reveals emergent patterns of negotiation between administrative mandates and operational realities. In such resource-constrained environments, this implementation gap can, paradoxically, provide a negotiable space for actors to contest and bargain in deciding their priorities. These negotiations are often influenced by internal politics, local cultural values, and the necessity of hidden work to make systems function - all of which play an important role in shaping the final form of the innovation. This creates significant space for what Rice and Rogers (1980) termed 'reinvention' - the modification of innovations during their implementation to accommodate local conditions and specific user requirements. In healthcare settings, such reinvention processes can illuminate important power dynamics, as practitioners may develop hybrid approaches that satisfy administrative reporting criteria while simultaneously preserving essential clinical functions and professional values.

Finally, the *Confirmation* stage represents the culmination of these processes, where individuals and organisations seek reinforcement for the innovation decision made. This may lead to the sustained embedding of the innovation, or conversely, to its discontinuance. The outcome often depends on the interplay between initial adoption motives and the ongoing capacity for adaptation. Rogers (2003) identified two forms of discontinuance particularly relevant to healthcare: 'replacement discontinuance' (adopting a perceived superior alternative) and 'disenchantment discontinuance' (abandoning innovations due to dissatisfaction). In some public healthcare organisations, disenchantment may manifest as superficial compliance that masks underlying operational abandonment, especially when digital controls are perceived to conflict with core clinical priorities or impose unsustainable workloads. However, in contexts like Thailand, characterised by the prevalence of forced selection mechanisms, replacement discontinuance often predominates, as administrative

mandates continually compel the adoption of newer systems deemed superior by central authorities, sometimes irrespective of practitioners' assessments of their contextual appropriateness or usability.

Overall, the innovation-decision process, particularly for complex digital MACs, can be significantly influenced by contextual factors. The COVID-19 pandemic, for instance, dramatically compressed the knowledge and persuasion phases through urgent hierarchical mandates, intensifying implementation pressure. As Malmi (1999) observed, diffusion patterns also possess crucial temporal dimensions, with the drivers for adoption shifting over time: initial adopters may be motivated by efficiency and performance optimisation, while subsequent implementers often respond more to institutional isomorphic pressures and legitimacy concerns. This temporality, especially when disrupted by crisis-accelerated diffusion, introduces profound complexity to the evolution of power relationships and implementation patterns. Crisis-driven situations often challenge formally accepted bureaucratic procedures by leading to the emergence of alternative practices that exist in parallel to formal ones. This dynamic, in turn, challenges traditional diffusion models predicated on voluntary adoption and gradual integration, highlighting scenarios where institutional imperatives may override professional discretion while simultaneously creating circumscribed opportunities for strategic adaptation within constrained parameters.

Beyond individual choices, DoI theory also outlines 'The Innovation Process in Organisations' (Rogers, 2003), encompassing phases such as Agenda-Setting, Matching, Redefining/Restructuring, Clarifying, and Routinising. While DoI provides a robust framework for mapping these adoption trajectories and understanding factors influencing them (e.g., perceived attributes of the innovation like relative advantage, compatibility, complexity, trialability, and observability), its application has extended across various domains and

geographical contexts. For instance, scholars have utilised innovation diffusion principles to explore the adoption of diverse practices in emerging economies. Thoradeniya *et al.* (2021), drawing on concepts such as those discussed by Abrahamson (1991) concerning the diffusion of management practices, examined the spread of sustainability key performance indicators (SKPIs) within private sector firms in a developing nation like Sri Lanka. Such studies demonstrate the utility of DoI in understanding the dissemination of managerial and accounting innovations.

However, as Quattrone and Hopper (2001) critically observed, traditional diffusion models may insufficiently capture the complex sociomaterial dynamics through which management accounting innovations, such as digital MACs, are reinterpreted and actively reshaped within specific organisational contexts. The adaptation of MA roles in response to digitalisation, involving the challenging of existing templates and the emergence of new ones (van Slooten *et al.*, 2024), is a process of such active reinterpretation rather than simple diffusion. These models can sometimes underplay the agency of adopters in shaping technology and the nuanced social processes of its embedding (McMaster *et al.*, 1997). This is particularly evident in public sector transformations, especially those accelerated by crises, where initial top-down diffusion of new systems or frameworks often necessitates substantial subsequent adaptation to become effective and sustainable. For instance, the response of Sri Lanka's public healthcare system to the COVID-19 pandemic involved a revolutionary change to its Incident Command System, moving towards a more collaborative, networked hierarchy (Jayasinghe *et al.*, 2020). While this was a rapid, crisis-driven adoption, the process involved significant restructuring and incorporation of diverse stakeholder inputs to fit the local context (Jayasinghe *et al.*, 2020), underscoring that even mandated changes require considerable translation to address specific operational realities and to potentially build more resilient systems for the long term. It is

important to note that while some temporary, crisis-born arrangements may cease once the situation stabilises, crises also provide a space to seek alternative and long-lasting discourses, such as the digitalisation imperatives that became institutionalised in Thailand post-pandemic. Such scenarios highlight the limitations of viewing innovation uptake solely through a diffusion lens and underscore the importance of considering active, contextual adaptation.

To address these limitations, the supplementary lens of SoT, as this study will now explore, directly addresses this theoretical limitation by reconceptualising the implementation journey as an active process of transformation and network construction, rather than a more passive transmission or adoption of a pre-defined innovation. It is these dimensions of agency, active construction, and sociomaterial entanglement that SoT brings to the fore.

*Sociology of translation (SoT): Unpacking the active construction of socio-technical networks*

Complementing the perspectives offered by DoI, SoT, which draws significantly from ANT (Callon, 1986; Latour, 1987, 2005; Law, 1992), conceptualises the introduction and embedding of technology not as a linear dissemination of a stable, pre-defined entity, but as a dynamic, contingent, and ceaselessly negotiated process of translation. This approach has gained increasing prominence in contemporary accounting literature, particularly in studies examining technological change and organisational adaptation (e.g., Dissanayake and Dellaportas (2023); Justesen and Mouritsen (2011)). The study by Adhikari *et al.* (2023) on digitalisation, employing a sociomateriality perspective akin to ANT, effectively illustrates how technology and organisational practices are mutually constituted, highlighting that technology's performance evolves in everyday life and shapes day-to-day practices, relationships, and identities.

From this viewpoint, an innovation such as a digital MAC is not merely adopted or rejected in its original form; rather, it is actively negotiated, interpreted, and transformed through the ongoing interactions of a heterogeneous assembly of human actors (e.g., policymakers, senior hospital administrators, clinicians, IT support staff, patients) and influential non-human actants (e.g., the MAC software itself, specific algorithms, data input interfaces, reporting templates, existing technical infrastructures, and even policy documents). Indeed, research influenced by translation has reconceptualised accounting innovations as emerging through complex processes of network formation and organisational fabrication, a clear departure from traditional diffusion theories that posit technological adoption as a more linear transmission of fixed entities (Robson and Bottausci, 2018). This process of fabrication, as Chua (1995) demonstrated in her seminal ethnography of three public hospitals, relies on the work of experts and networks to build consensus around new accounting images, showing how they are socially and politically constructed rather than objectively discovered.

A key distinction highlighted by McMaster *et al.* (1997), when contrasting DoI with ANT, pertains to the nature of the technology and the overall sociotechnical stance. While DoI might see a technology (like a digital MAC) as an entity whose form can be modified through reinvention based on implementation experiences, often treating the social system and the technology as initially separate entities that are subsequently brought together, SoT posits a more entangled view. It argues that the technology changes (is translated) through being enrolled - regardless of whether the form or content of the technology is modified and, crucially, that the social system and technology are inseparable. What might appear as a successfully implemented and stable technological system is, from an ANT perspective, merely evidence that the actor network has stabilised through successful translations. This aligns with

Latour's (2005) call to reassemble the social by tracing associations among diverse actors, conceptualising the social not as a static domain but as an evolving network of connections.

Central to understanding these processes are Callon's (1986) *four moments of translation*. These are not necessarily sequential or discrete stages but rather overlapping and iterative processes that characterise the efforts to build and stabilise an actor-network around an innovation.

The first moment, **Problematisation**, involves one or more key actors (the protagonists) defining a particular problem or issue in such a way that their proposed solution - for instance, the implementation of a new digital MAC to improve efficiency or transparency in healthcare resource allocation - becomes an 'obligatory passage point' (OPP). To pass through this OPP, other actors must align with the protagonists' definition of the problem and accept the proposed solution as indispensable for achieving their own varied goals. For example, central health authorities might problematise inconsistent financial reporting across hospitals and frame a standardised digital MAC as the necessary solution.

Following this, **Interessement** encompasses a series of actions, strategies, and devices deployed by the protagonists to interest other relevant actors and to interrupt or weaken any alternative alliances or solutions these other actors might be pursuing. The aim is to align these actors with the proposed OPP, effectively attempting to lock them into the network being formed around the innovation. This could involve demonstrations of the digital MAC's benefits, negotiations over its features, or the establishment of incentives (and disincentives) to encourage participation and adherence to the defined roles.

If successful, interessement leads to **Enrolment**, the third moment, where other actors accept the roles, responsibilities, and definitions ascribed to them within the proposed network.

Enrolment signifies that a relatively stable set of alliances has been established around the innovation. However, this acceptance is rarely passive; it often involves negotiation, compromise, and the subtle (or overt) modification of the actors' original interests to fit within the emergent network. For instance, clinical departments might agree to adopt the new digital MAC but only after negotiating specific adaptations to its reporting functionalities to minimise disruption to patient care.

The final moment, ***Mobilisation*** of Allies, involves ensuring that the enrolled actors (who are now spokespersons for the collectives they represent, e.g., a department head speaking for their clinicians) remain aligned and that the established network acts in concert to ensure the durability, spread, and wider acceptance of the (now significantly translated) innovation. This often requires ongoing effort to maintain the network, address emerging issues, and ensure that the 'black box' of the innovation (i.e., its stabilised form and function) does not unravel. The empirical utility of such a framework in healthcare has been demonstrated; for example, Preston *et al.* (1992) showed that the institutionalisation of accounting systems was more determined by the robustness of supporting networks than by purely technical attributes.

Throughout these moments, SoT emphasises the pivotal role of intermediaries and, more significantly, mediators (Latour, 2005). While intermediaries might simply transport meaning, instructions, or force without transformation (e.g., a policy document), mediators actively transform, translate, distort, and modify the meaning or elements they are supposed to carry. In the context of digital MAC implementation, IT specialists, specific managers, or even influential end-users can act as powerful mediators. They do not just implement a system; they interpret its requirements, adapt its functionalities, negotiate its use with different stakeholders, and in doing so, profoundly shape what the digital MAC becomes in that specific setting. Their

work is crucial in bridging the gap between abstract technological designs or policy mandates and concrete operational realities.

The concept of the actor-network itself is fundamental, underscoring the heterogeneity of the elements involved in any innovation process. These networks bind together human and non-human entities in an inseparable sociotechnical web. The digital MAC, with its software, algorithms, and interfaces, is not merely an inert tool but an active participant that shapes possibilities, constrains actions, and is, in turn, shaped by the human actors who engage with it. This perspective is particularly acute in the digital realm, where, as Latour (2011, p. 802) argues, “the expansion of digitality has enormously increased the material dimension of networks: The more digital, the less virtual and the more material a given activity becomes.”

Consequently, negotiation and transformation are inherent to the process of translation. An innovation like a digital MAC is rarely implemented in its pristine, originally conceived form. It is continuously interpreted, contested, adapted, and reconfigured as it encounters diverse local contexts, pre-existing institutional logics, established professional practices, and the varied interests of multiple actors. The observed changes in management accounting within the NHS due to broader organisational shifts (Smith *et al.*, 2005) can be understood as outcomes of such ongoing transformations and negotiations around control systems. This leads to the two-way process where the technology is shaped by the organisation, and simultaneously (Contractor *et al.*, 2011), the organisation (its practices, roles, and power relations) is reshaped by its engagement with the technology.

By focusing on these dynamic processes of ongoing socio-technical co-construction, the active work of mediators, and the intricate negotiations within heterogeneous networks, Translation Sociology offers a powerful analytical framework. This theoretical perspective is understood

to be particularly adept at facilitating an examination of the situated practices, the underlying power dynamics, and the often unpredictable and emergent outcomes that can characterise the implementation of complex digital MACs, especially within intricate and hierarchical organisational landscapes such as public healthcare networks. While an awareness of the critical discourse surrounding ANT's treatment of pre-existing social structures and power dynamics (Modell, 2020a; Whittle and Spicer, 2008) is maintained, its anticipated strength for guiding the analysis in this study lies in its established capacity to trace the formation and stabilisation of practices around new technologies in a manner that gives due attention to both human and non-human agency.

*Contrasting perspectives on key elements of digital MAC implementation*

To further elucidate the distinct analytical lenses offered by DoI and Translation Sociology, Table 5-1 adapts and extends the comparative framework suggested by McMaster *et al.* (1997, p. 73). It reinterprets key concepts in the specific context of digital MAC implementation within a hierarchical public healthcare setting.

**Table 5-1** Contrasting perspectives on digital MAC implementation: Diffusion vs. Translation

| Key Concept                                   | Diffusion   | Translation  |
|---|---|--|
| <b>Nature of Digital MACs (as Innovation)</b> | A system, practice, or object (e.g., new accounting software, data reporting protocol) perceived as new by public healthcare units/staff. Its attributes (relative advantage, complexity, etc.) influence adoption. | An evolving socio-technical assemblage. The digital MAC is initially an embryonic fact whose stability and form are achieved (or not) through actor negotiations, enrolment, and network-building within the healthcare context, eventually becoming (or failing to become) a 'black box.' |

| Key Concept   | Diffusion  | Translation   |
|---|--|---|
| <b>Communication &amp; Adoption/Implementation Process</b>  | <p>Information about digital MACs disseminated through channels (e.g., Government directives, training sessions) over time, leading to stages of adoption (knowledge, persuasion, decision, implementation, confirmation) by healthcare personnel.</p> | <p>The implementation of digital MACs as a series of ongoing translations (problematisation, interessement, enrolment, mobilisation) orchestrated by, and contested among, various actors (e.g., Government officials, hospital directors, IT specialists, clinicians, non-human data systems). ‘Inscriptions’ (e.g., policy documents, software code) attempt to steer these translations.</p> |
| <b>Role of Actors &amp; Intermediaries</b>                  | <p>Healthcare staff categorised by innovativeness (innovators, early adopters, laggards). Opinion leaders and change agents within the healthcare social system influence adoption decisions.</p>  | <p>Human actors (e.g., IT specialists, medical professionals, administrative staff) and non-human actants (e.g., specific MAC software, data platforms, performance indicators) form alliances. Intermediaries (and particularly mediators) actively translate, negotiate, and reshape the digital MAC and its associated practices.</p>  |
| <b>Organisational Adaptation &amp; Technological Change</b> | <p>Reinvention of digital MACs at local hospital/clinic level to better fit specific needs and constraints. Eventual routinisation of the (potentially modified) digital MAC into standard operating procedures. Changes are</p>                       | <p>Digital MACs and the healthcare organisation led to the two-way process. The digital MAC is transformed by being enrolled into the network (its meaning, use, and perceived form change). The network (organisation) is also transformed by the presence and</p>   |

| Key Concept                  | Diffusion  | Translation  |
|------------------------------|--|--|
|                              | made to the technology based on experience.  | functioning of the digital MAC. The sociotechnical fabric is reconfigured.   |
| <b>Sociotechnical Stance</b> | The digital MAC (technology) is introduced into the public healthcare social system. Focus is on the interface and factors affecting the transfer of technology to users and its subsequent impact on the social system. | The digital MAC and healthcare practices/actors constitute an inseparable sociotechnical imbroglio. Perceived separation or stability of the technology is an effect of successful network alignment and black boxing, not an inherent property. |

*Source:* Adapted by authors from McMaster et al. (1997) to the context of digital MACs in public healthcare

As Table 1 illustrates, these two theoretical traditions offer different, yet potentially complementary, ways of interpreting the introduction and assimilation of digital MACs. DoI provides a valuable vocabulary for describing the observable patterns of spread and categories of adopters, while Translation Sociology directs attention to the underlying processes of construction, negotiation, and the dynamic interplay of human and non-human elements that shape what the digital MAC ultimately becomes in practice. Recognising these distinct yet synergistic perspectives form the basis for the integrated analytical approach adopted in this study, which will be elaborated in the following section.

#### ***An integrated analytical approach: Synthesising insights for nuanced understanding***

Drawing from two complementary perspectives, DoI theory furnishes valuable frameworks for understanding the macro-level patterns and stages of innovation adoption, and SoT offers nuanced insights into the micro-processes of active construction, negotiation, and network formation, this study posits that an integrated analytical approach, drawing upon the complementary strengths of both, is essential for a comprehensive understanding of digital

MAC adaptation within the Thai public healthcare context. The rationale for such integration lies in the recognition that the journey of a digital MAC is simultaneously a process of diffusion - it is intended to spread and be adopted across the organisation - and a process of translation - it is actively shaped, interpreted, and transformed by those who engage with it. The experience of management accountants grappling with digitalisation, where diffused technological expectations meet individual and collective interpretation and enactment, leading to potential role stress (van Slooten *et al.*, 2024), exemplifies this duality. This dual perspective functions on both a tactical and strategic level. Tactically, it allows for a fine-grained analysis of day-to-day adaptations and workarounds. Strategically, it reveals how these localised actions, in aggregate, can reshape long-term organisational trajectories and the very meaning of the innovation itself. Similarly, the way digital tools are not just adopted but become performative in shaping daily work and stakeholder relations in contexts like NGOs (Adhikari *et al.*, 2023) underscores the intertwined nature of diffusion and translation. This dual nature necessitates an analytical strategy capable of capturing both its broad trajectories and its situated, actor-driven constructions.

Adopting such an integrated approach offers several advantages for the analysis. Firstly, it facilitates bridging macro and micro perspectives. DoI can assist in outlining the broader, often hierarchically driven, diffusion pathways of digital MACs, including the influence of mandates and systemic pressures such as crisis-accelerated diffusion. SoT, in turn, enables a deeper investigation into the specific, localised ways in which these diffused innovations are made sense of, contested, adapted, and ultimately enacted by different groups of actors at the operational level.

Secondly, this approach allows for a more robust understanding of the interplay between structure and agency. While DoI often highlights structural factors influencing adoption (e.g.,

organisational characteristics, attributes of the innovation), SoT brings actor agency to the forefront, demonstrating how individuals and groups, even within ostensibly constraining structures, actively shape technological trajectories. An integrated analytical view can therefore explore how centrally mandated diffusion initiatives (representing structural elements) are encountered, interpreted, and modified by local translation efforts (representing agentic responses).

Furthermore, this integration serves to provide enriched explanations of key empirical phenomena, particularly when considering the organisational-level adoption process. Rogers (2003) outlined '*The Innovation Process in Organisations*' through five sequential stages: ***Agenda-Setting*** (where general organisational problems are defined that may create a perceived need for an innovation), ***Matching*** (where a problem from the organisation's agenda is fitted with an innovation), ***Redefining/Restructuring*** (where the innovation is reconfigured to fit the organisation, and the organisation itself may adapt), ***Clarifying*** (as the innovation is put into more widespread use and its meaning becomes clearer to members), and ***Routinising*** (when the innovation becomes incorporated into the regular activities of the organisation and loses its separate identity).

While these stages provide a useful map of organisational adoption, SoT can illuminate the complex social processes occurring within each. For instance, the Agenda-Setting and Matching stages in DoI can be viewed as sites of intense Problematisation (Callon, 1986), where powerful actors define organisational problems in ways that make certain digital MACs appear as obligatory passage points. The Redefining/Restructuring stage, where DoI acknowledges modification of the innovation, becomes particularly rich when analysed through a Translation lens; it is here that the active work of Interessement and Enrolment (Callon, 1986) by various actors (including intermediaries) shapes how the digital MAC is

modified, resisted, or accepted, and how its relationship with existing organisational structures and practices is negotiated. This is far more than a simple technical adjustment; it involves the forging of alliances and the alignment (or misalignment) of interests. Similarly, the DoI stages of Clarifying and Routinising can be seen as the ongoing Mobilisation of an actor-network, where the meanings and uses of the digital MAC are continuously negotiated and stabilised (or destabilised) within the organisation. Thus, concepts from SoT can provide analytical depth to understand the how and why of the transitions and transformations occurring across Rogers' broader organisational diffusion stages. The individual roles of 'opinion leaders' or 'change agents' identified in DoI can also be re-conceptualised through a Translation lens as crucial 'intermediaries' or 'mediators' (Latour, 2005), who are actively involved in translating objectives, mediating between stakeholders, and reconfiguring the innovation itself, rather than merely influencing adoption decisions. Even the fundamental DoI concept of reinvention (Rice and Rogers, 1980) is, at its core, a translational process whereby the innovation's original form and meaning are altered to align with new contexts and interpretations.

Consequently, in the analytical phase of this research, Rogers' (2003) model of the organisational innovation process, alongside the individual innovation-decision process, will be employed as a framework to understand the broader dissemination strategies, adoption patterns, and temporal dynamics associated with the digital MACs within the Thai public healthcare network. These DoI concepts will act as sensitising devices to identify key phases and overarching influences. Simultaneously, core concepts from SoT - such as the moments of translation, the role of mediators, and the formation of actor-networks - will be utilised to investigate the intricate negotiations, the pivotal roles of diverse human and non-human actors (including the technology itself), and the resultant transformations that characterise the on-the-ground implementation process. This approach facilitates a localised and contextual analysis

of the broader diffusion patterns identified by DoI, viewed through the lens of translation; it involves using DoI to map the general landscape of diffusion and then applying SoT concepts to zoom in on critical events, actor interactions, and points of adaptation within that local landscape. By adopting this dual theoretical lens as a sensitising framework, the research aims to build a richer, more multi-layered interpretation of the empirical data. It is anticipated that this approach will provide a robust foundation for the subsequent development of an empirically grounded conceptual model (to be presented in the Discussion section).

### ***5.2.2 Contextualising digital MACs adaptation: Professional and system dynamics***

The introduction and integration of digital MACs within complex organisational settings, such as hierarchical public healthcare systems, are profoundly shaped by the interplay between the technologies themselves, the professional landscape, and the overarching control architectures. This section builds upon the integrated DoI and SoT framework outlined in the previous section by delving into specific theoretical dimensions crucial for understanding this adaptation. We first explore the inherent challenges digital MACs pose to professional practice within bureaucratic structures. Subsequently, we examine the transformative impact of datafication on MACs. Finally, we theorise the emergence of adaptive professional practices - specifically hybrid expertise and hidden work - as outcomes of, and responses to, these dynamics, particularly through processes of constrained translation.

#### ***The challenge to professional practice: Digital MACs in bureaucracies***

The implementation of digital MACs within healthcare contexts, especially those characterised by strong professional roles and bureaucratic control systems, often generates significant epistemological and practical tensions. As van Slooten *et al.* (2024) argue, such digitalisation can lead to MAs experiencing role conflict and ambiguity as their established role templates

are challenged and new, sometimes unclear, ones emerge. These tensions arise from the interaction between administrative desires for oversight and the autonomy traditionally exercised by healthcare professionals, a dynamic that is amplified and reconfigured by digitalisation. The experience of the NHS (Smith *et al.*, 2005) highlighted how organisational change, including shifts in control and accounting practices, can impact public sector entities with strong professional cadres.

A foundational premise in understanding these dynamics is the potential incongruence between formal administrative controls and the operational realities of organisations where core activities are dominated by professionals (Abernethy and Stoelwinder, 1995). Clinicians, often possessing a strong professional orientation, may resist or critically engage with controls perceived as threatening their autonomy, infringing upon professional values, or conflicting with patient care priorities. This can lead to a 'clash of cultures' between professional and bureaucratic modes of control (Abernethy and Stoelwinder, 1995), a tension that becomes particularly acute with the introduction of digital MACs that promise enhanced visibility and standardisation. The very nature of professional work, which often relies on tacit knowledge and discretionary judgment, can be challenged by digital systems that seek to codify and monitor practices. Through this process, subjective professional judgements risk being monitored by objective, standardised metrics, which can ultimately impact the quality of patient care and public service delivery.

The digital transformation of MACs intensifies these traditional tensions by introducing new dimensions of visibility through datafication and novel forms of algorithmic governance, which can fundamentally reconfigure the parameters of professional practice (Quattrone, 2016). As Foucault and Deleuze (1977) suggested, new forms of visibility can also be new forms of power

and control. This is particularly relevant as digital MACs are diffused, often through mandated, top-down mechanisms in public sector hierarchies (Lapsley and Wright, 2004; Malmi, 1999). Such diffusion pathways may offer limited scope for initial negotiation, thereby foregrounding the importance of subsequent translation processes enacted by organisational members. The friction between these increasingly pervasive digital controls and established professional logics can lead to the development of new professional configurations, sometimes manifesting as a hybrid professional ethos (Kurunmäki, 2004), where professionals incorporate managerial or technical competencies (a point further elaborated in Section 2.2.3).

These dynamics are not monolithic across the organisation but manifest with varying intensity and form at different levels, leading to multilevel hybridity (Grossi *et al.*, 2017; Grossi *et al.*, 2024). *At the macro-level*, encompassing societal and policy spheres, hybridity can be observed in fundamental shifts in healthcare governance and accountability frameworks. Here, digital systems reconfigure institutional oversight and regulatory compliance, with accounting systems acting as powerful instruments in reshaping professional boundaries and generating new patterns of institutional control (Preston *et al.*, 1992). These macro-level transformations consequently establish the broader parameters within which professional practice must adapt. Moving to *the meso-level*, or the organisational sphere, hybridity is evident in the reconfiguration of control systems, which can potentially lead to new power centres based on digital expertise and data management capabilities. At this level, organisations may develop hybrid accountability mechanisms that attempt to bridge diverse institutional logics, such as integrating clinical and administrative objectives (Caperchione *et al.*, 2017), though in practice some of these logics may become dominant while others remain more symbolic. These meso-level transformations often underscore the crucial role of intermediaries in translating central directives. Finally, at *the micro-level*, involving individuals and groups, hybridity emerges

through the adaptive practices of professionals. For instance, healthcare professionals develop strategies to maintain essential clinical autonomy while ostensibly satisfying administrative reporting requirements imposed by digital MACs, leading to new forms of professional identity. Begkos and Antonopoulou (2022), for example, explored how clinical engagement with performance metrics and accounting technologies in the English NHS led to hybridisation as practice, where clinicians actively shaped and were shaped by these systems. Their study showed professionals engaging in decoupling, negotiating, and reinterpreting metrics to align with clinical priorities, thereby illustrating a form of active translation.

The successful implementation of accounting innovations, as Abernethy and Bouwens (2005) argued, often requires a degree of decentralisation and substantive user involvement to mitigate resistance and ensure that systems are adapted to local needs. Their research suggests that for innovations to be effectively integrated, practitioners need both the adaptability to respond to new information and influence over system design. However, these conditions are frequently absent in hierarchical public healthcare bureaucracies, particularly in emerging economies, where implementation is often mandated, and resources for local adaptation are scarce (van Helden and Uddin, 2016). This scarcity of formal modification opportunities amplifies the significance of informal translation processes.

Within these emerging economy contexts, contextual factors such as prevailing cultural practices, entrenched organisational hierarchies, resource constraints, and specific institutional arrangements profoundly influence how digital innovations are interpreted, translated, and enacted (van Helden *et al.*, 2021). The integrated theoretical framework of this paper, combining DoI and SoT, seeks to extend Abernethy and Stoelwinder's (1995) conceptualisation of professional-bureaucratic tensions. Specifically, we focus on how these tensions are navigated and mediated in the era of digital MACs through the active translation

efforts of various actors, including strategically positioned intermediaries (such as IT specialists), and how these efforts lead to the emergence of adaptive professional practices. The inherent rigidity of such systems often necessitates that translation becomes a more covert or constrained activity, shaping the innovation from within accepted boundaries.

### ***Datafication and the transformation of management accounting controls***

The evolution of MACs is increasingly driven by *datafication*, the socio-technical process of transforming diverse aspects of organisational practices, services, and social relations into quantifiable data, which can then be used to generate novel forms of value and insight (Mayer-Schönberger and Cukier, 2013). Moll and Yigitbasioglu (2019) explicitly discussed how big data and the transformation of accounting information are reshaping the accounting field, noting that the proliferation of digital technologies significantly contributes to the big data phenomenon and necessitates new forms of management and analysis. This phenomenon is more than mere digitisation (the technical conversion of analogue to digital formats); it represents a profound epistemological reconfiguration of how accounting intelligence is constructed, disseminated, and operationalised within complex organisational, particularly bureaucratic, architectures (Mergel *et al.*, 2019). As healthcare institutions become embedded within interconnected digital ecosystems, characterised by the convergence of vast datasets and an intensification of analytical capabilities (Mergel *et al.*, 2016; Redden, 2018), unprecedented extractive capabilities for generating managerial insights emerge.

This transformation through datafication creates new calculative spaces where traditional accountability relationships are fundamentally reconstituted through dynamic socio-technical interactions. These interactions establish novel forms of visibility (and invisibility), calculability, and, increasingly, algorithmic governance, where decisions may be influenced or

driven by automated data analysis. Such changes directly impact the nature of the innovation (digital MACs) as conceptualised in DoI theory - altering its perceived complexity, trialability, and the nature of its relative advantage. From SoT perspective, datafication introduces powerful new actants (e.g., algorithms, integrated databases, dashboards) and inscriptions (e.g., digital performance reports, automated alerts) that actively shape the processes of problematisation, interessement, enrolment, and mobilisation. The capacity of digital technologies such as cloud-based analytics and AI to support access to distributed ledgers and big data, automate decision-making and improve financial visibility, fundamentally alters the actor-network around MACs (Moll and Yigitbasioglu, 2019).

It is particularly noteworthy, as elucidated by recent work such as Begkos *et al.* (2024), that digital performance measurement architectures stemming from datafication can simultaneously centralise financial governance while also necessitating enhanced clinical engagement to interpret and operationalise the data through an integrated technological infrastructure. To conceptualise these dynamics, it is useful to draw upon archetypes of datafication systems described in existing literature, often from healthcare contexts like the UK's NHS, as they provide a valuable framework for analysing the specific systems encountered in our Thai case.

For instance, at a macro-organisational level, systems performing functions analogous to Service Line Reporting (SLR) are described as enabling top-down financial analytics (Begkos *et al.*, 2024). These can facilitate strategic resource allocation by enhancing the visibility of cost structures and performance metrics. Such systems are theorised to establish new accountability parameters by demarcating financial responsibility boundaries across previously integrated service domains, leading to situations where technological systems and human actors become deeply intertwined in practice. In emerging economy contexts, the introduction of such data-intensive systems often encounters significant implementation challenges related

to data standardisation, infrastructure limitations, and technical capacity deficits. These challenges can fundamentally reshape how the intended functionalities manifest within specific institutional environments and become key sites for translation efforts.

At a meso-organisational level, the literature describes systems with capabilities akin to *Patient-Level Information & Costing Systems (PLICS)*, which instantiate granular cost analysis methodologies (Begkos *et al.*, 2024). These are purported to enable unprecedented analysis of individual patient costs through sophisticated algorithmic calculation frameworks. This granular approach represents a fundamental shift from traditional aggregate measurement frameworks toward micro-level performance analytics, which can reconfigure both professional practice parameters and institutional evaluation mechanisms. Within healthcare bureaucracies often characterised by limited formal opportunities for modification, the introduction of these types of systems may generate distinctive patterns of adaptation and translation as practitioners navigate between standardised reporting requirements and operational realities constrained by resource limitations and varying technological capabilities.

Further, at the micro-organisational level, the integration of clinical, operational, and financial dimensions, for example through comprehensive systems like *Electronic Patient Records (EPR)* or similarly functioning information ecosystems, is shown to fundamentally reconfigure professional boundary work by enhancing visibility across previously discrete operational domains (Begkos *et al.*, 2024). Literature suggests that while such standardised systems aim to enhance operational efficiency through uniform performance metrics, they can simultaneously generate significant unintended consequences. These may include increased task complexity, multifaceted professional resistance patterns, and operational disruptions that fundamentally challenge implementation trajectories and necessitate significant local translation (Glenngård and Ellegård, 2024). The adoption of standardised clinical coding protocols within such

systems, for instance, represents a particularly significant epistemological transformation in how healthcare practices are conceptualised and monitored. This standardisation process converts qualitative clinical encounters into structured, analysable datasets, theoretically enabling predictive analytics and algorithmic decision support mechanisms, though the practical realisation is subject to contextual interpretation and adaptation.

This study seeks to investigate the complex interconnectedness among organisational, group, and individual levels (Grossi *et al.*, 2024), examining how digital MACs, reshaped by datafication, catalyse multilevel hybridity. By focusing on the translation processes occurring during the implementation stage of Rogers' (2003) model, this research illuminates how practitioners negotiate centralised mandates shaped by datafication controls with operational realities. This analytical approach, integrating DoI with SoT, allows an examination of how constrained agency operates, revealing patterns of strategic adaptation even within environments offering limited formal modification opportunities. The way these datafication systems (regardless of their specific local names or configurations, such as those found in Thailand) are integrated and used in a specific context will depend heavily on these translation efforts.

#### ***Emergent adaptive practices: Theorising hybrid expertise and hidden work in translation***

The profound transformations in MACs brought by digitalisation and datafication necessitate corresponding shifts in professional identities, skills, and day-to-day practices within healthcare organisations. As innovations are diffused and translated, particularly under conditions of constraint common in public sector hierarchies, new forms of expertise and work patterns emerge. Two influential theoretical constructs that illuminate these professional transformations are the hybrid professional ethos (Kurunmäki, 2004), further explored in

contemporary healthcare settings through concepts like hybridisation as practice (Begkos and Antonopoulou, 2022), and the concept of hidden work (Barnard *et al.*, 2024). These concepts, when viewed through the lens of SoT, help explain how professionals adapt to and co-construct the reality of digital MACs. The evolving role of management accountants in this digital era, potentially leading to a ‘double-edged sword’ of increased role stress for some versus new opportunities for others (van Slooten *et al.*, 2024) underscores the need for such adaptive practices.

Kurunmäki (2004) seminal study documented how Finnish medical professionals, in response to healthcare reforms involving new accounting practices, developed the hybrid professional ethos. They actively incorporated calculative accounting practices and managerial competencies into their professional repertoire, integrating this new expertise with their existing clinical knowledge rather than merely being subjected to it. Similarly, Begkos and Antonopoulou (2022) investigated the hybridisation practices medical managers engage in to promote accounting and performance measurement within the English NHS, demonstrating how these managers enact hybridity through specific micro-activities such as equivocalising and de-stigmatising to encourage clinical engagement with accounting technologies. This hybridisation transformed their professional identity and was facilitated by a context where accounting practices were viewed as transferable techniques, not exclusive professional territory. This perspective is vital as it challenges assumptions of fixed professional boundaries and highlights how expertise can diffuse and be translated across domains through the mobilisation and adaptation of techniques. Digitalisation has thus challenged conventional professional boundaries, making them more fluid and mobile concepts. The need for accountants to develop new skills and competencies to remain relevant in an increasingly digital economy, as highlighted by Moll and Yigitbasioglu (2019), resonates strongly with this

idea of hybridisation, where professional roles expand to incorporate new, digitally driven expertise. This aligns with the DoI concept of reinvention, where users modify an innovation, but SoT further allows us to see this as an active reshaping of both the innovation and the identity of the translator.

Building upon and complementing such hybrid professional ethos, the concept of hidden work, particularly 'hidden care work' as articulated by Barnard *et al.* (2024) in primary healthcare, describes non-patient-facing activities undertaken by medical professionals. These activities - such as administrative tasks, system navigation, peer support, and workarounds - are crucial for high-quality patient care but often remain invisible within formal accountability frameworks and are under-recognised. This concept is particularly salient in the context of digital MAC implementation, where the formal system may create new burdens or fail to align with practical realities, necessitating significant hidden work to bridge the gap. The pressures of organisational change in public sector entities can often lead to increased workloads and the necessity for staff to find workarounds to meet targets (Smith *et al.*, 2005), which can be conceptualised as a form of hidden work.

The significance of such hidden work may be particularly pronounced in specific socio-cultural and economic contexts, such as those found in emerging economies or the global south. In these settings, resource constraints might necessitate greater reliance on informal support systems, and as our study suggests, cultural values emphasising collective responsibility can also shape the nature and extent of these often unrecognised, yet vital, efforts, making hidden work a culturally embedded phenomenon. The challenges of digital illiteracy or unequal access in resource-constrained environments, as noted by Adhikari *et al.* (2023), may also compel users to engage in extensive hidden work to navigate or compensate for system limitations. These contextual and cultural nuances can influence how translation processes manifest

through hidden work, making it a critical lens for understanding adaptation, though it must be recognised that this hidden labour can place a significant, and sometimes intolerable, burden on professionals. This hidden work can be seen as a direct consequence of, and a crucial component of, the translation process, where actors make the innovation workable in their local setting.

Integrating these perspectives on hybrid expertise and hidden work within a DoI and Translation framework provides a richer understanding of adaptation by illuminating several critical dimensions. Firstly, it highlights the epistemological reconfiguration and skill development required, as professionals engage in translation by learning new skills, often informally, leading to a hybridisation of their knowledge base that is central to forming a hybrid professional ethos. Secondly, it underscores strategic adaptation within institutional constraints, where, in hierarchical settings with mandated innovations, professionals engage in constrained translation by subtly adapting practices, developing workarounds (which constitutes hidden work), and selectively using system features. This reveals a form of agency operating within structural limitations. Thirdly, this integration brings to light the interplay of visible and invisible labour; while datafication MACs make certain tasks highly visible, they often concurrently increase the need for hidden work to manage these new systems or compensate for their deficiencies - labour critical for successful diffusion but frequently unacknowledged. Finally, through these processes of acquiring new skills, adapting practices, and performing hidden work, professional identities themselves are translated and reconfigured, becoming hybridised to embody a blend of competencies and to navigate multiple, sometimes conflicting, logics.

This integrated analytical framework, which anticipates the emergence of hybrid expertise and hidden work as key features of the translation of digital MACs, appears particularly valuable

for investigating how these systems transform professional expertise within bureaucratic structures. The development of hybrid professional expertise, augmented by necessary hidden work, is not merely a passive outcome but an active process of translation where individuals and groups strive to make innovations functional and meaningful within their specific, often constrained, operational worlds. This is more than just reinvention; it is the ongoing social construction of both the technology-in-use and the professional-in-practice.

## 5.3 METHODOLOGY

### 5.3.1 *Research context*

Thailand's healthcare system presents an exemplary empirical context for examining the implementation dynamics of digital management accounting controls within hierarchical bureaucratic structures. The nation's healthcare network represents an institutional architecture characterised by the multilevel hybridity - wherein transformations in management accounting controls manifest simultaneously across macro (societal), meso (organisational), and micro (individual) levels, yet operate within rigid accountability frameworks that significantly constrain practitioner agency. This multilayered governance structure creates distinctive patterns of diffusion as innovations traverse multiple institutional echelons from central ministerial directives through regional health offices to localised implementation contexts.

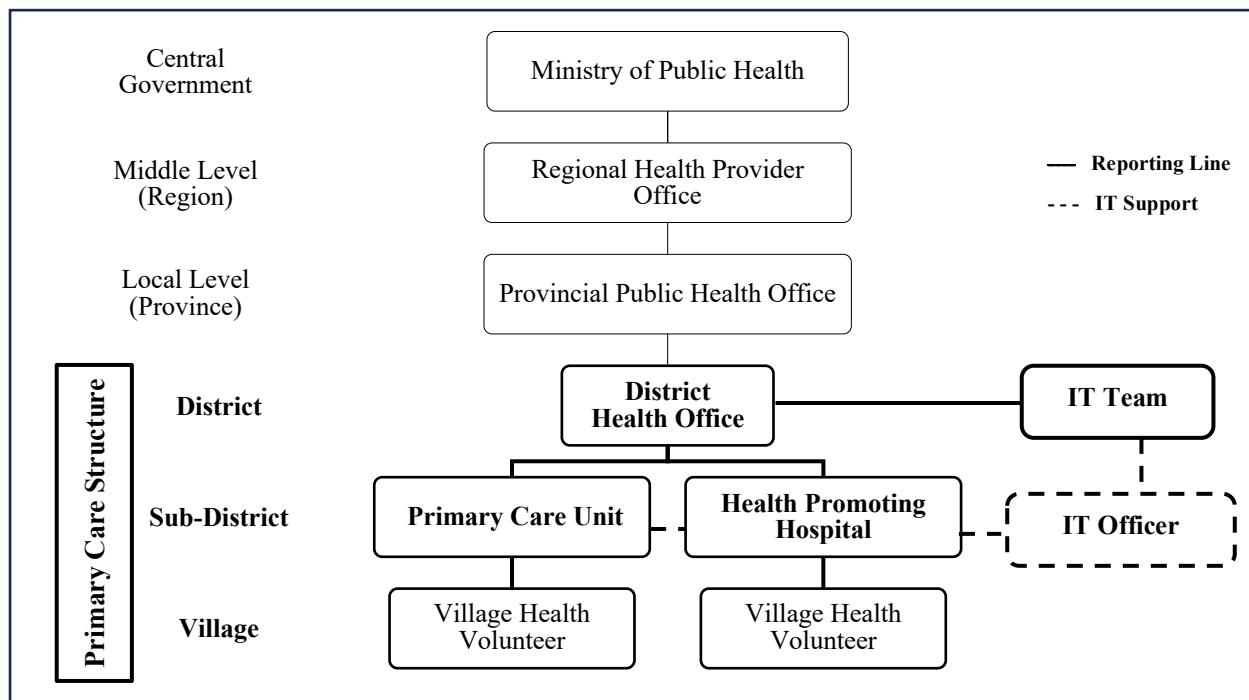
The District Health Office in Southern region represents a theoretically significant research site that exemplifies the complex interrelationships between administrative control architectures, clinical operations, and technological infrastructure within Thailand's decentralised healthcare system. The district office coordinates a comprehensive service network encompassing five Primary Care Units staffed by multidisciplinary healthcare professionals, including physicians and specialists, and sixteen Sub-district Health Promoting Hospitals. This organisational structure serves a population exceeding 91,211 residents and employs 131 healthcare

practitioners, including 16 physicians, supplemented by an extensive community network of 1,391 village health volunteers (Department of Health Service Support, 2024).

As illustrated in Figure 5-1, a distinctive characteristic of this organisational context is the integration of information technology expertise throughout the service delivery architecture. The selective District Health Office diverges significantly from conventional district healthcare administrative structures in Thailand by establishing a strategically distributed IT department comprising 22 personnel - a central IT manager (programmer) who oversees 21 IT officers embedded throughout the organisational network, with dedicated IT support stationed at each of the sixteen Sub-district Health Promoting Hospitals and five Primary Care Units. This distributed technological expertise provides exceptional analytical opportunities for examining how digital MACs diffuse and are translated, and the emergence of strategic intermediation within constrained environments. This configuration exemplifies the centres of calculation (Latour, 1987) – nodes within networks where information is gathered, processed, and redistributed, creating critical translation points shaping how the innovation is adapted.

The first author's embedded positionality within the regional academic community, serving as a university lecturer with established networks among healthcare authorities, strengthened methodological access and interpretive capabilities. This institutional positioning, combined with familial connections to key organisational stakeholders, facilitated exceptional access to organisational processes and implementation dynamics typically inaccessible to external researchers. Additionally, the researcher's prior professional engagement within the region during 2020-2022 provided essential contextual understanding of the district health office's evolutionary trajectory in control methodologies during the COVID-19 pandemic, enabling a richer longitudinal perspective on the adaptation process.

**Figure 5-1** Thai national health service with IT support of selective district health office



### 5.3.2 Data collection

To build a rich, contextualised understanding suitable for theory development, this investigation employed an extended ethnographic approach (O'Reilly, 2009, 2012) over six months (August 2023 – January 2024). Ethnography, though historically less prevalent in accounting research (Kalyta and Malsch, 2018), is increasingly recognised for its power in uncovering the nuances of organisational life and informing theory (Ahrens and Chapman, 2006). Influential discussions on ethnographic applications and its value in accounting, such as those by Deng (2023) exploring its scientific aspirations, and Bamber and Tekathen (2023) detailing the lived experiences of accounting ethnographers, highlight its strength in investigating organisational transformation, understanding lived realities of accounting practices, and developing nuanced theory from empirical observations, especially in complex or emerging contexts.

Our approach was informed by Latour's (1987) concept of the 'accumulation cycle,' emphasising recursive encounters with events to deepen understanding. Data collection was designed to capture the multi-level hybridity (Grossi *et al.*, 2017; Grossi *et al.*, 2024) inherent in the adaptation process, gathering data across macro (societal/policy), meso (organisational), and micro (individual practitioner) levels. This involved several integrated methods. Firstly, documentary analysis entailed a systematic review of Thailand's national healthcare policy frameworks, digital governance mechanisms (especially during the pandemic), technological specifications, control system documentation, performance metrics, and internal communications, which helped to trace the intended diffusion pathways and formal structures. Secondly, 50 in-depth, semi-structured interviews were conducted across three hierarchical levels to capture diverse perspectives on implementation and adaptation. This included discussions at the strategic level (n=10) with executive directors, senior administrators, and doctors involved in setting implementation parameters and resource allocation; the intermediate level (n=9) with departmental managers and IT specialists acting as translational intermediaries; and the implementation level (n=31) with frontline clinical staff (General Practitioners – doctors, and Nurses), village health volunteers, accountants, and auditors directly engaging with the digital MACs. Further details of the interview participants are provided in Table 5-2.

To ensure the representativeness of these interview participants, a stratified purposive recruitment strategy was combined with snowball sampling (Saunders *et al.*, 2019). This approach allowed access to a diverse range of actors - from executive directors to village volunteers - mitigating selection bias by capturing voices beyond just those recommended by management (O'Reilly, 2012).

**Table 5-2** Description of the interview

| No. | Code        | Function /Area   | Duration (minutes) | No. | Code         | Function /Area   | Duration (minutes) |
|-----|-------------|------------------|--------------------|-----|--------------|------------------|--------------------|
| 1   | Executive 1 | Director         | 54                 | 26  | GP 7         | Public relations | 39                 |
| 2   | Executive 2 | Programmer       | 90                 | 27  | GP 8         | Public relations | 32                 |
| 3   | Executive 3 | Programmer       | 40                 | 28  | GP 9         | Epidemiology     | 38                 |
| 4   | Executive 4 | Director         | 69                 | 29  | GP 10        | Accounting       | 41                 |
| 5   | Executive 5 | Director         | 120                | 30  | Accountant 1 | Accounting       | 43                 |
| 6   | Manager 1   | Data Management  | 45                 | 31  | Accountant 2 | Accounting       | 35                 |
| 7   | Manager 2   | Public relations | 55                 | 32  | Accountant 3 | Accounting       | 30                 |
| 8   | Manager 3   | NCD              | 39                 | 33  | Volunteer 1  | Village No. 02   | 24                 |
| 9   | Manager 4   | Accountability   | 35                 | 34  | Volunteer 2  | Village No. 01   | 40                 |
| 10  | Manager 5   | Epidemiology     | 51                 | 35  | Volunteer 3  | Village No. 03   | 16                 |
| 11  | ITO 1       | IT-Officer       | 60                 | 36  | Volunteer 4  | Village No. 08   | 25                 |
| 12  | ITO 2       | IT-Officer       | 57                 | 37  | Volunteer 5  | Village No. 08   | 27                 |
| 13  | ITO 3       | IT-Officer       | 65                 | 38  | Volunteer 6  | Village No. 04   | 41                 |
| 14  | ITO 4       | IT-Officer       | 36                 | 39  | Volunteer 7  | Village No. 09   | 40                 |
| 15  | Doctor 1    | General Clinic   | 58                 | 40  | Volunteer 8  | Village No. 05   | 33                 |
| 16  | Doctor 2    | Dental Care      | 52                 | 41  | Volunteer 9  | Village No. 05   | 22                 |
| 17  | Doctor 3    | General Clinic   | 47                 | 42  | Volunteer 10 | Village No. 04   | 32                 |
| 18  | Doctor 4    | Dental Care      | 42                 | 43  | Trainee 1    | Internship       | 49                 |
| 19  | Doctor 5    | General Clinic   | 36                 | 44  | Trainee 2    | Internship       | 25                 |
| 20  | GP 1        | Antenatal Care   | 50                 | 45  | Trainee 3    | Internship       | 28                 |
| 21  | GP 2        | General Clinic   | 43                 | 46  | Trainee 4    | Internship       | 43                 |
| 22  | GP 3        | Public relations | 48                 | 47  | Trainee 5    | Internship       | 28                 |
| 23  | GP 4        | General Clinic   | 32                 | 48  | Auditor 1    | Auditing         | 69                 |
| 24  | GP 5        | Data Management  | 34                 | 49  | Auditor 2    | Auditing         | 30                 |
| 25  | GP 6        | NCD              | 39                 | 50  | Auditor 3    | Auditing         | 30                 |

Thirdly, to complement individual interview data and capture collective negotiation dynamics, six strategically designed focus groups were conducted, as detailed in Table 5-3. These discussions provided methodologically significant opportunities to observe real-time negotiation processes between different stakeholders, revealing how organisational actors collectively interpret and translate digital MACs within their specific institutional contexts.

**Table 5-3** Description of the focus groups

| No. | Members | Function / Area   | Duration (minutes) |
|-----|---------|-------------------|--------------------|
| 1   | 5       | Patients          | 36                 |
| 2   | 3       | Patients          | 37                 |
| 3   | 3       | Patients          | 33                 |
| 4   | 5       | Volunteers        | 35                 |
| 5   | 5       | Local Government  | 70                 |
| 6   | 3       | Doctor and Nurses | 46                 |

Furthermore, extensive participant observation, comprising 87 hours in board and sub-meetings and 80 hours documenting daily operations, captured formal decision-making, clinical workflows, IT support interventions, and informal practices, including shadowing key actors to understand improvisational practices and workarounds. Finally, the researchers maintained a shared digital field diary throughout the ethnographic immersion, documenting observations, personal reflections, and emergent analytical insights. This diary was crucial for ongoing reflexive analysis (Brewer, 2000) and for tracing the evolution of understanding.

To understand the flow of influence and interpretation across hierarchical levels, we systematically traced how specific policy directives cascaded through the organisation and observed interactions at key junctures between different levels. Data from these multiple sources were systematically triangulated (Creswell and Miller, 2000) to enhance the credibility and robustness of the emerging theoretical constructs.

### **5.3.3 Data analysis**

Data analysis was an iterative and inductive process, conducted concurrently with data collection, which allowed for a dynamic interplay between empirical observations and conceptual development. This approach facilitated the development of themes and concepts directly from the data. The shared digital diary was instrumental in this, allowing the research team to capture and discuss emergent patterns and refine data collection strategies in real-time.

Our analytical process privileged ‘epistemological reflexivity’ – a critical self-examination of the researcher’s influence on the research process and interpretations, ensuring that findings were grounded in participants’ meanings rather than solely researcher presuppositions (Bamber and Tekathen, 2023; Brewer, 2000). The use of MAXQDA 2025 (MAXQDA, 2025) was integral to managing the dataset and systematically conducting our inductive analysis, aligning with established practices for computer-assisted qualitative data analysis.

The analytical trajectory involved systematic coding cycles, primarily following the spirit of Miles *et al.*’s (2020) The first stage involved an initial open coding process, where interview transcripts, field notes, and documents were subjected to In-Vivo coding and descriptive coding to preserve authentic expressions and identify initial concepts and categories directly from the data. MAXQDA’s ‘Open Coding’ mode was utilised here, allowing for efficient creation of new codes directly from highlighted text segments, with options to assign colours for preliminary organisation and to attach initial analytical thoughts as code memos or segment comments. In-vivo codes, using participants’ exact words, were also systematically created using MAXQDA’s dedicated function to ensure emergent concepts remained grounded in the empirical data; these were often initially grouped under a specific parent code for easy identification and later review. This initial breaking up of the data generated broad analytical domains, as illustrated in Figure 5-2 - Initial Codes.

Subsequently, in a phase of focused coding and category development, the initial codes and categories were systematically compared, contrasted, and grouped to develop more abstract and refined theoretical constructs. The ‘Code System’ within MAXQDA was actively managed throughout this stage; codes were merged where conceptually similar, sorted (e.g., alphabetically or by thematic relevance using colours), and structured into hierarchies with

parent codes and subcodes to build conceptual density. The properties and dimensions of emerging categories were elaborated by creating detailed code memos or by developing further subcodes. This phase involved an abductive reasoning process – iterating between the empirical data and existing theoretical lenses (DoI and SoT, as sensitising concepts) to explore relationships and develop deeper explanations. The software facilitated systematic coding, retrieval, and the constant comparison of incidents and codes across the dataset, which is a cornerstone of rigorous qualitative analysis.

The third stage, thematic organisation and conceptual model development, involved further iteration and refinement where core categories and their properties were identified and integrated into overarching themes. For instance, the initial domains such as ‘Workload Imbalance,’ ‘Manual Processes Preference,’ ‘Paper vs. Digital Preference,’ ‘Tension Between Targets and Patient-Centred Care,’ and ‘Data Accessibility and Utilisation’ were further analysed, leading to the development of the theme Localised Professional Practices and Identity Transformation [LOC], which encompassed sub-themes such as Hybrid Professional Ethos and Hidden Work Processes. These specific sub-themes emerged from the data coded under the broader initial concept, rather than [LOC] being a singular code applied directly. The systematic use of memos within MAXQDA was crucial during this stage; code memos captured evolving definitions and relationships of categories, while free analytical memos were used to draft integrative theoretical insights and explore connections between categories.

**Figure 5-2** Summary of codes and thematic organisation in developing the conceptual model



Figure 5-2 summarises the evolution of codes into the main thematic dimensions that form the building blocks of our conceptual model. The relationships between these themes were

explored using MAXQDA's Code Relations Browser, which helps visualise co-occurrences of codes, and further developed through diagramming in MAXMaps. Concept maps were created in MAXMaps to visually model the emerging relationships between categories and themes, helping to identify a central explanatory category and to refine the structure of the developing theory. This visual tool facilitated the transition from thematic understanding to a more integrated conceptual framework. The analytical refinement led to a coding architecture comprising five primary analytical dimensions (Diffusion Dynamics [DIF], Translation Mechanisms [TRANS], Implementation Processes [IMPL], Adoption Decision Patterns [ADOPT], and Localised Professional Practices [LOC]) and two cross-cutting contextual dimensions (Centralised Control Systems [CENT] and Organisational Mediation [MED]). The connections between these initial codes, revised codes (core categories), and the final thematic structure were carefully mapped to ensure a clear audit trail from data to theory, as depicted in Figure 5-2.

## 5.4 EMPIRICAL GROUNDING

### 5.4.1 *Diffusion dynamics: From fragmentation to mandated integration*

The empirical data reveals that the journey of digital MACs within the Thai public healthcare system was not linear but evolved through distinct phases, each characterised by different diffusion dynamics and pressures. This temporal evolution provides crucial context for understanding how and why certain translation and adaptation mechanisms emerged.

#### *Pre-pandemic phase: Limited diffusion and seeds of problematisation*

Prior to the COVID-19 pandemic, the diffusion of integrated digital MACs was minimal. Instead, the healthcare system was characterised by a fragmented digital landscape, which, as our model will show, created the conditions for later problematisation and intervention.

Executive 2, who also serves as a lead programmer for the district, described this earlier technological landscape:

“Before widespread digital integration, we primarily used offline data applications, sharing information occasionally through individual chats or by uploading files to cloud storage.”

This quote illustrates a low level of innovation adoption, typical of an early or knowledge stage of diffusion for integrated systems. The offline data applications and occasional sharing point to a lack of interconnectedness. This fragmentation likely contributed to various operational challenges such as inefficiencies, potential service delivery delays, and difficulties in coordinated decision-making, forming part of the problem to be addressed. The underdeveloped accountability frameworks further highlight a system ripe for change. Executive 3, another key programmer on the leadership team, linked the subsequent digital transformation directly to heightened accountability demands that were catalysed by an external shock:

“The shift towards enhanced responsibility and improved decision-making, in my view, was directly catalysed by the COVID-19 pandemic.”

This perspective is crucial, as it indicates that while technology was available, a significant external pressure, acted as a powerful catalyst. The pandemic, therefore, triggered a re-evaluation of existing systems and initiated a strong problematisation of the fragmented status quo, paving the way for accelerated diffusion of more centralised and integrated digital MACs.

### ***Crisis-accelerated diffusion: Pandemic-driven implementation***

The COVID-19 pandemic triggered an unprecedented acceleration in the diffusion and implementation timelines for digital MACs. The difficulty in managing the escalating public health crisis with disjointed, manual systems created immense strain on the health facility, highlighting the severe burden of the existing infrastructure. Diffusion processes that might

typically span years, involving gradual persuasion and decision stages, were compressed into months or even weeks due to urgent, top-down mandates. This reflects a shift towards a forced-selection diffusion pattern under crisis conditions. The immense pressure to respond effectively created a palpable sense of urgency and stress among staff. Executive 2 depicted this temporal compression and the resulting imperative succinctly:

“It wasn’t really a choice with the pandemic; we were all thrust into working with online data. The feeling was one of immense pressure. You couldn’t refuse, and we were essentially learning and teaching each other as we went along. The stakes were too high to get it wrong.”

This statement underscores how the crisis bypassed voluntary adoption, creating implementation imperatives. This situation can be seen as part of a disaster management agenda, potentially shifting conventional response frameworks from more flexible or collaborative archetypes to rigid top-down mandates initially. Our integrated model (as depicted in Figure 5-3; to be fully elaborated in Section 5) will explore how subsequent translation efforts introduce collaborative elements back into this rigid diffusion context. This acceleration was particularly noticeable in the rapid deployment of integrated dashboard systems. As Executive 2 elaborated:

“My role involved compiling daily patient reports for region 12, which informed the central government’s national dashboard. This facilitated data-driven policy decisions based on real-time data and enabled citizens to monitor their health during quarantine.”

Figure 5-4 in Appendix visually represents this sociotechnical transformation, illustrating the shift from predominantly offline, periodic data processes to real-time, online integrated systems. The figure highlights the rapid transition from traditional data handling to a datafication environment, where information flow became immediate and critical for crisis management. This visual representation complements Executive 2’s account by showing the practical changes in data infrastructure and usage patterns.

These mandated dashboards also function as powerful inscriptions, attempting to steer the actions and perceptions of diverse actors by making certain data highly visible and central to decision-making. Implementation dynamics during this phase differed markedly from conventional diffusion patterns. Manager 1 detailed how administrative mandates established non-negotiable parameters:

“The district chief urged network hospital IT officers and programmers to prioritise the Digital Health initiative’s completion within six months, emphasising the immediate application of advanced big data systems ahead of other competitive priorities.”

Such directives exemplify the dramatic compression of implementation schedules during the crisis, setting tight deadlines for complex systems. The authoritative language (‘urged’) reflects heightened hierarchical commands typical of crisis situations, replacing consultative approaches with top-down directives. This temporal pressure posed unique challenges, demanding rapid capacity building that often-exceeded organisational readiness, setting the stage for significant translation efforts by those tasked with implementation

#### ***Post-pandemic adaptation: Sustained diffusion and evolving implementation parameters***

As the immediate pandemic crisis subsided, implementation parameters shifted towards more deliberate and systematic approaches, although the pace of digital transformation remained more intense than pre-pandemic levels. While the crisis phase involved reactive implementation driven by urgent needs, the post-pandemic period demonstrated a more proactive, strategic integration of digital MACs into healthcare governance. This phase can be understood as moving towards the implementation and confirmation stages of the innovation-decision process on a wider scale, but still heavily influenced by the initial forced adoption.

This adaptation phase revealed a critical shift where funding became explicitly tied to digital performance, making data-driven controls essential for operational viability and fundamentally driving their continued diffusion. Executive 5 articulated this change:

“The era of data-driven budgeting demands rigorous data controls. I must pay more attention to the data than ever before. Hospitals that ignore or misunderstand big data face significant funding penalties, driving patients to better-funded hospitals. This patient movement triggers a crucial financial resource shift. So, implementing big data applications is now the cornerstone of effective management, with per-patient funding varying widely based on district-specific data.”

This account clarifies how digital management accounting capabilities grew central to resource allocation post-pandemic, reshaping implementation through performance metrics. The executive’s focus on funding mechanisms signals a significant change: digital competencies evolved from optional skills to strategic necessities, fundamentally altering institutional priorities and evaluation systems. The observation about differentiated district funding highlights how algorithmic governance led to variations in digital management capabilities, creating asymmetries in budgetary control and performance monitoring across units.

This evolution significantly altered local operational rhythms, even for those at the community level. Village Health Volunteers (VHVs), who act as a crucial link between the formal healthcare system and local residents by providing basic health services and education, experienced these changes directly. As Volunteer 6 observed:

“We have monthly meetings because the workload related to the mobile application is gradually increasing.”

This seemingly simple statement reveals a profound shift at the practitioner level. The gradual increase in workload signals an ongoing, sustained recalibration of daily tasks, moving beyond the initial crisis response. This intensification of implementation activities, directly tied to the mobile application, highlights the tangible impact of digital transformation on healthcare

workers. The need for more frequent meetings underscores the growing complexity and importance of managing these digital tools at the local level. Practitioners are now balancing immediate operational demands, driven by the application, with long-term strategic goals. This localised workload increase, therefore, represents a microcosm of the broader institutional changes, showcasing how digital governance directly translates into increased responsibilities and altered operational practices within healthcare units, necessitating ongoing adaptation and potentially reinvention of practices at the user level.

#### ***5.4.2 Translation mechanisms: Actors actively shaping digital MAC implementation***

The mandated diffusion of digital MACs, particularly under accelerated timelines, did not result in a simple, passive adoption. Instead, our findings reveal that healthcare practitioners at various levels - from frontline volunteers to senior executives - engaged in active and multidimensional translation processes. They mediated between centralised directives and local operational realities, thereby shaping how these digital controls were implemented and experienced. These translation mechanisms are central to our conceptual model, explaining how mandated innovations are adapted within constrained contexts. This sub-section provides empirical evidence for these translation processes, demonstrating how they manifested procedurally, strategically, and technically. The societal aspect of translation will also be evident, particularly in how community norms and local knowledge influence these processes.

#### ***Procedural translation: Adapting workflows and bridging system gaps***

A primary form of translation involved the reconfiguration of operational workflows. Practitioners adapted established procedures to meet new technological requirements, often creating hybrid systems where old and new practices coexisted. This procedural translation

demonstrates that implementation was not a mere technical rollout but a socio-material process that reshaped daily work. Participants in Focus group 6 described this transformation:

“P1: The rules and regulations still require accounting and financial paperwork to be completed in physical form. As a result, the rise of big data increases the number of jobs we have since we need to process both digital and traditional documents.

P2: For the past two to three years, performance metrics had to be entered into the database while also being documented on paper.”

These accounts illustrate how practitioners developed hybrid documentation methods. This was not simply resistance, but a translation effort to satisfy dual demands: the new digital reporting requirements and the enduring institutional insistence on traditional verification protocols. This highlights a common outcome of translation where, rather than direct replacement, innovations are woven into existing frameworks, often increasing workload as a consequence. This observation provides empirical grounding for understanding how formal inscriptions like digital system requirements are reconciled with pre-existing institutional logics (e.g., physical paperwork for accountability).

Manager 1 elaborated on further procedural adaptations developed to capture essential tacit knowledge that formal digital systems often failed to accommodate:

“In community settings, like very small villages, I keep separate notes to track document routing. The central system lacks this detail, failing to show who needs to sign or where to deliver documents. Therefore, we must directly inform the relevant people.”

This example clearly shows a practitioner acting as a mediator, bridging the gap between the standardised, formal digital MAC and the nuanced, often informal, communication and workflow realities of the local context. The separate notes represent a supplementary, locally developed inscription necessary for the system to function effectively in practice. This act of creating a parallel, informal system is a clear example of localisation, where practitioners

actively translate a standardised process to make it workable within the unique realities of their specific community setting. This type of procedural translation, which incorporates local, practical knowledge, is a key mechanism of adaptation within our model.

***Strategic translation: Exercising agency within mandates***

Beyond procedural tweaks, healthcare practitioners also engaged in strategic translation. This involved more deliberate efforts to reshape implementation parameters and the meaning of the digital MACs, often to align them better with local needs or professional values, without overtly challenging administrative mandates. These strategic actions illuminate how actors exercise agency and enact interessement – attempting to guide the innovation in a particular direction that serves their perceived interests or the interests of their patients/community.

“Sometimes, younger staff place too much trust in data systems, overlooking established hierarchies. Because of this, I occasionally deviate from new control systems and use traditional methods.”

This observation shows a leader strategically navigating the tension between new digital controls and established organisational norms and power structures. This selective deviation is not a rejection of the innovation, but a translation of its application to maintain what the executive perceives as essential organisational functioning. This speaks to the socio-cultural entanglement where technology use is mediated by existing social hierarchies and cultural practices. This type of strategic balancing is a crucial adaptive mechanism.

Executive 4 provided further insight into strategic adaptations concerning management accounting mechanisms, illustrating how central policies were localised:

“While the central government sets quarterly performance targets and funding, these don’t reflect seasonal disease changes in our region. Therefore, we created a local tracking system that meets central reporting needs but allows us to adjust resources based on predicted regional disease patterns.”

This is a powerful example of strategic translation. This represents a sophisticated form of context-specific adaptation, moving beyond simple reinvention. It demonstrates a localised-led initiative where practitioners did not just alter the tool, but built a complementary system to embed crucial local knowledge - in this case, seasonal epidemiological patterns - that the centralised MAC was blind to. Practitioners developed a parallel system – a local actor-network with its own data and logic – that allowed them to meet formal reporting requirements (enrolment in the central system) while simultaneously adapting resource allocation to local epidemiological realities. This hybrid system represents a significant transformation of the centrally mandated MAC, making it more contextually relevant and effective. Our conceptual model will highlight how such strategic translations enable functional adaptation despite the rigidity of initial mandates. The tension between standardised central targets and local needs is evident here, and the local tracking system is the manifested solution born from this tension.

Manager 3 further advanced strategic translation by institutionalising research activities:

“Our leadership mandated that three district office departments conduct technology-related research, a program we call ‘Routines to Research’ or ‘R2R.’”

Institutionalising research capabilities represents a sophisticated translation mechanism. Here, the innovation (digital MACs and related technologies) is translated into an opportunity for organisational learning and capacity building. By framing technology adoption within a research paradigm, the leadership transformed a potentially passive reception of technology into an active process of knowledge generation and strategic development. This indicates that translation can also be about redefining the purpose and potential of an innovation within the local context.

### ***Technical translation: Mediating technology within standardised frameworks***

Practitioners, particularly IT staff and end-users, also engaged in technical translation. This involved adapting the standardised technological infrastructures themselves, or their use, to address local constraints, system incompatibilities, and operational needs. These adaptations demonstrate that technological implementation is not just a technical deployment but involves complex negotiation between standard parameters and local realities, often revealing the materiality of the technology and its limitations. IT Officer 1 articulated the cognitive challenges of navigating fragmented systems:

“It’s stressful. Managing multiple, disconnected digital systems is challenging. We use government programs for e-claims and error-checking, as well as tracking software from the district office, but they don’t communicate with each other. When a system fails, we often need new users, making it difficult to keep track.”

This assessment highlights how the innovation (the suite of digital systems) presented significant operational difficulties due to a lack of integration. The IT officer’s experience of stress points to the real burdens imposed by poorly aligned technologies. The effort to manage these disconnected systems, track users, and troubleshoot failures constitutes a form of ongoing technical translation aimed at making a fragmented technological landscape workable. This provides evidence for how the characteristics of the technology itself (e.g., complexity, lack of compatibility as per DoI) necessitate translation efforts by users and intermediaries.

Technical translation also extended to temporal adaptations aimed at circumventing infrastructure limitations. Volunteer 9 described accessing systems during off-peak hours:

“Near the monthly data submission deadline, high app usage prevents login. To access the app, I must get up really early. Also, my phone’s limited memory prevented image uploads.”

This observation shows technical translation encompassing user behaviour modifications to navigate system constraints. The volunteer's strategic adaptation – modifying work schedules due to system capacity issues and dealing with device memory limitations – is a clear instance of users actively working around the technology's limitations. These are often invisible but crucial efforts to ensure the system's continued use. These insights are important for understanding the practical realities of implementation.

Furthermore, technical translation manifested through adaptive responses to abrupt technological transitions. Volunteer 3 described a fundamental material change required for implementation:

"I had to upgrade from a basic push-button phone with a black and white screen to a smartphone for this job."

This seemingly straightforward statement encapsulates a significant socio-technical shift and a personal adaptation that was a prerequisite for engaging with the new digital MACs. The transition represents a substantial technological adaptation impacting the implementation trajectory for this individual, highlighting how diffusion can impose material requirements on adopters.

Field observations also highlighted technical translation leading to hybrid implementation landscapes where old and new methods coexisted. Even with smartphones available, volunteers continued using pen, paper, and photos for data collection. This blending is a clear example of active technical translation, showcasing adaptive integration rather than a linear replacement of old methods. Crucially, the persistence of these manual methods beyond a simple transition period suggests a more permanent hybridity. This can be interpreted as a rational response to several underlying factors, such as unreliable infrastructure (e.g., poor mobile connectivity in remote areas), a lack of trust in the stability of the new digital tools, or the pragmatic efficiency

of established methods for certain tasks. This continued reliance on manual backups is a form of technical translation that ensures data integrity and operational continuity when the formal digital system is perceived as fallible or impractical. Such hybrid approaches often reflected pragmatic choices - responding to unreliable infrastructure, leveraging existing skills, or addressing specific task needs - and illustrated how functional continuity was maintained through flexible, user-driven adaptations shaped by local realities.

#### ***5.4.3 Exploring implementation dynamics and adoption patterns of digital MACs***

This sub-section examines the specific processes surrounding the implementation and adoption of different types of digital MACs: systems analogous to Service Line Reporting (SLR), Patient-Level Information & Costing Systems (PLICS), and Electronic Patient Records (EPR). By looking at these distinct systems, we can see how different actors mediate their adoption and how varying forms of translation and agency emerge, further populating our conceptual model with empirically grounded mechanisms. The data here will show how executive authority, managerial negotiation, and IT-led technical mediation shape the trajectory of these different innovations.

#### ***Executive-driven adoption through authority decisions: The case of SLR-type systems***

The adoption of systems analogous to Service Line Reporting (SLR), which enable high-level financial and performance oversight, predominantly occurred through executive-driven mechanisms, reflecting 'authority innovation-decisions'. While these top-down mandates established powerful control architectures, they also created significant tensions and procedural complexities at the local level, forcing subtle forms of adaptation rather than outright change. Analysis points to complex arrangements through which centralised control imperatives

reshaped both technological infrastructures and professional practices within an increasingly data-centric environment.

The implementation of these digital controls established powerful performance frameworks that altered organisational priorities via algorithmic governance. These frameworks functioned as technical embodiments of executive authority, creating direct material links between data submission and financial allocations. The structural rigidity of these centralised frameworks was underscored by Executive 2:

“It is more difficult and nearly impossible to change the procedures and performance measures because the central government sets controls and reporting through the data system.”

This observation highlights how digital MACs, once implemented top-down, can become ‘black-boxed’ to a certain extent, making them resistant to local modification. However, this very rigidity, which seems contradictory to the concept of hybridity, is what forced translation to occur in other domains. When the formal system is inflexible, practitioners must create workarounds, engage in hidden work, and develop parallel informal processes to make it function. The system’s inflexibility does not prevent adaptation; it merely pushes it into less visible, often more costly and inefficient, forms.

Building upon this centrally defined structure, executive directives translated these controls into local performance expectations. Executive 5 articulated how SLR-type systems established interconnected performance metrics creating collective responsibility:

“The district evaluates hospital-wide data use, setting performance targets with incentives. If staff do not meet these targets, it leads to system-wide problems, and hospital directors are held responsible.”

The centralised digital architecture further established technological platforms altering information flows. Executive 4 described how:

“Public health services are now deeply reliant on JHCIS<sup>9</sup> data, which generates performance tracking graphs accessible via the dashboard.”

This clarifies how centralised digital architectures enabled enhanced visualisation capabilities, transforming abstract metrics into comprehensible representations that reshaped data interpretation and use.

Despite technological advances, executive-driven adoption often maintained traditional verification alongside digital innovations, creating hybrid accountability mechanisms. This hybridity was not a temporary phase, but a necessary, ongoing adaptation influenced by several factors. A persistent institutional belief in the robustness of physical verification, coupled with legal and regulatory mandates for hard-copy records, compelled the continuation of manual processes. Accountant 1 detailed the hierarchical verification pathways:

“The district office manages internal controls, records accounts, and handles payments. They are responsible for all these functions. We submit weekly reimbursement documents for their verification.”

This shows how centralised control systems established structured accountability pathways connecting micro-level activities with macro-level oversight, generating implementation imperatives through reporting frequency.

Executive 3 described heightened verification for financial transactions:

“A financial manager implements rigorous controls to prevent budget overruns and ensure accurate financial reporting.”

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<sup>9</sup> JHCIS is Thailand’s national primary care information system that integrates patient data management, clinical records, and epidemiological surveillance to facilitate resource allocation through the National Health Security Office.

This observation indicates how centralised control architectures established comprehensive verification pathways shaping resource use and creating intensified scrutiny. Auditor 1 elaborated on documentation retention:

“Legal requirements mandate document retention for five to ten years for Office of the Auditor General (OAG) inspections.”

This requirement shows centralised systems established temporal accountability mechanisms extending institutional memory. Manager 4 further articulated persistent documentation needs:

“Documentation remains a requirement, with supervisor signatures needed for all records. We provide annual work summaries, stored both in physical books and digital files for future reference and continuity.”

This reveals how standardised documentation created redundant verification pathways, bridging established accountability with emerging digital requirements. This hybridised documentation system reflects the complex interplay between technological innovation and established institutional processes. It creates multi-layered accountability structures that reinforce executive control, but it also questions the presumed efficiency gains of digitalisation. The coexistence of both systems introduces significant inefficiencies and costs, a paradoxical outcome for reforms often justified on the grounds of cost-saving and effectiveness.

#### ***Manager mediated adoption through strategic negotiation: The case of PLICS-type systems***

The implementation of JHCIS systems akin to Patient-Level Information & Costing Systems (PLICS), which require more granular data and local input, was characterised by significant managerial negotiation and mediation. Here, middle managers functioned as crucial intermediaries, translating executive mandates and system requirements into workable local practices. They did not simply react to problems; instead, they actively created what can be described as manager-led ‘work-nets’ - newly created systems of practice, communication, and

verification - to enable translation. They actively created a negotiation space to balance control with operational feasibility through strategic adaptations. These adoption processes occurred through intricate arrangements creating circumscribed modification opportunities despite rigid accountability structures. Middle managers engaged in 'interessement' and 'enrolment' by shaping how these systems were used and by aligning staff with modified procedures.

These newly formed work-nets operated through several multidimensional adaptation strategies. Manager-mediated adoption manifested particularly through data verification frameworks ensuring quality within largely automated costing systems. Accountant 1 articulated this approach:

"Although manual verification is time-intensive, it is essential for minimising data entry errors. This process allows for pre-entry accuracy checks, particularly vital when processing manually submitted volunteer forms, ultimately enhancing reporting precision."

This observation clarifies how managers developed hybrid verification protocols integrating manual oversight with automated processing. The reference to volunteer forms shows verification frameworks accommodated variable data quality, creating bridges between community collection and institutional validation.

Implementation generated patterns of user-centred system refinement as professionals identified enhancement opportunities. Trainee 3 recommended:

"There is a need for enhanced training in the practical application of this technology, coupled with a more streamlined and user-friendly system for patient data entry."

This feedback points to opportunities spanning professional development and interface design. The emphasis on experiential learning highlights the need for contextual engagement to

develop operational proficiency, showing implementation trajectories are shaped by practitioner feedback which managers can then champion.

Temporal adaptations represented another critical dimension where managers mediated between requirements and constraints. Manager 2 articulated how these adjustments enabled contextually responsive oversight:

“Data submission is mandated daily in real-time due to budgetary and regulatory requirements. However just in case, I give them an extra day or two.”

This temporal adaptation reveals the vital mediating role managers played. By creating discretionary buffers within ostensibly rigid frameworks, managers established implementation flexibility acknowledging practical constraints while maintaining accountability. This nuanced approach demonstrates successful digital transformation depended upon managers’ ability to create modification opportunities within hierarchical contexts.

The sophistication of manager-mediated adaptation extended to comprehensive enhancement visions. Doctor 1 elaborated:

“I’d like to improve the online booking system for patient convenience and streamline data management in Excel. Integrating AI would also help, particularly in tracking and managing records more efficiently. It would reduce errors, ease the workload, and enable more accurate patient data management.”

This progressive roadmap reveals how operational engagement generated system evolution trajectories. Practitioner engagement catalysed technological aspirations fundamentally reshaping implementation beyond initial parameters.

Manager-mediated adoption further manifested through developing integrated analytical frameworks. Manager 2 described this approach:

“At every opportunity, I ask health practitioners to do a SWOT analysis, and I connect the results to our brand-new data activity control systems.”

This strategy shows practitioners integrating technical implementation with procedural and strategic objectives. By linking analytical frameworks with technological capabilities, the manager created an integrated translation enhancing both technology adoption and strategic decision-making. This approach indicates successful implementation required developing multidimensional translation capabilities addressing technical, procedural, and strategic needs simultaneously.

Implementation catalysed significant development of analytical capabilities and standardised communication protocols. Manager 4 explained requirements for frontline staff:

“Officers and nurses across ten departments are required to develop one-page summary infographics to report to the district office and share with the community, emphasising real-time data with concise information.”

This requirement reflects a reconfiguration of documentation practices through standardised formats prioritising analytical distillation. The one-page summary format represents a methodological departure requiring professionals to develop data synthesis capabilities. This finding suggests implementation success increasingly depended on developing professional analytical skills.

Communication adaptations further illustrate integrated translation mechanisms. Manager 1 described this approach:

“For critical reporting issues, we utilise direct communication channels, such as personal Line chat [an application similar to WhatsApp] or phone calls.”

This adaptation reveals a translation strategy where communication methods were selected based on importance and verification needs. Using direct verification for critical communications allowed practitioners to create nuanced communication ecologies optimising

verification while minimising costs. This integrated approach shows implementation often involved developing hierarchical communication strategies varying resource deployment according to message significance.

Ultimately, the data demonstrates how manager-mediated adoption reshaped PLICS-type system implementation through strategic negotiation bridging executive mandates and operational realities. This negotiation operated through the creation of these multidimensional work-nets addressing verification, enhancement, analytical capability, and communication. The resulting patterns reveal successful digital transformation depends not merely on technology deployment but on cultivating managerial translation capabilities enabling contextually responsive implementation. This clearly illustrates managers acting as key mediators within the actor-network.

### ***IT-mediated adoption through technical translation: The case of EPR-type systems***

The implementation of Electronic Patient Records (EPR)-type systems revealed significant challenges related to fragmented system architectures, which constrained integration and workflow efficiency. However, it also highlighted the critical role of IT specialists as key intermediaries and active agents of technical translation. These IT teams did not just install systems; they actively mediated between the technology's capabilities (and limitations) and the users' needs, often engaging in significant problem-solving and system adaptation.

Trainee 1 articulated these complexities associated with fragmented systems:

“We struggled with this OS [Operation System] from the start. It's overly complex, with each application in its own isolated environment, making management a nightmare. The sheer number of disconnected components and lack of integration were overwhelming and slowed us down.”

This observation points to how EPR implementation frequently produced technological silos constraining operational efficiency. Characterising this complexity as overwhelming illustrates how fragmented architectures created cognitive overload for users.

Implementation dynamics further reveal complex adaptation patterns as practitioners navigated technological constraints. Doctor 3 described these challenges regarding EPR use:

“Even with the newer JHCIS systems, user comfort is inconsistent, and technical support is frequently lacking.”

When asked about support, the doctor continued:

“We have some manuals, but they’re not always clear. More training would definitely help.”

This data highlights how EPR implementation often lacked comprehensive support systems, creating operational challenges through insufficient training and documentation. The resulting gaps necessitated informal knowledge networks and improvisational practices, often facilitated by the IT team.

At the same time, powerful financial incentives were introduced to drive adoption, creating a significant tension between the goal of full digitalisation and the messy reality of implementation. Resource allocation frameworks created powerful incentives for EPR implementation. IT Officer 1 observed the direct financial implications:

“Our income has increased. The better you are with the systems, the more efficient the work, and that can affect revenue.”

This linkage created implementation imperatives transcending conventional adoption decisions, establishing ‘forced selection’ mechanisms where economic incentives influenced EPR trajectories. This presents a contradiction: while the organisation pushed for full, efficient

digitalisation to reap financial benefits, the systems themselves were fragmented and difficult to use, making those benefits unattainable without intense, hands-on mediation.

Amidst these challenges, the ethnographic work revealed a crucial organisational adaptation where IT specialists became the central agents of translation. IT specialists operated as mediators between abstract technological frameworks and concrete operational realities, developing contextually responsive solutions despite infrastructural limitations. In our case organisation studied, a key strategy implemented by the director post-pandemic involved establishing a distributed configuration architecture for the IT teams to enable coordinated implementation across five distinct zones. Field observations documented approximately 20 IT staff strategically divided into these five zonal groups, with each group responsible for comprehensive technological installation within their designated area. This structured deployment fostered implementation synergies through specialised teams, creating contextually responsive mechanisms that balanced standardisation with localised EPR adaptation needs. This unique structure of the IT team is a significant finding, demonstrating an organisational adaptation to support technological diffusion and translation.

The architecture facilitated technical translation operated through collective expertise, creating knowledge networks that transcended conventional hierarchies. An interesting characteristic of these teams was their composition; observations revealed that approximately half of the IT staff possessed healthcare backgrounds rather than formal IT training. This hybrid background of the IT team members themselves is a crucial factor, enabling them to better understand user needs and translate technical jargon into practical solutions. Support structures were embedded within this model, with a designated sub-leader in each zone available to assist team members with IT issues. The collaborative support structure was evident in practice. As shown in Appendix – Figure 5-5, one IT officer was observed seeking assistance from a sub-leader based

at another hospital to resolve a data error impacting hospital performance metrics. The issue was addressed remotely in real-time using video calls and screen-sharing technology, allowing the sub-leader to control the officer's monitor and directly implement the fix. This example underscores the functional importance of the established knowledge networks and distributed support systems within the IT team structure. This collaborative professional approach extends beyond expert skill and reflects a socio-cultural aspect of working, deeply embedding the MAC translation process within these supportive interactions rather than it being a purely technical process.

These configuration adaptations were complemented by knowledge transfer mechanisms designed to create sustainability. District programmers were observed systematically training IT staff on comprehensive utilisation protocols. This pedagogical approach highlights how IT-mediated adoption created a multilevel distribution of expertise, establishing distributed competency frameworks that enhanced long-term viability. This educational dimension represents a departure from conventional technology transfer models, indicating that EPR success was significantly dependent on systematic knowledge multiplication orchestrated by these IT intermediaries.

Furthermore, EPR system implementation catalysed significant transformations in professional analytical capabilities for the IT team. The district's strategic directives for 2024 reveal a substantive shift:

“Each IT officer must analyse prior-year data for comparative insights, support hospital directors in developing health promotion initiatives, and pursue increased funding from the government.”

This directive signals a reconfiguration of professional boundaries, transforming IT specialists from technical support staff into strategic partners who hold analytical responsibilities. This

evolution represents a progression from descriptive documentation toward evaluative assessment, reconstituting professional expertise within increasingly data-centric environments, again positioning the IT team as central to the evolving actor-network around digital MACs.

#### ***5.4.4 Emergent adaptive practices: Local professional responses and identity shifts***

The interplay of mandated diffusion and situated translation efforts around digital MACs catalysed significant adaptations in local professional practices and spurred transformations in professional identity within Thailand's healthcare bureaucracy. Practitioners, navigating the increasingly data-focused and often resource-constrained environment, developed hybrid competencies and engaged in essential, yet often unrecognised, hidden work. These dynamics, empirically detailed below, are core components of our conceptual model, illustrating how individuals and groups enact agency and contribute to organisational adaptation, even in contexts offering limited formal modification opportunities or training.

#### ***Hybrid professional identity development through system adaption***

The shift towards digital systems prompted a multifaceted process of hybrid professional identity formation. Practitioners actively integrated traditional clinical or administrative expertise with emerging technological skills, often navigating significant institutional constraints and demonstrating a degree of receptiveness toward digitalisation. This process was not without friction, often creating underlying tensions between different professional groups and generations of staff.

A primary manifestation of hybridity was the development of self-teaching strategies due to limited formal training. This was especially true for staff whose roles were formally technical

but who came from non-technical backgrounds, a key source of hybridity in this context. As IT Officer 4, who had a background in public health, articulated:

“Many colleagues, especially those with backgrounds in public health or nursing, struggle with the technology. For me, I lacked formal computer science training, but I pursued self-study. We primarily learn through hands-on experience and online resources. While formal classes are available, independent study is essential to manage the workload and keep pace with technological advancements.”

This account is crucial, as it illustrates a core form of hybridity observed: individuals with clinical or public health expertise transforming into functional IT specialists through informal, self-directed learning. This is not an IT officer learning more about computers, but a healthcare professional becoming an IT officer out of necessity. Such accounts highlight a shift where experiential knowledge gained legitimacy alongside formal credentials, enabling practitioners to enhance capabilities despite limitations.

Identity transformation further involved a reconfiguration of professional boundaries, as digital proficiency evolved from an optional skill to a core requirement influencing evaluations. GP 4 reflected:

“I learned through self-directed problem-solving and adaptation. Digital proficiency, once optional, is now a mandatory job requirement and influences performance evaluations.”

The fact that practical engagement and self-directed learning became routes to acquiring necessary competencies, especially when formal training was insufficient or ill-suited to immediate implementation needs, demonstrates how necessity drove this hybridisation among clinical staff. Doctor 4’s reflection illuminated this boundary renegotiation:

“Many years of formal training primarily prepared me for emergency room work. However, I acquired the necessary management software and budgeting skills for just one month through practical experience onsite.”

Experiencing these discontinuities between formal education and implementation needs illustrates how hybrid identities emerged opportunistically through engagement with diverse knowledge domains.

Concurrently, mediating roles became apparent, with technologically proficient staff informally assisting colleagues. IT Officer 1 described this:

“While progress is being made, challenges persist. Specifically, older staff members often encounter difficulties with technology, necessitating supportive assistance for their adaptation.”

Observing these interactions shows hybrid identities incorporating organisational facilitation and knowledge sharing, crucial for service continuity. This dynamic also revealed intergenerational tensions, as younger staff who were more comfortable with technology sometimes clashed with established hierarchical norms. Hybridisation also manifested through negotiations between traditional authority and emerging competencies, particularly regarding intergenerational dynamics. Executive 1 described a strategic arrangement fostering reciprocity:

“Senior staff who struggle with digital data contribute by providing alternative forms of assistance to younger colleagues of the IT staff, such as sitting with them in OT [Overtime] or delivering a meal.”

Employing such adaptive mechanisms allowed recognition of diverse contributions beyond technical skills and maintained intergenerational knowledge transfer. Facing these difficulties forced reliance on improvisational learning and informal networks. Collectively, these dimensions illustrate that hybrid professional identities emerged through active adaptation processes integrating traditional expertise with digital requirements via diverse strategies.

### ***Hidden work processes sustaining implementation***

Essential to the functional implementation and ongoing use of digital MACs were extensive hidden work processes – labour contributions crucial for navigating the system yet often institutionally unrecognised or under-resourced. Fieldwork observations revealed practitioners strategically navigating formal requirements and operational realities, compensating for system constraints, infrastructural limitations, and training gaps through efforts extending significantly beyond formal job descriptions.

While any technological transition involves a temporary increase in workload, the evidence here suggests that the hidden work observed is not merely a transient phase. Rather, it represents a more permanent state driven by systemic issues like fragmented digital architectures, persistent dual-documentation requirements, and a fundamental lack of system integration. Paradoxically, the drive toward digitalisation in this context often created more work, rather than reducing it, a burden absorbed by practitioners through these hidden processes. The willingness to undertake such work also reflects certain societal and cultural values regarding professional commitment and mutual support.

A key dimension involved temporal boundary extensions, with staff frequently working beyond formal hours, blurring the lines between professional and personal life. Manager 3 described this pervasive phenomenon, noting the invasion of work into personal time:

“I consistently worked beyond regular hours, both at the health centre and at home. While overnight stays were occasional, bringing work home became a daily routine.”

This systematic extension represents a significant undocumented labour subsidy. Observations sometimes captured the quiet hum of computers in otherwise closed clinics after dark, or, as depicted in Appendix – Figure 5-6, staff clustered on the floor of a dentist’s room, laptops

balanced precariously, intensely focused on data compilation long after clinical hours. IT Officer 4 recounted this intensity:

“While not a daily occurrence, the workload often required me to work late into the night, particularly when organising patient data and appointments. On some occasions, this extended until 3 a.m.”

Such extensions represent acute manifestations where practitioners absorbed substantial personal costs. While some institutions began formalising overtime, selective application noted by GP 5 - often favouring junior staff - suggests extensive temporal creep had become normalised, an accepted, if unstated, part of the job for many:

“The hospital will pay overtime for interns and younger staff members who enter data into the database beyond midnight. Furthermore, all information gathered through conventional means - such as books, papers, and physical copies - must be entered into the database immediately.”

Another critical dimension entailed knowledge circumvention mechanisms, born from necessity. Significant gaps in formal training necessitated the formation of unofficial learning networks and reliance on self-teaching. GP 1 identified stark disconnections between technology access and expertise:

“Despite having access to advanced technology, including costly vital signs monitor connected to the data system, practitioners lack the necessary expertise to utilise it. This equipment remains unused due to insufficient training.”

Fieldwork confirmed this, revealing expensive equipment like the innovative monitor sometimes still wrapped in plastic, stored away from active use (see Appendix – Figure 5-7). This gap forced practitioners to compensate through alternative learning pathways, often observed during brief lulls in clinical work or after hours. Trainee 3 described the common reality:

“Our training for digital programs primarily involved learning from colleagues. Currently, we rely heavily on self-study due to the rapid evolution of these programs. We often seek information from staff or online resources like YouTube.”

Reliance on self-study and peer support indicates alternative knowledge acquisition represented a core, if hidden, implementation dimension.

These circumventions extended beyond the clinic walls, mobilising intergenerational family networks as informal support systems. GP 4 shared, almost matter-of-factly, how work seeped into domestic life:

“Family members, including my child, assist with data entry. This support is necessary due to the program’s unclear file setup.”

Utilising these personal resources indeed reflects life beyond formal professional commitments influencing the translation and adaptation process. This reliance on unofficial labour substitutes for support unavailable through formal channels and is an important empirical observation informing our model. The theoretical implications of such hidden work will be further explored in the Discussion section.

Finally, fieldwork encountered data authenticity negotiations as practitioners developed creative, sometimes ethically fraught, reporting strategies. Volunteer 10 candidly described practices observed in community settings, driven by performance metrics linking compensation directly to reporting output:

“While our village reports no app issues, neighbouring areas experience difficulties, particularly among older individuals. I’ve observed instances of fabricated data entry, driven by the need to fulfil paid reporting requirements. This contrasts with previous systems where non-completion had no consequences.”

Hearing accounts like this illuminated the intense pressures created by performance metrics, particularly among those facing technological barriers or lacking adequate support, sometimes leading to the entry of ghost data simply to meet targets. Crucially, these implementation

challenges directly led to staff resignations, an ultimate hidden cost when the burden became too great. Volunteer 6 explained this stark reality:

“The app’s complexity presents challenges, especially for those with limited technical skills. The requirement to document work with photos and send them via the app has led to staff resignations.”

These multiple dimensions of hidden work - extended hours, knowledge circumvention, family labour, and authenticity negotiations - often operated synergistically. They formed a resilient, if invisible, ecology of unofficial practices that maintained operational viability despite the significant gaps between formal system designs, available resources, and the complex realities on the ground in Thailand’s public healthcare setting. These hidden practices are not just side effects but are integral to how the digital MACs are made to work and thus are a crucial element of the adaptation process our model seeks to explain.

## 5.5 DISCUSSION

This study empirically investigated how primary healthcare organisations in Thailand adapt to the mandated implementation of digital Management Accounting Controls (MACs). Our research sought to answer: *How does the interplay between the Diffusion of Innovation and the Sociology of Translation enable the adaptation to mandated digital Management Accounting Controls in public healthcare in emerging economies?* The rich ethnographic data revealed a complex adaptation process far removed from a simple linear adoption. The findings demonstrated that adaptation is a dynamic, multi-layered process characterised by an ongoing tension between top-down diffusion pressures and bottom-up translation efforts. We found that the initial, often crisis-accelerated, diffusion of digital MACs was met with a series of procedural, strategic, and technical translations by organisational actors at all levels. A crucial finding was the pivotal mediating role of a uniquely structured, hybrid IT team, which acted as

a key agent in making the centrally mandated systems functional within the local context. Furthermore, the empirical evidence overwhelmingly showed that successful adaptation necessitated the emergence of new professional practices, specifically the development of hybrid professional identities and the undertaking of significant, often unacknowledged, hidden work by practitioners to bridge the gap between the formal systems and operational realities. These empirical findings provide the foundation for the development of a conceptual model that articulates this complex adaptation process.

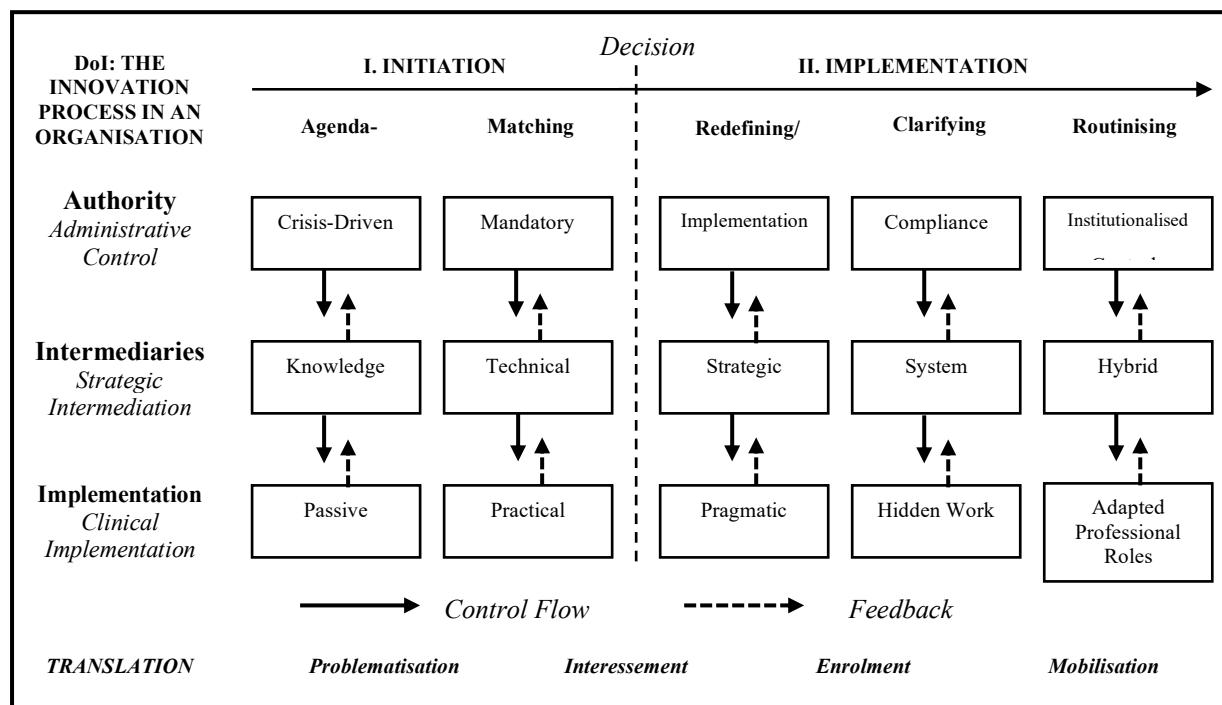
### ***5.5.1 The proposed conceptual model of diffusion, translation, and adaptation***

As a key contribution of this paper, we develop an empirically grounded conceptual model (see Figure 5-3) that arises from our findings. The model integrates Rogers' (2003) 'Innovation Process in an Organisation' (DoI) as a foundational structure for understanding the broader diffusion trajectory of digital MACs. This is interwoven with key concepts from Sociology of Translation (SoT) to explain the active processes of negotiation, mediation, and transformation that characterise the assimilation of these controls. Crucially, the model also incorporates the emergence of adaptive professional practices - namely hybrid professional identities and hidden work - as both outcomes of, and critical contributions to, this overall organisational adaptation process, particularly within the Thai public healthcare context. The model posits that the adaptation journey typically unfolds through an initiation phase, largely driven by diffusion dynamics, and an implementation phase, where translation and emergent practices become paramount, with continuous feedback influencing the process.

The initiation of digital MAC adoption often commences with Agenda-Setting, frequently characterised in our study by centralised, authority-driven innovation decisions, especially under crisis conditions such as the COVID-19 pandemic. This stage aligns with Problematisation in Translation theory, where key actors, such as central health authorities or

senior administrators, define the existing situation (e.g., fragmented data, inadequate pandemic response capabilities, as a problem for which the new digital MAC is framed as an obligatory passage point (OPP). IT specialists or other influential intermediaries can play a significant role here by shaping the initial conceptualisation of technological systems as indispensable solutions.

**Figure 5-3** Diffusion and translation processes in organisational innovation



Following this, the Matching phase of diffusion, where organisations attempt to align technological innovations with identified needs, often involves centralised technology selection. IT teams and other intermediaries, as shown in our findings, function as critical diffusion agents and opinion leaders. Concurrently, these actors engage in Interessement, actively working to align other actors with the proposed innovation and its perceived benefits, often by beginning to reconfigure technological systems to accommodate institutional constraints while maintaining essential functionality. As Latour (1987) observed, such intermediaries can become centres of calculation, where diffusion trajectories are substantially

translated through technical and social mediation, reconciling administrative frameworks with operational realities. For instance, the IT team began the technical mediation by adapting government programs and tracking software to function within the local infrastructure, even though the systems were not integrated.

The implementation phase sees the Redefining/Restructuring of the innovation, where it is modified to fit organisational structures, and the organisation adapts to the technology. This is a critical juncture for Enrolment, as various actors, through negotiation and compromise, accept or redefine their roles within the emerging actor-network around the digital MAC. Our findings illustrate managers mediating PLICS-type reporting by creating discretionary buffers in deadlines and frontline healthcare professionals engaging in pragmatic adaptation by actively reshaping control systems to fit local conditions, a form of reinvention. It is also at this stage that the development of a hybrid professional ethos (Kurunmäki, 2004) is particularly evident, as staff begin to integrate new technological competencies with their existing professional knowledge. A salient example is the doctor who, despite years of clinical training, acquired necessary software and budgeting skills through one month of hands-on experience.

As implementation progresses, the innovation's meaning and implications become Clarified through practical experience and continuous adaptation. This involves ongoing translation and the Mobilisation of Allies to ensure the durability of the (now translated) innovation. IT teams and managers continue their mediating roles through system adaptation, negotiating between administrative requirements and operational realities. Clinical staff simultaneously develop localised practices, including significant 'hidden work' (Barnard *et al.*, 2024), to maintain essential functionality and professional autonomy while ostensibly complying with administrative oversight. This was clearly seen in the extensive, uncompensated overtime staff undertook, with some working until 3 a.m. to manage patient data, a practice that became a

normalised, hidden subsidy to the system. These complementary translation processes, as empirically detailed in Section 4, create sophisticated patterns of organisational adaptation.

Finally, Routinising occurs as the (translated) innovation becomes embedded within organisational practices, effectively institutionalised. From a Translation perspective, this signifies a relative stabilisation of the actor-network, where the digital MAC, in its adapted form, becomes a more taken-for-granted part of the socio-technical landscape. Our findings suggest this involves IT teams consolidating their hybrid expertise (evolving from technical support into strategic analytical partners) and clinical staff fully integrating digital requirements into their adapted professional roles. This integrated model, therefore, reveals how successful and sustained digital transformation in the studied context emerges from the complex and ongoing interplay between structured, often top-down, diffusion initiatives and the nuanced, situated translation and adaptation mechanisms enacted by organisational members at multiple levels.

### **5.5.2 Theoretical contributions**

#### ***Extending diffusion of innovation in hierarchical and mandated contexts***

While DoI theory provides a robust general framework, our study offers specific insights into its operation within hierarchical, resource-constrained public sector organisations in emerging economies, particularly under conditions of mandated or crisis-driven change. Firstly, our temporal analysis delineates distinct phases from pre-pandemic fragmentation through crisis-accelerated adoption to post-pandemic strategic integration. This extends conventional stage models (e.g., Rogers, 2003; Malmi, 1999). It particularly highlights how external shocks like the COVID-19 pandemic can drastically reconfigure diffusion trajectories, compress timelines, and alter the very nature of adoption decisions, thus substantiating and extending the

observations of Agostino *et al.* (2021). This rapid, often forced, adoption of digital tools resonates with the challenges and opportunities outlined by Moll and Yigitbasioglu (2019) concerning internet-related technologies, and the subsequent need for MAs to adapt their roles and practices, which can be fraught with new ambiguities (van Slooten *et al.*, 2024).

Secondly, the predominantly mandated nature of digital MAC adoption in the Thai public healthcare system, especially evident during the crisis, underscores the significance of forced selection mechanisms (Abrahamson, 1991) in such contexts. This directly informs the discussion around innovation discontinuance. In settings characterised by strong hierarchical control and significant resource constraints, replacement discontinuance (Rogers, 2003) may often be driven not by user-led evaluations of alternatives or disenchantment, but by administrative mandates from central authorities compelling the adoption of newer systems deemed superior. This can occur, as our findings suggest, irrespective of detailed practitioner assessments of contextual appropriateness or usability. Our model contributes by showing that even when diffusion is forced and systems are replaced by mandate, subsequent translation processes and the emergence of adaptive professional practices become absolutely crucial for local actors to appropriate, adapt, and ultimately make these mandated systems workable in their specific operational environments. This aligns with observations in other public sector contexts where top-down changes necessitate considerable adaptation in management accounting to maintain operational effectiveness (Smith *et al.*, 2005).

Thirdly, the crisis-accelerated diffusion observed resonates with the notion that disaster management agendas can reshape governmental responses, potentially shifting conventional tactical response archetypes. The initial top-down, rigid imposition of digital systems during the pandemic can be seen as such a shift. Our conceptual model contributes by illustrating that this initial rigid diffusion archetype is not the end of the story at the operational level. It is met,

and actively mediated, by multifaceted translation efforts. These translation processes, enacted by various organisational actors, introduce collaborative, negotiated, and adaptive elements back into the system. Thus, our model demonstrates a dynamic interplay between initial rigid diffusion impulses during crises and subsequent, more collaborative (though often constrained and informal) translation and adaptation practices. This nuanced view suggests that diffusion and translation are not mutually exclusive but are intertwined, iterative phases in organisational adaptation, especially pertinent in hierarchical public sector contexts responding to urgent external pressures.

### ***Illuminating translation processes in resource constrained public sector contexts***

This research contributes to Sociology of Translation (SoT) by providing rich empirical illustrations of its mechanisms - problematisation, interessement, enrolment, and mobilisation (Callon, 1986) - within the specific and often challenging context of a hierarchical, resource-constrained public healthcare system in an emerging economy. The findings demonstrate how these processes unfold not only through overt, formal strategies but also through the myriads of everyday procedurals, strategic, and technical translations enacted by a diverse range of organisational actors. The insights from Adhikari *et al.* (2023) on how digitalisation becomes sociomaterially embedded in similarly constrained NGO settings, altering practices and identities, support the argument that translation is a vital lens for understanding technology assimilation in such environments.

A particularly significant insight, grounded in our empirical data, is the pivotal role of intermediaries (Latour, 2005). Our model, informed by findings, highlights managers and, notably, the uniquely structured hybrid IT team as crucial mediators in the adaptation process. These actors did far more than merely transmit information or deploy technology; they actively

translated central directives, adapted system functionalities, negotiated diverse requirements, and built essential bridges between different professional groups and hierarchical levels within the healthcare network. The IT team, with its distinctive blend of healthcare domain knowledge and IT skills, its distributed structure, and its collaborative internal support mechanisms, exemplified a powerful centre of calculation (Latour, 1987). This team actively shaped how digital MACs were understood, implemented, troubleshooted, and ultimately used, thereby significantly influencing the trajectory and form of these innovations within the local context. Furthermore, the use of dashboards and standardised reporting templates can be understood as inscriptions (Latour, 1987) that attempt to steer action and create visibility, though their actual effects are always mediated by local translation. The challenges in achieving stable black-boxing of these digital MACs, particularly when systems were fragmented or poorly supported, further underscore the ongoing nature of translation.

***Understanding adaptive practices: Hybridity and hidden work as core to adaptation***

A key theoretical contribution of this study, emerging directly from our empirical findings, is the illumination of how adaptive professional practices are core to organisational adaptation. Our conceptual model explicitly incorporates the emergence of these practices - specifically, the development of hybrid professional expertise and the performance of extensive hidden work - as integral components of the overall process. This extends existing literature (e.g., Kurunmäki, 2004; Begkos & Antonopoulou, 2022; Barnard *et al.*, 2024; Abernethy & Stoelwinder, 1995) by showing how these practices are not merely individual coping mechanisms or by-products of change but are fundamental to how organisations navigate and sustain digital transformations, especially under conditions of mandated change and resource scarcity.

The way professionals in our study developed hybrid expertise provides strong support for our model's emphasis on emergent professional practices. Crucially, this hybridity was not always about a single professional group adding a new skill, but often about individuals from one domain transforming to fill roles in another out of necessity. A primary example is the IT support team, where roughly half the members came from clinical or public health backgrounds and became functional IT specialists through self-study and peer support. This finding provides a nuanced understanding of hybridisation, moving beyond clinicians simply learning managerial skills to show a more fundamental role transformation. These findings resonate with observations in other complex healthcare settings, such as the English NHS, where medical professionals have also been shown to actively engage in hybridisation as practice, mediating the introduction of accounting technologies through their situated actions (Begkos and Antonopoulou, 2022). This underscores that the adaptive practices identified in our Thai context are not merely ad-hoc responses but represent a fundamental mechanism - central to our conceptual model (Figure 5-3) - through which organisations and their members adapt to, and make sense of, new digital control systems within constrained hierarchical environments. This provides an empirical grounding for understanding how management accountants navigate the 'double-edged sword' of digitalisation, where pressures to adapt can lead to role stress but also to the development of new, hybrid roles (van Slooten *et al.*, 2024). The imperative to develop new digital skills and competencies (Moll and Yigitbasioglu, 2019) is a fundamental driver of these emergent hybrid practices.

The phenomenon of constrained hybridisation details how practitioners actively constructed new professional identities by integrating technical skills with their existing clinical or administrative expertise, often despite limited formal training or restricted opportunities for direct system modification. This self-directed learning, improvisational engagement, and role

expansion demonstrate considerable agency and a pragmatic, receptive approach to acquiring necessary competencies. The strategic integration of local epidemiological knowledge by finance managers into supplementary tracking systems is a prime example of such hybrid expertise in action, reflecting the complex epistemological integrations that can occur in emerging economies (van Helden *et al.*, 2021) and lead to contextually effective solutions.

The pervasive nature of hidden work - encompassing temporal boundary extensions, intricate knowledge circumventions, the leveraging of informal and even familial support networks, and challenging data authenticity negotiations - provides crucial insights into the often-unseen efforts that underpin the functionality of digital MACs. This empirically substantiates and extends the work of Barnard *et al.* (2024). This hidden work is particularly significant in the Thai context, reflecting not only responses to system deficiencies but also what appeared to be deep-seated socio-cultural values related to professional commitment and mutual support, thus illustrating a profound socio-material entanglement.

Such informal adaptations are common in public sector entities undergoing significant change (Smith *et al.*, 2005) and can be exacerbated in contexts with resource limitations or digital divides, as seen in some NGO settings (Adhikari *et al.*, 2023). Our model positions this hidden work as a vital, albeit often invisible and unsourced, component of organisational adaptation, which, while essential for operational continuity, can also carry significant human costs, including burnout and staff turnover.

### ***Synthesising DoI and SoT for a holistic view of adaptation***

A core theoretical contribution of this paper lies in the development of an integrated conceptual model (Figure 5-3) that synergises key insights from DoI theory and SoT. This synthesis was not a predetermined theoretical goal but rather an analytical necessity driven by the richness

and complexity of the empirical data. While DoI is highly effective in mapping the broader patterns, stages, and influential characteristics associated with innovation spread, its traditional formulations can sometimes underemphasise the active, constructive agency of adopters and the intricate, socially embedded processes of negotiation and adaptation that occur locally (Quattrone and Hopper, 2001). Conversely, SoT, with its focus on actor-networks and the processes of translation, excels at detailing these micro-level dynamics but may offer less explicit guidance on the overarching diffusion pressures and structural constraints within which translation efforts unfold. The empirical reality we observed - a top-down, mandated diffusion colliding with intense, bottom-up, and sideways adaptations - could not be fully explained by either lens in isolation. The complexities of digitalisation's impact on MACs, affecting both their broad diffusion and their localised, translated effects on professional roles and potential stress (Moll and Yigitbasioglu, 2019; van Slooten *et al.*, 2024), necessitate such an integrated view.

Our empirically grounded model attempts to bridge these perspectives. It demonstrates how macro-level diffusion dynamics (often mandated, hierarchical, and crisis-accelerated in our public sector context) provide the initial impetus and structural framework for change. These are then met, mediated, and transformed through meso- and micro-level translation activities enacted by diverse human and non-human actors. The sociomaterial perspective, emphasising the inseparable link between social practices and material technologies (Adhikari *et al.*, 2023), enriches this understanding of the translation process within the context of digital MACs. These translations, in turn, shape the ultimate form, function, and meaning of the innovation within the local setting and lead to the emergence of critical adaptive professional practices. This synthesis, we argue, offers a more holistic, multi-level, and nuanced understanding of how complex digital MACs are adopted, resisted, adapted, and ultimately integrated within

challenging public sector environments, providing a richer explanation than either theory could offer in isolation.

## 5.6 CONCLUSION

This ethnographic study investigated the complex socio-technical dynamics surrounding the diffusion and implementation of digital MACs within Thailand's hierarchical public healthcare bureaucracy. The central achievement of this research, driven by our empirical findings, is the development of an empirically grounded conceptual model (Figure 5-3). This model elucidates how organisational adaptation to these digital MACs is not a straightforward adoption of technology, but rather a complex and ongoing process driven by the interplay between centrally mandated diffusion pressures, the active and situated translation efforts of diverse organisational actors (a perspective central to Sociology of Translation), and the crucial emergence of adaptive professional practices, such as hybrid identities and hidden work. Our analysis, by integrating DoI theory with SoT, offers a nuanced understanding of this co-evolution of technology, practice, and organisation within a constrained public sector environment.

Theoretically, this study contributes by extending DoI theory to account for forced selection and replacement discontinuance patterns prevalent in hierarchically controlled systems, and by illustrating how crisis conditions can accelerate diffusion, initially imposing rigid change archetypes that are subsequently mediated by local translation. Furthermore, it enriches SoT by providing detailed empirical evidence of how translation mechanisms operate within the public sector, particularly highlighting the pivotal role of intermediaries like specialised IT teams and managers in shaping technological trajectories. The importance of understanding the materiality of technology in such processes, as championed by sociomaterial perspectives, is crucial for appreciating the full dynamics of translation. The research also deepens the

understanding of emergent professional practices, showing how hybrid expertise is cultivated under constraint and how extensive hidden work becomes essential for system functionality, thereby highlighting the profound socio-material entanglements inherent in digital MAC adaptation. The synthesis of DoI and Translation perspectives within our conceptual model offers a more holistic explanatory framework for these complex adaptive processes.

The findings and the proposed conceptual model carry significant practical and policy implications for administrators and policymakers managing digital transformations, particularly in similar resource-constrained public sector contexts or emerging economies. Lessons from diverse settings, including the UK's NHS (Smith *et al.*, 2005) and NGOs in developing nations (Adhikari *et al.*, 2023), show that a context-specific, localised approach is paramount. Firstly, there is a clear need to formally acknowledge and strategically support the crucial role of intermediaries, such as the uniquely structured IT teams and middle managers observed in this study. These actors are not mere implementers but vital translators and mediators who bridge the gap between central directives and local operational realities; empowering them can significantly enhance the success of digital initiatives. Secondly, policymakers at the central government level as well should adopt more realistic implementation frameworks that explicitly account for the substantial hidden costs and workload intensifications associated with digital MAC adoption, especially when pursued under compressed timelines. Recognising and potentially resourcing the extensive hidden work required to sustain functionality is essential for both system viability and staff well-being. Thirdly, professional development strategies should be reconfigured to actively foster the kind of hybrid expertise observed, where individuals blend technical skills with domain-specific knowledge through both formal and informal learning pathways. This speaks directly to the need for accountants to acquire new skills to navigate the digital age (Moll and Yigitbasioglu,

2019) and for organisations to support the development of clearer, more coherent role templates to mitigate potential role stress associated with these new demands (van Slooten *et al.*, 2024). Finally, and crucially, accountability systems and performance metrics associated with new digital MACs must be critically evaluated and, where necessary, redesigned. This is to ensure they align with operational realities and resource availability in diverse local contexts, thereby mitigating incentives for counterproductive reporting behaviours or undue pressure on staff.

While this study provides rich, contextualised insights, certain limitations should be acknowledged. The findings are based on an in-depth ethnographic study within a dominant district health office network in Southern Thailand. While this allowed for a nuanced understanding of local dynamics, the direct generalisability of the specific manifestations of adaptation to other public healthcare contexts - even within Thailand - may be limited. Future research could therefore benefit from comparative case studies across diverse geographical and institutional settings to test and refine the conceptual model of emergent adaptation.

Building on this research, several avenues for future inquiry emerge. Longitudinal studies would be valuable to track the long-term evolution and sustainability of the observed adaptive practices and the stability of the translated digital MACs. Further investigation into the increasing role of algorithmic governance and Artificial Intelligence (AI) within public sector MACs in emerging economies, and how these are translated and adapted, presents another critical research frontier.

Additionally, more research is needed to explore the complex epistemological integrations occurring as diverse knowledge traditions (e.g., central, local, indigenous, professional, managerial) are navigated and hybridised within professional practice. Ultimately, understanding these hybridisations is essential for designing digital systems that do not merely

overlay technology onto existing structures, but meaningfully integrate with the lived realities of healthcare practitioners.

In essence, the digital transformation of management accounting in public healthcare, as demonstrated in this study, is a profoundly socio-technical undertaking. Successful and sustainable implementation and adaptation arise not from technological determinism or simple compliance with mandates, but from the nuanced, ongoing, and often challenging translation processes enacted by individuals and groups who strategically leverage, formally or informally, the limited modification opportunities available within existing structures. Even with constrained agency, practitioners develop vital adaptations to maintain essential services while attempting to meet oversight demands. During critical periods, such as the COVID-19 pandemic, these dynamics intensify, as heightened public apprehension can reconfigure accountability relationships, leading to an increased willingness among individuals to accept intensified surveillance via data analytics in response to significant public health threats (Ahn and Wickramasinghe, 2021). Ultimately, fostering positive and effective digital transformation in such contexts hinges less on the technology itself and more on understanding and cultivating sophisticated, contextually responsive translation capabilities within specific institutional and socio-cultural environments.

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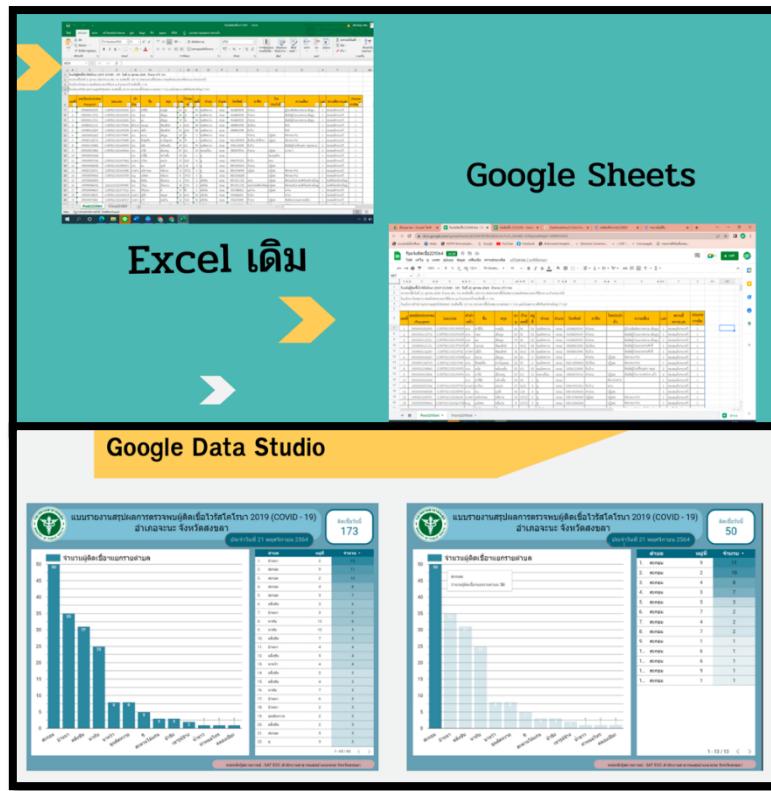
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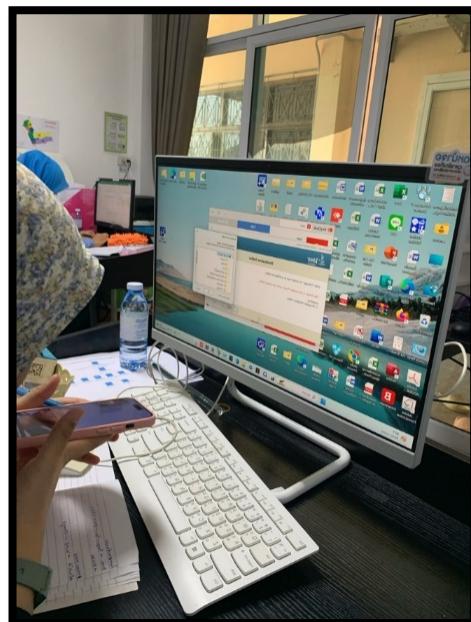
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## APPENDIX:

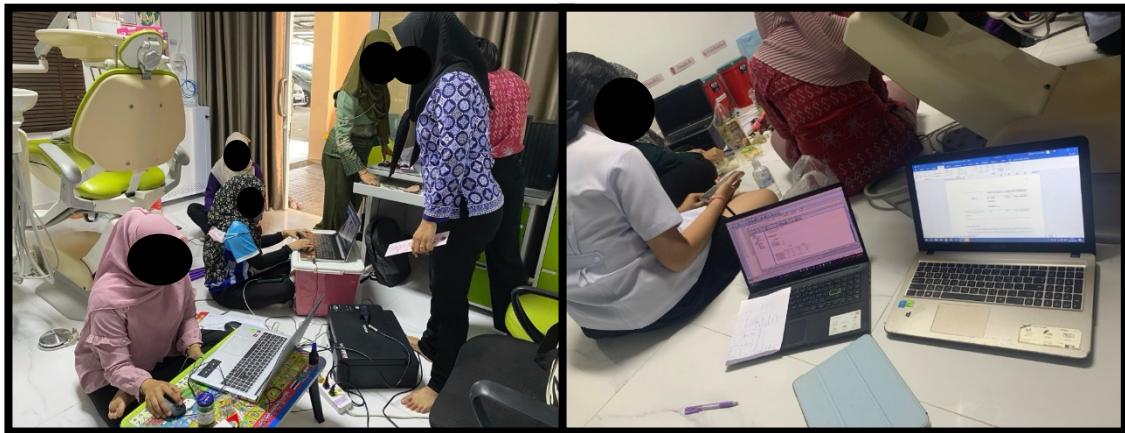
**Figure 5-4** Sociotechnical transformation of datafication during crisis-accelerated diffusion



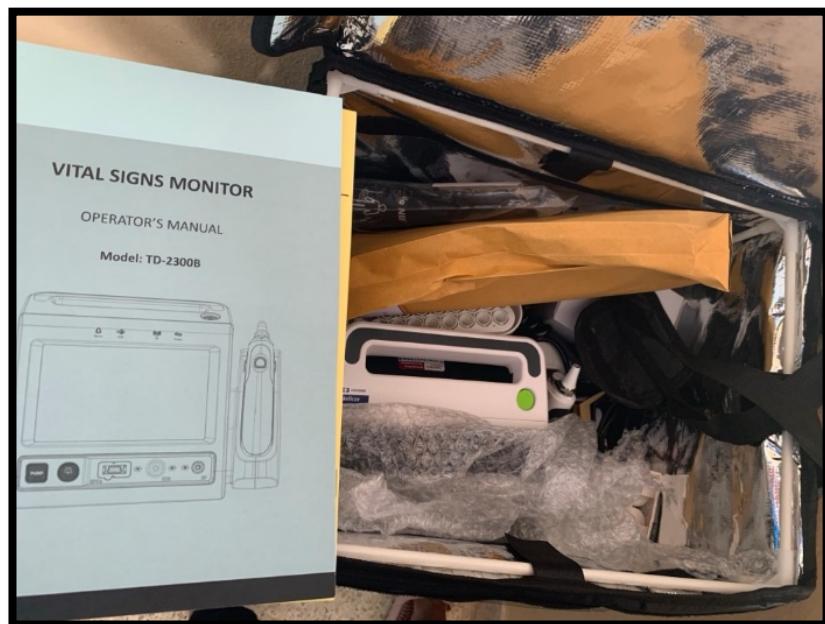
**Figure 5-5** Collaborative problem-solving via remote assistance between IT staffs



**Figure 5-6** Hidden work – Extended data entry in clinical spaces after hours



**Figure 5-7** Advanced monitoring equipment with the manual unused



## CHAPTER SIX: CONCLUSION

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The global public sector is experiencing a significant digital transformation, driven by the potential for increased efficiency and accountability through datafication - the conversion of organisational processes and services into measurable data (Argento *et al.*, 2025; Mayer-Schönberger and Cukier, 2013; Mergel, 2016). The COVID-19 pandemic greatly accelerated this trend, creating an urgent need for data-driven solutions in public service delivery (Agostino *et al.*, 2021). These pressures have been most intense in the healthcare sector, which has become a key focus for transformative management accounting and control reforms.

However, as shown in the previous chapters, a significant gap remains between top-down digital mandates and how they are practically implemented. While often presented as progress, digital systems frequently lead to unintended consequences (Agostino *et al.*, 2022b; Clarke, 2016), yet the ways in which they transform existing institutional practices are still not well understood empirically (Agostino *et al.*, 2022a; Grossi *et al.*, 2023). This is particularly true in the healthcare sector, where reforms driven by accounting practices have historically caused tensions with established professional norms (Broadbent *et al.*, 2001; Kurunmäki, 2004). Furthermore, existing research mainly focuses on Western countries (van Helden and Uddin, 2016), often overlooking the unique complexities of emerging economies, where technological requirements intersect with distinct institutional, resource, and sociocultural factors (Alawattage *et al.*, 2017; van Helden *et al.*, 2021).

To address this research gap, this thesis examined how mandated datafication is translated, negotiated, and adapted within Thailand's primary healthcare sector. The study argues that organisational adaptation to digital controls is not a linear process of technology adoption but an emergent and deeply social process, shaped by ongoing tensions between top-down

diffusion pressures and bottom-up translation efforts, with different actors contesting changes based on their competing priorities and contexts. The findings show that this adaptation is not a single phenomenon but surfaces through several interconnected dynamics. First, core management accounting functions like budgeting may evolve into complex hybrid systems where digital tools and paper-based practices become constitutionally entangled (Paper 1). Such hybridity creates unintended consequences, including amplified resource inequalities between facilities and new administrative burdens requiring significant, often unrecognised, hidden work by practitioners to maintain functionality (Paper 1; Paper 3).

Second, the transformation goes beyond technical processes to reshape fundamental governance structures. Digital co-production involving diverse actors promotes what this thesis describes as multiform accountability: a dynamic mix of formal, data-driven institutional requirements and informal, community-based relational practices (Paper 2). While earlier literature looks at hybrid accountability (Grossi *et al.*, 2017; Grossi *et al.*, 2024), multiform accountability uniquely captures the simultaneous operation of competing accountability systems that actors must manage at the same time. This idea advances beyond simple system merging to show how practitioners must deal with the ongoing tension between two competing logics: the formal, data-centric demands of new digital systems and the informal, relational expectations grounded in socio-cultural norms.

Finally, intermediaries facilitate this entire process by translating central directives into local realities. These mediators include community-based actors, such as volunteers bridging digital systems and local sociocultural norms (Paper 2), as well as organisational actors, like hybrid IT teams providing essential technical translation (Paper 3). To manage this complexity, practitioners develop new adaptive practices, including hybrid professional identities that

combine clinical, managerial, and technical skills, along with significant, though often unrecognised, hidden work that supports these systems (Paper 3).

The rest of this chapter is organised as follows. Section 6.1 outlines the main findings from the three empirical papers in detail. Section 6.2 discusses the study's theoretical contributions and practical implications. Finally, Section 6.3 describes the research limitations and suggestions for future research.

## 6.1 SUMMARY OF KEY FINDINGS

The findings from the three empirical papers collectively show that the mandated digitalisation of Thailand's primary healthcare sector initiates a complex, multi-layered process of organisational adaptation. Instead of a straightforward implementation, the process is marked by the emergence of hybrid practices, the essential role of mediation, and the formation of new professional norms.

First, Paper One examined how datafication changes budgeting practices. The findings show that digitalisation does not simply replace traditional systems but instead creates complex hybrid budgeting arrangements where new digital tools and old paper-based methods become closely linked. This sociomaterial hybridity, however, causes significant unintended effects (Broadbent and Guthrie, 2008). Contrary to the policy aims of improving fairness, the data-driven reforms were found to worsen existing resource inequalities between well-resourced and under-resourced facilities (Broadbent *et al.*, 2001). Moreover, the intense performance pressures created by the new digital controls led practitioners to develop advanced workaround strategies, including the fabrication of data, to meet centrally imposed targets and secure funding.

Second, Paper Two examined how digital co-production reshapes accountability. The research revealed that involving diverse actors (practitioners, patients, and community volunteers) on digital platforms results in multiple forms of accountability. This is characterised by a dynamic and often tense coexistence of formal, data-driven institutional demands and informal, community-based relational practices (van Helden *et al.*, 2021). The findings emphasise the essential role of indigenous intermediaries, especially village health volunteers, who serve as sociocultural mediators. They actively interpret formal digital requirements to fit local cultural norms and trust-based community relationships, thereby bridging the gap between the state's technological goals and the community's lived experiences (Hopper *et al.*, 2017; Latour, 2005).

Third, Paper Three explored how the healthcare organisation adapts to mandated digital management accounting controls. The study shows that adaptation is an emerging process driven by the tension between top-down dissemination and bottom-up interpretation. This process is critically enabled by two main factors: organisational intermediaries, especially the unique, hybrid IT specialists who perform vital technical translation (Begkos and Antonopoulou, 2022; van Slooten *et al.*, 2024); and the development of new adaptive practices by practitioners. These practices include creating hybrid professional identities, where clinical expertise is combined with technological and data management skills (Kurunmäki, 2004), and undertaking significant, often unrecognised, hidden work (e.g., extensive overtime, self-directed learning, and mobilising family networks) to maintain the functioning of the new digital systems (Barnard *et al.*, 2024; Chua, 1995; Smith *et al.*, 2005).

These three empirical enquiries are logically aligned to provide a cumulative understanding of the phenomenon. The thesis progresses from the micro-level materiality of daily budgeting practices (Paper One), through the meso-level relational dynamics of accountability (Paper Two), to a macro-level processual model of organisational adaptation (Paper Three). This

sequence allows the research to move from observing what happens at the sociomaterial interface, to understanding how this reshapes social relationships, and finally explaining why the overall system evolves into a stable hybrid state.

In summary, the three papers show that organisational adaptation in this context is a highly social and contested process. It is not driven by the smooth efficiency of technology but by the ongoing, often invisible, effort of human actors who mediate, interpret, and negotiate the tensions between digital mandates and practical realities.

## 6.2 THEORETICAL CONTRIBUTIONS AND PRACTICAL IMPLICATIONS

### 6.2.1 *Theoretical Contributions*

This thesis makes several unique contributions to the literature on public sector management accounting, digitalisation, and healthcare management, mainly by providing a deeply contextualised, ethnographic account from an emerging economy that connects macro-level policy with micro-level implementation realities.

Specifically, this thesis advances a conceptual framework for understanding public sector digitalisation through the integration of three core dimensions: emergent adaptation, hybridity, and multiform accountability. First, it conceptualises adaptation not as a linear adoption of technology, but as an emergent process of negotiation between rigid digital mandates and situated professional practices. Second, it demonstrates that this negotiation inevitably results in hybridity - a dual state where digital logic and traditional social norms (*such as Kreng-jai*) coexist. Finally, this hybrid environment necessitates the development of multiform accountability, a coping mechanism where practitioners fracture their reporting behaviour to satisfy these competing demands. Together, these concepts offer a comprehensive theoretical

lens for explaining why digital reforms in emerging economies often result in complex, layered outcomes rather than simple efficiency gains.

First, employing a sociomaterial lens (Orlikowski, 2007; Orlikowski and Scott, 2008), paper 1 provides a detailed account of datafication's complex and unintended consequences. While earlier studies have highlighted the contested nature of accounting innovations (e.g., Preston *et al.*, 1992), this research presents a contemporary case that challenges the techno-optimistic narratives around digitalisation. It goes beyond simply confirming that datafication is socially constructed to show how this process of fabrication, in a resource-limited context, actively produces outcomes that oppose policy aims. Specifically, the findings indicate that datafication does not necessarily promote greater equity but can, in fact, heighten institutional inequalities and encourage counterproductive behaviours, such as data fabrication, offering a vital counter-narrative to much of the policy literature (Adhikari *et al.*, 2023).

Second, paper 2 develops the concept of multiform accountability to explain governance in digitally co-produced public services. This contributes to the public sector accounting literature for emerging economies (e.g., Alawattage *et al.*, 2017; van Helden and Uddin, 2016) by enhancing a theoretical framework. Digitalisation creates not only monolithic accountability but also multiform accountability - the key conceptual contribution of the thesis. This framework illustrates how formal, hierarchical, data-driven demands coexist with informal, relational, community-based practices within digital environments. Digital co-production involves healthcare providers, patients, and volunteers (Bovaird, 2007; Osborne *et al.*, 2016), requiring ongoing negotiation between these different accountability forms. Indigenous cultural intermediaries, especially volunteer networks, play a crucial role in mediating this process, demonstrating how local contexts and practices reshape imposed changes (Arun *et al.*, 2021).

Third, paper 3 proposes a comprehensive conceptual model to explain organisational adaptation within hierarchical public sectors. Research on innovation adoption has often employed either Diffusion of Innovation (DoI) theory (Rogers, 2003) or the Sociology of Translation (Callon, 1986; Latour, 1987) in isolation. This study's main contribution is to demonstrate the importance of synthesising both approaches. The model indicates that adaptation results from the critical tension between top-down diffusion (often enforced and accelerated by crises) and bottom-up translation. Importantly, it incorporates emerging professional practices as a central element of this process. The thesis broadens the ideas of the hybrid professional ethos and significant hidden work (Barnard *et al.*, 2024; Kurunmäki, 2004) by illustrating them not just as outcomes, but as the essential, agency-driven mechanisms through which practitioners in constrained environments make mandated systems functional. In doing so, this study extends existing research on professional resistance in healthcare accounting (Begkos and Antonopoulou, 2022; Broadbent and Guthrie, 2008; Chua, 1995; Leotta and Ruggeri, 2017), highlighting how datafication engenders subtle, everyday adaptations beyond explicit opposition.

In addition, by employing an ethnographic approach, which is less common in accounting studies, this research offers a detailed and rich data set to explore the issues related to the sociomaterial complexities of digitalisation in a non-Western context. By providing a reflexive account of navigating an insider-outsider positionality, the study demonstrates how deep, trust-based access - achieved over an extended period - was vital for moving beyond official narratives to document the hidden work and informal practices that sustain digital systems (Brewer, 2000; O'Reilly, 2009, 2012). Furthermore, using QDAS in this emerging economy context revealed the limitations of standardised analytical tools; the failure of automated features such as AI assist - due to linguistic and sociocultural nuances - highlighted the urgent

need for grounded, interpretive techniques like In-Vivo coding to preserve authentic local meanings (Miles *et al.*, 2020). This reflexive utilisation of digital tools responds to recent calls for increased methodological rigour and transparency in qualitative accounting research (Bamber and Tekathen, 2023; Deng, 2023; Steccolini, 2019).

### ***6.2.2 Implications for policy and practice***

The empirical findings of this thesis provide several important and practical implications for policymakers and public sector managers guiding digital transformations, especially in emerging economies. Rather than merely implementing technology, successful digitalisation requires a thorough understanding of the socio-technical context.

First, it is essential for policy to go beyond a focus on technology and to officially recognise and support the vital human infrastructure that mediates and maintains digital systems. A key point is that public health information becomes much more effective when it is formally channelled through trusted cultural and religious leaders who can adapt institutional goals into locally accepted practices. Instead of imposing new systems in isolation, policymakers should connect digital applications with existing, trusted volunteer networks that close the gap between technological challenges and community expectations. This support should also include making the unseen and emotional labour of practitioners visible. The sustainability of digital systems currently depends on this unacknowledged support, and funding this work is vital to prevent staff burnout and ensure the long-term success of digital reforms.

Second, implementation plans should be designed for hybridity and co-production, not just for the straightforward replacement of older methods. Research clearly indicates that transitioning to a digital system often necessitates maintaining legacy paper-based documentation alongside new digital data entry, primarily due to institutional risk aversion. Public sector officials should

plan for this increased staff workload and refrain from assuming that digitalisation will immediately generate efficiencies. Moreover, managers should proactively establish dedicated digital spaces for co-production. For example, creating digital forums where individuals can collaboratively monitor their healthcare through peer support and sharing visual aids, such as images of daily meals, fosters a sense of community and empowers patients in managing their own care.

Finally, the findings emphasise the importance of avoiding rigid, one-size-fits-all accountability frameworks. Linking funding solely to inflexible, centrally imposed data targets can create intense pressure, potentially leading to counterproductive behaviours such as data fabrication. Policymakers should instead promote and design for the reality of multiple forms of accountability, where formal, data-driven metrics coexist with informal, relational knowledge. A successful digital transformation will be one that values both, rather than allowing quantitative data to completely overshadow the rich, qualitative insights essential for effective public service.

### **6.3 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH**

While this thesis offers a detailed and nuanced account of digitalisation in Thai primary healthcare, there are a few limitations to consider when interpreting its findings, which also open up promising avenues for future research.

Firstly, the findings are based on an in-depth ethnographic study of a specific healthcare district in Southern Thailand. While this approach provided the necessary depth, the unique sociocultural dynamics of the region have undoubtedly influenced the observed phenomena. Consequently, the direct generalisability of these findings to other contexts may be limited. This emphasises the need for comparative studies to develop a more robust, non-Western-

centric theory of public sector adaptation. Future research could, for example, expand this study through cross-country analyses within the ASEAN region. Calls for further investigation into the region's unique institutional factors, such as, highlight a clear opportunity for alignment (Kristanto and Cao, 2025). Such work could explore how different forms of state hierarchy and political connections mediate the implementation of digital management accounting controls.

Second, a critical consideration for generalisability is the specific temporal context of the fieldwork, which took place in the immediate aftermath of the COVID-19 pandemic. It could be argued that the observed phenomena - such as data fabrication and intense hidden work were merely symptoms of crisis management. However, this thesis argues that the pandemic served as a magnifying glass that exposed deep-seated structural vulnerabilities rather than creating them. The structural misalignment between top-down digital mandates and bottom-up resource constraints persists in the post-pandemic period. Therefore, the findings regarding hybrid practices are not transient but are likely generalisable to other resource-constrained public sector settings (such as education or local government) where rigid performance systems are imposed on high-context working cultures.

Third, this research has mainly focused on local levels within the healthcare system. While this has provided some valuable insights into how digital mandates are implemented in practice, less attention was given to the hierarchical relationship between central government controls and local budgeting or accountability practices. Future studies could more explicitly explore the “policy-to-practice” cycle, tracing how national management accounting controls - such as performance-linked funding rules - are enacted, challenged, or altered at the frontline. Long-term studies would also be beneficial to observe how these adaptive practices develop over time. Such research could determine whether hybrid systems eventually form into new routines or remain as unstable compromises maintained by hidden efforts.

Fourth, while this thesis provides a detailed examination of the current wave of datafication, the technological landscape is rapidly evolving. The study did not include the next generation of accounting technologies, such as Artificial Intelligence (AI) and predictive analytics, which are beginning to reshape public sector management accounting. Future research should critically explore how such technologies reconfigure budgeting practices, accountability mechanisms, and control systems, and whether they alleviate or intensify the hidden work and emotional labour identified in this study.

Finally, although this research involved multiple stakeholders, patient perspectives were not the main focus. Since accountability in healthcare is ultimately relational and citizen-facing, future research could explore how patients perceive digital co-production and accountability, and how these perceptions influence the legitimacy of management accounting controls in practice. This would expand the accounting literature's engagement with users of public services, not just providers.

In summary, despite these constraints, this study has offered valuable insights into the complex realities of public sector digitalisation. The constraints themselves highlight promising directions for advancing accounting research: comparative studies of budgeting reforms, longitudinal analyses of hybrid systems, critical examinations of AI in public accounting, and deeper engagement with patient perspectives. Future research can build upon the frameworks developed here to continue exploring not only how digital systems are designed, but also whose actors make them function and at what cost.

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## APPENDIX A: ETHICS APPROVAL



University of Essex

23/06/2023

Mr Sirisak Siripibarn

Essex Business School

University of Essex

Dear Sirisak,

### **Ethics Committee Decision**

Application: ETH2223-1198

I am pleased to inform you that the research proposal entitled "Big Data: Diffusion, Management Accounting Practices and Accountability - A Case of Public Healthcare Service in Thailand" has been reviewed on behalf of the Ethics Sub Committee 2, and, based on the information provided, it has been awarded a favourable opinion.

The application was awarded a favourable opinion subject to the following **conditions**:

#### Extensions and Amendments:

If you propose to introduce an amendment to the research after approval or extend the duration of the study, an amendment should be submitted in ERAMS for further approval in advance of the expiry date listed in the ethics application form. Please note that it is not possible to make any amendments, including extending the duration of the study, once the expiry date has passed.

#### Covid-19:

Please note that the current Government guidelines in relation to Covid-19 must be adhered to and are subject to change and it is your responsibility to keep yourself informed and bear in mind the possibility of change when planning your research. You will be kept informed if there are any changes in the University guidelines.

Yours sincerely,

Casper Hoedemaekers

## The Local Ethical Approval



### Consent Forms

**Project's Title:** Big Data: Diffusion, Management Accounting Practices and Accountability  
- A Case of Public Healthcare Service in Thailand

**Researcher:** Sirisak Siripibarn

**Research Statement:**

My name is Sirisak Siripibarn, and I am a PhD student in the Department of Accounting at the University of Essex, United Kingdom. I would like to invite your organisation to take part in a research study. Before you decide whether to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. This study aims to explore how the usage of big data has resulted to a transformation in management accounting systems and practises, the adoption of digitisation, and the changing nature of accountability relationships in the Government Primary Health Care Services, Thailand. The District Health Office of Chana is chosen as a case study due to its typical type of government office in Thailand, its well use of big data since the COVID-19 pandemic, and its strong connection to the nearby university (RMUTSV) from which the researcher is affiliated. Among its many contributions, this research has accelerated the diffusion of big data and influenced the way management accounting practises, which has the potential to change the nature of healthcare services in Thailand.

Data would be gathered in several different ways, including through written sources, audio or video recordings, participant observation, individual interviews, and focus group interviews. Firstly, observations of participants will take place at the Chana District Health Office. Second, there are the interviews which consist of various groups and will take place from executives, programmers, primary care units directors, operational staffs, and village health volunteers. Each interview will last between 40 and 60 minutes at the research site. A digital voice recorder (subject to participant consent) will be used to capture the interviews, which will then be transcribed and translated. The interview will also make use of note taking. Participants are free to select a convenient location for the interviews. Subject to permission, meetings will be observed, as well as secondary materials including organisational reports and other documents that explain how big data is diffused and used. Moreover, to gather a diverse sample, the study will conduct focus groups' interviews with government officials, such as directors, operational staffs, and volunteer groups in the community with senior officers as moderators.

It is up to participant to decide whether he or she wish to take part in this research study. If participants do decide to take part, they will be asked to provide written consent. They are free to withdraw at any time, without giving a reason. Withdrawal will have no impact on their works, assessments, or future career.

The identifiable data provided will be securely stored in password protected computers and accessible only to the members of the research team directly involved in the project, and that confidentiality will be maintained. The data collected would be used to support other research in the future and may be shared anonymously with other researchers.



The study's findings will shed light on the relationship between big data and management accounting techniques. Your responses will be included in a PhD thesis that may be cited in future studies, presented at conferences, or published in academic journals. Any additional studies, publications, or presentations will keep you identify and details confidential.

Ethics review body has reviewed and approved for the ethical approval by Social Sciences Ethics Sub-Committee at the University of Essex or the University of Essex Ethics Committee.

If you have any concerns about any aspect of the study or have a complaint, in the first instance please contact the researcher, Sirisak Siripibarn (e-mail [ss22843@essex.ac.uk](mailto:ss22843@essex.ac.uk)) or Supervisors, Dr Bedanand Upadhyaya ([b.upadhyaya@essex.ac.uk](mailto:b.upadhyaya@essex.ac.uk)) or Dr Chaminda Wijethilake ([c.wijethilake@essex.ac.uk](mailto:c.wijethilake@essex.ac.uk)).

Here, any authorised management or representative of your organisation can offer consent:

Name: Mr. Nom Wannaboribun

Position/Title: Public Health Executive Chana

Organisation Name: Chana District Public Health Office

Location: Moo 2 Tambon Banra Amphoe Chana Songkhla Province 90130

In addition, the organisation and study participants' identities shall remain concealed and anonymized in any subsequent publications (including the PhD thesis).

Name

Mr. Nom Wannaboribun

Date

3 July 2023

Signature

46025

*Note: A Thai translation of this text will be provided.*



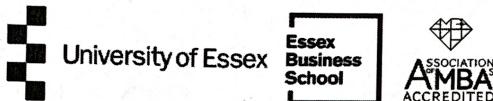
## หนังสือแสดงเจตนาข้อมูล (Consent Forms)

### เรียน สาธารณะสุขอำเภอจะนะ

ด้วยข้าพเจ้านายศิริศักดิ์ ศิริภิบาล นักศึกษาปริญญาเอกทางด้านการบัญชีบริหาร มหาวิทยาลัย เอสเซ็กซ์ ณ ประเทศไทยอังกฤษ สาธารณรัฐอาณาจักร โดยข้าพเจ้าขอมีความประสงค์ขอเรียนเชิญ หน่วยงานของท่านเข้าร่วมการศึกษาวิจัยในหัวข้อ “ฐานข้อมูลขนาดใหญ่ (Big Data): การบริหารงาน แนวทางการปฏิบัติงานภาครัฐ และความรับผิดชอบต่อข้อมูล - กรณีศึกษาบริการสาธารณสุขในประเทศไทย” ซึ่งก่อนที่ท่านจะพิจารณาตัดสินใจเข้าร่วมในการศึกษาวิจัยนี้ ขอ ความกรุณารอ่านเอกสารฉบับนี้อย่างละเอียดถี่ถ้วน เพื่อให้ท่านได้รับทราบถึงเหตุผลและ รายละเอียดของการศึกษาวิจัยในครั้งนี้

งานวิจัยขึ้นนี้มีวัตถุประสงค์เพื่อศึกษาถูกยุทธ์การบริหารงาน และแนวทางการปฏิบัติงานใน ภาครัฐโดยใช้ฐานข้อมูลขนาดใหญ่ (Big Data) รวมถึงความรับผิดชอบต่อการใช้ข้อมูลของ หน่วยงานภาครัฐในประเทศไทย ซึ่งสำนักงานสาธารณสุขอำเภอจะนะได้รับเลือกกรณีศึกษาเชิง ลึก เนื่องจากเป็นหน่วยงานที่มีศักยภาพสูงในการใช้ระบบฐานข้อมูลขนาดใหญ่ (Big Data) ใน การบริหารงาน ตั้งแต่ช่วงเริ่มต้นของการระบาดเชื้อไวรัสโคโรนา ๒๐๑๙ (COVID-19) จนถึง ปัจจุบัน นอกจากนั้นสำนักงานสาธารณสุขอำเภอจะนะ ยังมีความเกี่ยวข้องกับคณะกรรมการบริหารธุรกิจ มหาวิทยาลัยเทคโนโลยีราชมงคลรัตนโกสินทร์ จังหวัดสิงคโปร์ ซึ่งได้มีการประสานงานแลกเปลี่ยนองค์ ความรู้ซึ่งกันและกันมาตลอด และเป็นมหาวิทยาลัยต้นสังกัดของผู้วิจัย

อนึ่ง หากท่านตัดสินใจเข้าร่วมการวิจัยแล้ว ผู้วิจัยจะขอเก็บข้อมูลมีระยะเวลาประมาณ ๕ เดือน โดยจะเริ่มดำเนินการตั้งแต่เดือนกันยายน ถึง เดือนธันวาคม พ.ศ. ๒๕๖๖ ณ สำนักงาน สาธารณสุขอำเภอจะนะ โดยมีวิธีการเก็บข้อมูลซึ่งประกอบด้วย การปฏิบัติงาน, การ สังเกตการณ์, การบันทึกและหลักฐานด้านเอกสาร รวมถึงการสัมภาษณ์และการประชุมกลุ่ม ย่อย ในส่วนของการสัมภาษณ์นั้นจะทำการสัมภาษณ์โดยจะใช้เวลาประมาณ ๔๐ ถึง ๖๐ นาทีแล้วแต่กรณี ซึ่งจะเริ่มจากจากผู้บริหารระดับสูง, ผู้พัฒนาระบบฐานข้อมูล, ผู้บริหาร ระดับกลาง, ผู้อำนวยการหน่วยบริการปฐมภูมิ, เจ้าหน้าที่ระดับปฏิบัติงาน และอาสาสมัคร สาธารณสุขประจำหมู่บ้าน (อสม.) โดยข้อมูลจะถูกจดบันทึกและบันทึกด้วยเครื่องบันทึกเสียง ซึ่งข้อมูลจะถูกเก็บไว้เป็นความลับ ผู้วิจัยจะใช้รหัสแทนชื่อและข้อมูลส่วนตัวของผู้ให้สัมภาษณ์ หลังจากนั้นข้อมูลจะถูกแปลงและส่งกลับให้ผู้เข้าร่วมการสัมภาษณ์ทบทวนอีกครั้งเพื่อพิจารณา ซึ่งหากเห็นชอบ ผู้เข้าร่วมจะได้รับหนังสือแสดงความยินยอมในการมีส่วนร่วมในการศึกษาวิจัย ครั้งนี้ เพื่อลงนามในการตอบรับก่อนจะเริ่มกระบวนการเก็บข้อมูลและสัมภาษณ์ ในกรณีที่ผู้ให้ สัมภาษณ์รู้สึกไม่สบายใจกับบางคำถาม ผู้ให้สัมภาษณ์มีสิทธิ์ที่จะไม่ตอบคำถามเหล่านั้นได้ รวมถึงมีสิทธิ์ถอนตัวออกจากงานวิจัยนี้เมื่อใดก็ได้โดยไม่ต้องแจ้งให้ทราบล่วงหน้า และการ ปฏิเสธหรือถอนตัวออกจากโครงการวิจัยนี้ จะไม่มีผลกระทบต่อการทำงาน และระบบการ ประเมินได้ ทั้งสิ้น ซึ่งข้อมูลส่วนตัวของผู้เข้าร่วมการวิจัยจะถูกเก็บรักษาไว้ ไม่เปิดเผยต่อ สาธารณะเป็นรายบุคคล แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวม



ผลของงานวิจัยขึ้นนี้จะแสดงให้เห็นถึงศักยภาพในการเปลี่ยนแปลงในหน่วยงานบริการสาธารณะขึ้นพื้นฐานประเทศไทยสู่ความเป็นมืออาชีพ โดยการใช้เทคโนโลยีสมัยใหม่ในการบริหารจัดการข้อมูล เอกสารงานวิจัยขึ้นนี้จะถูกนำเสนอในงานวิทยานิพนธ์ระดับปริญญาเอก และนำเสนอในงานนิทรรศการ รวมถึงการตีพิมพ์ในวารสารวิชาการระดับนานาชาติที่อาจนำไปใช้ อ้างอิงเพื่อเป็นประโยชน์ในการศึกษาที่เกี่ยวข้องในอนาคต

โครงการวิจัยนี้ได้รับการตรวจสอบและอนุมัติ จากคณะกรรมการจัดการจัดการทางสังคมศาสตร์ มหาวิทยาลัย(essex) หรือ คณะกรรมการจัดการจัดการ มหาวิทยาลัย(essex) หากท่านมีข้อกังวล เกี่ยวกับแก่คุณมั่นคง ๆ ของการวิจัย หรือมีข้อร้องเรียน ในกรณีแรก โปรดติดต่อผู้วิจัย นายศิริศักดิ์ ศิริวิบูล (อีเมล์ [ss22843@essex.ac.uk](mailto:ss22843@essex.ac.uk)) หรืออาจารย์ที่ปรึกษา ดีอุกเตอร์ Bedanand Upadhyaya (อีเมล์ [b.upadhyaya@essex.ac.uk](mailto:b.upadhyaya@essex.ac.uk)) หรือ ดีอุกเตอร์ Chaminda Wijethilake (อีเมล์ [c.wijethilake@essex.ac.uk](mailto:c.wijethilake@essex.ac.uk))

จึงเรียนมาเพื่อโปรดพิจารณาในการมีส่วนร่วมในงานวิจัยในครั้งนี้

ข้าพเจ้าได้อ่านรายละเอียดในเอกสารนี้ครบถ้วนแล้ว และข้าพเจ้ามีอำนาจในการลงนาม

ชื่อ: นพ พน ภานุรัตน์

ตำแหน่ง: ผู้อำนวยการ ๑๖๘

หน่วยงาน: สันทิราษฎร์ วิทยาลัย ๑๖๘

ที่ตั้ง: หมู่ที่ ๑๖๘ บ้านน้ำดี ต.นาดี ๑๖๘ บ.น้ำดี วังน้ำ ๙๐๑๓๐

ข้าพเจ้าเข้าใจข้อความในหนังสือแสดงเจตนาขึ้นโดยตลอดแล้ว จึงลงลายมือชื่อไว้

ชื่อ

วันที่

ลายมือชื่อ

นพ พน ภานุรัตน์

๓ กันยายน ๒๐๒๓

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## APPENDIX B: INFORMATION AND CONSENT FORMS



University of Essex



### Participant Information Sheet for Research Project: "Big Data: Diffusion, Management Accounting Practices and Accountability - A Case of Public Healthcare Service in Thailand"

Dear participant,

I, Sirisak Siripibarn, am currently carrying out a piece of research entitled, "Big Data: Diffusion, Management Accounting Practices and Accountability - A Case of Public Healthcare Service in Thailand" under the supervision of Dr Bedanand Upadhyaya and Dr Chaminda Wijethilake.

We are investigating how the usage of big data has resulted to a transformation in management accounting systems and practises, the adoption of digitisation, and the changing nature of accountability relationships in the Government Primary Health Care Services, Thailand.

This information sheet provides you with information about the study and your rights as a participant.

#### **What does taking part in the research involve?**

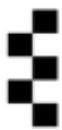
Data would be gathered in several different ways, including through written sources, audio or video recordings, participant observation, individual interviews, and focus group interviews. Firstly, observations of participants will take place at the Chana District Health Office. Second, there are the interviews which consist of various groups and will take place from executives, programmers, primary care units directors, operational staffs, and village health volunteers. Each interview will last between 40 and 60 minutes at the research site. A digital voice recorder (subjects to participant consent) will be used to capture the interviews, which will then be transcribed and translated. The interview will also make use of note taking. Participants are free to select a convenient location for the interviews. Subject to permission, meetings will be observed, as well as secondary materials including organisational reports and other documents that explain how big data is diffused and used. Moreover, to gather a diverse sample, the study will conduct focus groups' interviews with government officials, such as directors, operational staffs, and volunteer groups in the community with senior officers as moderators. Each group discussion lasts approximately from 60 to 90 minutes.

#### **Do I have to take part?**

Naturally, there is no obligation to take part in the study. It's entirely up to you. If you do decide to take part you will be given this information sheet to keep and be asked to give consent to take part. If publications or reports have already been disseminated, these cannot be withdrawn, however, these will only contain anonymised or aggregated data. If you decide to participate in the study and then change your mind in the future, you can withdraw at any point, even after the data has been collected. If you wish to withdraw from the study at any time, please contact the researcher on the details below.

#### **Will my taking part in this study be kept confidential?**

All information collected will be kept securely in password protected computers and accessible only to the members of the research team directly involved in the project, and that confidentiality will be maintained. However, this research forms part of my studies at the University of Essex and therefore may be subject to scrutiny by other University staff in determining the outcome of my degree. If you are mentioned individually in any publications or reports then a participant number or pseudonym will be used and identifying details will be removed. A list may be kept linking participant numbers or pseudonyms to names, but this will be kept securely and will only be accessible by those listed above. A copy of the information which we record about you, but not other participants, will be provided, free of charge, on request.



University of Essex



**Are there any possible disadvantages or risk of taking part?**

There is no danger you need to worry about.

**What are the possible benefits of taking part?**

It cannot guarantee any certain outcomes from your involvement. However, your participation will help to better facilitate healthcare decision making and the potential to change healthcare policies in Thailand.

**What is the legal basis for using the data and who is the Data Controller?**

The legal basis for processing the data collected from this project is informed consent. The Data Controller for his project is the University of Essex and the contact is the University Information Assurance Manager ([dpo@essex.ac.uk](mailto:dpo@essex.ac.uk)).

**What should I do if I want to take part?**

Please fill out and sign the attached consent form if you wish to participate in the study. After that, a member of the research team will conduct the interview.

**Who is funding the research?**

This study is unfunded because it is part of a doctoral thesis.

**What will happen to the results of the research study?**

The study's findings will shed light on the relationship between big data and management accounting practices. Your responses will be included in a PhD thesis that may be cited in future studies, presented at conferences, or published in academic journals. Any additional studies, publications, or presentations will keep you identify and details confidential.

**Who has reviewed the study?**

I have applied for ethical approval to undertake this study. My application was reviewed and approved by the Social Sciences Ethics Sub-Committee at the University of Essex.

**What happens if something goes wrong?**

If you are harmed by taking part in this research project, there are no special compensation arrangements. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been treated during the course of this study then you should immediately inform the student and/or their supervisor (details below). If you are not satisfied with the response, you may contact the Essex Business School Research Ethics Officer, Dr Casper Hoedemaekers ([choedem@essex.ac.uk](mailto:choedem@essex.ac.uk)) or Sarah Manning-Press ([sarahm@essex.ac.uk](mailto:sarahm@essex.ac.uk)) who will advise you further.

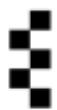
**Name of the Researcher/Research Team Members**

We would be very grateful for your participation in this study. If you need to contact us in future, please contact me ([ss22843@essex.ac.uk](mailto:ss22843@essex.ac.uk)) or Dr Bedanand Upadhyaya ([b.upadhyaya@essex.ac.uk](mailto:b.upadhyaya@essex.ac.uk)) or Dr Chaminda Wijethilake ([c.wijethilake@essex.ac.uk](mailto:c.wijethilake@essex.ac.uk)). You can also contact us in writing at: EBS, University of Essex, Colchester CO4 3SQ.

You are welcome to ask questions at any point.

Yours,

*Sirisak Siripibarn*



**Participant Consent form for Research Project: "Big Data: Diffusion, Management Accounting Practices and Accountability - A Case of Public Healthcare Service in Thailand"**

Dear participant,

This research is being carried out by Sirisak Siripibarn under the supervision of Dr Bedanand Upadhyaya and Dr Chaminda Wijethilake.

If you agree to participate in this study, you will be interviewed by the researcher. The answers which you provide will be recorded through notes taken by the interviewer and audio recording.

Please see the attached Participant Information Sheet for details about the study and your rights as a participant.

Yours,  
Sirisak Siripibarn

| <b>Statement of Consent</b>   | <b>Please initial each box</b> |
|---|--------------------------------|
| • I confirm that I have read and understood the information provided in the Participant Information Sheet dated 26/06/23 for the above study. I have had an opportunity to consider the information, ask questions and have had any questions satisfactorily answered.  | <input type="checkbox"/>       |
| • I understand that my participation is voluntary and that I am free to withdraw from the project at any time without giving any reason and without penalty. I understand that any data collected up to the point of my withdrawal will be destroyed/ cannot be withdrawn because it cannot be identified.  | <input type="checkbox"/>       |
| • I understand that the identifiable data provided will be securely stored and accessible only to the members of the research team directly involved in the project, and that confidentiality will be maintained.   | <input type="checkbox"/>       |
| • I understand that my fully anonymised data will be used for a PhD thesis that may be cited in future studies, presented at conferences, or published in academic journals.  | <input type="checkbox"/>       |
| • I understand that the data collected about me will be used to support other research in the future and may be shared anonymously with other researchers.  | <input type="checkbox"/>       |
| • I give permission for the data to be stored in the form de-identified (anonymised) transcripts and audio recordings that I provide to be deposited in password protected computers and accessible only to the members of the research team directly involved in the project, so that they will be available for future research and learning activities by other individuals. | <input type="checkbox"/>       |
| • I agree for this interview and focus group to be audio recorded and recorded via notes taken by the researcher.   | <input type="checkbox"/>       |
| • I agree to participate in the research project, "Big Data: Diffusion, Management Accounting Practices and Accountability - A Case of Public Healthcare Service in Thailand", being carried out by Sirisak Siripibarn.   | <input type="checkbox"/>       |

Participant's signature

Date

Researcher's signature

Date

## APPENDIX C: INTERVIEW QUESTIONS

### Interview Introduction

Mr./Ms. (name of interviewee)

My name is Sirisak Siripibarn, and I'm a PhD student in the Department of Accounting at the University of Essex, England. My research is on "Big Data: Diffusion, Management Accounting Practices and Accountability – A Case of Primary Healthcare Service in Thailand."

I'm looking at how the use of big data is changing management accounting and the way healthcare organisations in Thailand work. Your insights would be very valuable for this study, and I really appreciate your time. With your permission, I'd like to take notes and record our conversation to make sure I capture everything accurately.

This research has been approved by the University of Essex Ethics Committee and will follow their ethical guidelines throughout.

**Interview details (CODE):** \_\_\_\_\_

**Name of interviewee:** \_\_\_\_\_

**Position of interviewee:** \_\_\_\_\_

**Day and date:** \_\_\_\_\_

**Start time:** \_\_\_\_\_ **Finish time:** \_\_\_\_\_

### Interview Questions [Big Data (BD) / Data Collecting (DC) for field workers/ volunteers]

| <b>Paper 1: To investigate how datafication transforms budgeting practices in public sector healthcare</b> |   | <b>BD</b>               | <b>DC</b> |
|--|---|-------------------------|-----------|
| <b>Introduction to the people involved and what they do in the organisation.</b>                           |   |                         |           |
| 1  | I would appreciate it if you would inform me about your role here.  |                         |           |
| 2  | Could you please explain the nature of your work?   |                         |           |
| 3  | How long have you been working in this job?   |                         |           |
| 4  | Give me an overview of the key data activities you undertake at work.   |                         |           |
| 5  | How has been your job changing over the years?  |                         |           |
| <b>Since COVID-19, the use of applications has led to changes in organisations and work activities.</b>    |   |                         |           |
| <b>Big data's Settings (Different Applications)</b>  |   | <b>Problematisation</b> |           |
| 6  | BD: What were the reasons for introducing applications to conduct data? ( <i>The basic concept of big data</i> )                      |                         |           |
|  | DC: In your opinion, how does using an app to collect patent data benefit the organisation compared to the traditional method?        |                         |           |
| 7  | How do you think being part of the organisation's employing the application to collect patent data initiatives? – Initial challenges? |                         |           |
| 8  | BD: How does using the app to conduct data apply to all your jobs?  |                         |           |

|   |   |                      |  |
|---|---|----------------------|--|
|   | <ul style="list-style-type: none"> <li>- Executives/Programmers: Dashboard &amp; Apps</li> <li>- Directors/Field Workers: Applications</li> </ul> <p><i>(Accounting perspective: E.g., PMS, planning and monitoring, specially budgeting and investment, reporting and feedback practices etc.)</i></p> |                      |  |
|   | DC: How does using the app to collect patient data apply to your jobs?  |                      |  |
| 9   | Why do you think the applications are important to your organisations/to better serve the patients? <i>(Aims &amp; Goals)</i>   |                      |  |
| 10  | To your knowledge, did these goals originate internally, or were they influenced by an external rule or agency?   |                      |  |
| <b>Supervised big data quality &amp; Worker participation</b> |   | <i>Interessement</i> |  |
| 11  | <p>Do you have data activities policies in place for the entire organisation?</p> <p>If yes, can you provide the guidelines?</p> <p>If no, how do you get started with data activities?</p>   |                      |  |
| 12  | How do your colleagues find accept/reject the introduction of the apps?   |                      |  |
| 13  | In the early stages of implementation, how do you connect with different actors? <i>(Both human and non-human actors)</i>   |                      |  |
| 14  | <p>What are the effective ways to promote and train people to use the apps?</p> <p>And what makes you think that these are better than other alternatives?</p>  |                      |  |
| <b>Individuals' use of big data</b>                           |   | <i>Enrolment</i>     |  |
| 15  | How did you adopt the applications within the existing conventional manual systems?   |                      |  |
| 16  | How did people respond to the changes that were made?   |                      |  |
| 17  | Were they more administrative or technological in background?   |                      |  |
| 18  | Have you ever experienced any difficulty or resistance of using new data activities? Any fixes?   |                      |  |
| <b>Daily routines and their relations with big data</b>       |   | <i>Mobilisation</i>  |  |
| 19  | <p>Do you think the use of apps works and has a beneficial impact?</p> <p>If yes, please explain.</p> <p>If not, where are the problems located?</p>  |                      |  |
| 20  | How satisfied are you with the current data activities, or do you feel that further improvements must be made to better meet the needs of the organisation as a whole?  |                      |  |
| 21  | In your opinion, what are the organisation's primary big data-related problems for the future? <i>(Including people's resistance)</i>   |                      |  |
| 22  | In what ways does the organisation handle to counter these threats?   |                      |  |

|  |   |                         |           |           |
|--|---|-------------------------|-----------|-----------|
| <b>Paper 2: To explore how digital co-production transforms accountability in public sector healthcare</b>   |   |                         | <b>BD</b> | <b>DC</b> |
| 1  | Before the pandemic, were you working on any data applications? |                         |           |           |
| <b>Organisations continually search for innovative solutions to the issues they face since the pandemic.</b> |   | <i>Problematisation</i> |           |           |

|  |   |                      |  |
|--|---|----------------------|--|
| 2  | What programmes do you use for organising data? (Recheck - P1: Q8)  |                      |  |
| 3  | Do you make use of the alternative, non-mandated application?<br>If so, please describe.  |                      |  |
| 4  | Do you have opinions on the practical benefits of emerging forms of data digitisation such the cloud, blockchain, Chatbots, ML/AI, robotics, etc.?<br>If yes, please explain and continue with question 5.<br>If no, continue with question 6.  |                      |  |
| 5  | There are data digitisations require immediate attention, and which ones can wait.<br>- Please let me know if these data applications have been rejected by your organisation or are just waiting to be implemented.<br>- What are some data applications that your organisation tried out but ended up on? |                      |  |
| <b>The needs are crucial to sustaining an innovation.</b>  |   | <b>Interessement</b> |  |
| 6  | In what ways do you feel that those applications contribute to the general achievement of the work that you do?   |                      |  |
| 7  | How well do emerging forms of data applications meet the needs of the organisation?   |                      |  |
| 8  | I'm interested as to how your organisation plans to take advantage of innovative data applications techniques.  |                      |  |
| <i>During the COVID-19, an organisation has a short time to adjust an innovation. After that, the novelty became routine and ingrained in the organization's structure, making further changes unlikely (Tyre and Orlikowski, 1994).</i> |   |                      |  |
| <b>The newer information <u>employees</u> must learn to implement an innovation, the harder it is to use.</b>  |   | <b>Enrolment (i)</b> |  |
| 9  | When compared to more conventional methods, to what extent do you think the organisation uses data applications?  |                      |  |
| 10   | Have you ever met resistance from workers when trying to implement BD strategies? (Recheck - P1: Q21)   |                      |  |
| 11   | Are there enough time and experienced people to train employees on the new data methods?  |                      |  |
| 12   | Does your organisation have a designated budget for these initiatives?  |                      |  |
| <b>Leaders who promote new ideas are crucial to success.</b> <b>Enrolment (ii)</b>   |   |                      |  |
| 13   | Do you think your organisation puts data applications into action proactively or reactively?  |                      |  |
| 14   | To what extent do the leaders at your organisation influence how data tools are used?<br>If so, please explain how that impact presents in general.   |                      |  |
| 15   | Which way did the decision to implement data applications come about - from the bottom up or from the top down?<br>(i) Design stage   |                      |  |

|   |  |                     |  |
|---|--|---------------------|--|
|   | (ii) Implementation stage<br>(iii) Monitoring, assessment and feedback stage   |                     |  |
| 16  | What role, if any, do you think related government agencies and Thai universities serve in promoting data applications at your organisation?   |                     |  |
| <b>Sustainability, which is closely related to routinizing.</b> |  | <b>Mobilisation</b> |  |
| 17  | How has the organisational culture been changed toward the applications' usage? ( <i>Forms</i> )   |                     |  |
| 18  | Have new cultural patterns emerged and/or old cultural traditions have been abandoned? ( <i>Norms</i> )  |                     |  |
| 19  | When implementing the applications, how do people feel about the top leaders? ( <i>Capabilities to act and interact</i> )                      |                     |  |
| 20  | Is there anything else you might consider improving the efficiency of your organisation's operations? (e.g., new applications, software, etc.) |                     |  |
| 21  | In the next two to five years, what is your organisation planning to do with BD/DC?  |                     |  |

|   |   |
|---|---|
| <b>Paper 3: To examine how public healthcare organisations adapt to mandated digital management accounting controls</b> |   |
| <b>Interview Questions for Executives/Programmers &amp; Directors/Field Workers</b>                                     |   |
| <b>Big data's Settings</b>  | <b>Problematisation</b>   |
| 1   | Please give me an overview of the use of the applications changed your previous responsibilities over the years.  |
| 2   | When and how do the apps link into your job responsibilities?   |
| 3   | Do you feel you've contributed on how the organisation implements the new data activities control systems?<br>If yes, please explain.<br>If not, were they influenced by an external rule or agency? (NHSO) |
| 4   | The extent to which national budgeting is linked to new data activities.  |
| 5   | How local implementation of using the app to conduct data is affected by national funding from NHSO?  |
| <b>Supervised big data quality &amp; Worker participation</b>   |   |
| 6   | Do you have any techniques (apart from financial incentives) to convince people to accept the new data activities control systems?  |
| 7   | What strategies do you employ to promote and raise awareness through participant (workers/volunteers) networks?   |
| 8   | How can you support members in the adoption and implementation of new accounting innovations using the newest member network?   |
| 9   | If the data activities goals are not met, what consequences will there be?<br>And when the problem arises, how do you solve it?   |
| <b>Organisational use of big data</b>   |   |
| <b>Enrolment</b>  |   |

|  |  |
|--|--|
| 10   | In what ways have conventional practices for reporting and accounting been modified?   |
| 11   | When it comes to reporting and assessment, what changes have been made?  |
| 12   | What has happened to the conventional bureaucratic/hierarchical relationships?   |
| 13   | After using the new control systems, how effective have the staff been?  |
| 14   | What kind of reaction did you get from the staffs after changed the control systems?   |
| 15   | Have you ever experienced any difficulty or resistance? any fixes?   |
| <i>Giving both new accounts/counter accounts to patients is part of the BD implementation process.</i> |  |
|  | <b>Daily routines and the relation with patients</b>   |
| 16   | With current control systems, how do you get feedback from patients?   |
| 17   | From a patient's point of view, what kind of effect does it have on performance?   |
| 18   | What the officers think of patient's satisfaction after the introduction of BD?  |
| 19   | Have the new data activities controls impacted how your personal live?<br>- Affect positively? Please explain.<br>- Affect negatively? Please explain. |
| 20   | Overall, how satisfied are you with the current control systems?   |
| 21   | In your opinion, what else can make this current control systems more effective?   |

## APPENDIX D: SUMMARY OF THE INTERVIEW Participants?

### Description of the Interview

| No.           | Level / Role | Function / Area  | Date       | Place           | Duration (mins) |
|---------------|--------------|------------------|------------|-----------------|-----------------|
| Executive 01  | Top          | Director         | 01/12/2023 | Hospital 1      | 54:23           |
| Executive 02  | Top          | Programmer       | 12/12/2023 | Regional Office | 90:00           |
| Executive 03  | Top          | Programmer       | 18/12/2023 | Online (ZOOM)   | 40:21           |
| Executive 04  | Top          | Director         | 22/12/2023 | Hospital 2      | 69:26           |
| Executive 05  | Top          | Director         | 09/01/2024 | Home            | 120:00          |
| Manager 01    | Middle       | Data Management  | 17/10/2023 | District Office | 44:57           |
| Manager 02    | Middle       | Public relations | 17/10/2023 | Hospital 1      | 55:00           |
| Manager 03    | Middle       | NCD              | 17/10/2023 | Hospital 1      | 39:24           |
| Manager 04    | Middle       | Accountability   | 18/10/2023 | Hospital 1      | 34:30           |
| Manager 05    | Middle       | Epidemiology     | 18/10/2023 | Hospital 1      | 51:12           |
| ITO 01        | Local        | IT-Officer       | 04/10/2023 | Hospital 1      | 59:38           |
| ITO 02        | Local        | IT-Officer       | 16/11/2023 | Hospital 4      | 57:17           |
| ITO 03        | Local        | IT-Officer       | 22/11/2023 | Hospital 5      | 64:56           |
| ITO 04        | Local        | IT-Officer       | 19/12/2023 | Hospital 2      | 35:44           |
| Doctor 01     | Local        | General Clinic   | 03/10/2023 | Hospital 1      | 57:33           |
| Doctor 02     | Local        | Dental Care      | 05/10/2023 | Hospital 1      | 51:50           |
| Doctor 03     | Local        | General Clinic   | 09/10/2023 | Hospital 1      | 46:31           |
| Doctor 04     | Local        | Dental Care      | 10/10/2023 | Hospital 1      | 41:32           |
| Doctor 05     | Local        | General Clinic   | 06/12/2023 | Hospital 4      | 35:53           |
| GP 01         | Local        | Antenatal Care   | 02/10/2023 | Hospital 1      | 50:25           |
| GP 02         | Local        | General Clinic   | 03/10/2023 | Hospital 1      | 43:25           |
| GP 03         | Local        | Public relations | 09/10/2023 | Hospital 1      | 47:57           |
| GP 04         | Local        | General Clinic   | 10/10/2023 | Hospital 1      | 31:35           |
| GP 05         | Local        | Data Management  | 10/10/2023 | Hospital 1      | 34:09           |
| GP 06         | Local        | NCD              | 12/10/2023 | Hospital 1      | 38:41           |
| GP 07         | Local        | Public relations | 17/11/2023 | Hospital 4      | 39:26           |
| GP 08         | Local        | Public relations | 21/11/2023 | Hospital 5      | 32:19           |
| GP 09         | Local        | Epidemiology     | 20/12/2023 | Hospital 2      | 37:57           |
| GP 10         | Local        | Accounting       | 22/12/2023 | Hospital 2      | 41:00           |
| Accountant 01 | Local        | Accounting       | 12/10/2023 | Hospital 1      | 42:35           |
| Accountant 02 | Local        | Accounting       | 16/11/2023 | Hospital 4      | 35:01           |
| Accountant 03 | Middle       | Accounting       | 20/12/2023 | Online (ZOOM)   | 30:00           |
| Volunteer 01  | Community    | Village No. 02   | 05/10/2023 | Hospital 1      | 24:04           |
| Volunteer 02  | Community    | Village No. 01   | 06/10/2023 | Hospital 1      | 39:52           |
| Volunteer 03  | Community    | Village No. 03   | 11/10/2023 | Hospital 1      | 15:54           |

| No.                                   | Level / Role | Function / Area | Date       | Place         | Duration (mins) |
|---------------------------------------|--------------|-----------------|------------|---------------|-----------------|
| Volunteer 04                          | Community    | Village No. 08  | 11/10/2023 | Hospital 1    | 14:50           |
| Volunteer 05                          | Community    | Village No. 08  | 11/10/2023 | Hospital 1    | 27:01           |
| Volunteer 06                          | Community    | Village No. 04  | 18/10/2023 | Hospital 1    | 41:01           |
| Volunteer 07                          | Community    | Village No. 09  | 20/10/2023 | Hospital 1    | 40:00           |
| Volunteer 08                          | Community    | Village No. 05  | 20/10/2023 | Hospital 1    | 33:02           |
| Volunteer 09                          | Community    | Village No. 05  | 30/11/2023 | Hospital 1    | 22:00           |
| Volunteer 10                          | Community    | Village No. 04  | 15/12/2023 | Hospital 1    | 32:00           |
| Trainee 01                            | New          | Internship      | 14/12/2023 | Hospital 1    | 48:38           |
| Trainee 02                            | New          | Internship      | 18/12/2023 | Hospital 1    | 24:50           |
| Trainee 03                            | New          | Internship      | 18/12/2023 | Hospital 1    | 27:41           |
| Trainee 04                            | New          | Internship      | 21/12/2023 | Hospital 2    | 42:55           |
| Trainee 05                            | New          | Internship      | 21/12/2023 | Hospital 2    | 27:44           |
| Auditor 01                            | Central      | Auditing        | 13/12/2023 | Online (ZOOM) | 69:47           |
| Auditor 02                            | Central      | Auditing        | 03/01/2024 | Online (ZOOM) | 30:00           |
| Auditor 03                            | Central      | Auditing        | 04/01/2024 | Online (ZOOM) | 30:00           |
| <b>Summary of Interview (persons)</b> |              |                 |            |               | <b>50</b>       |

**Abbreviation Notes:**

Hospital - 1 = Large-sized hospital (Accountable for over 7,000 patients)

Hospital - 2 = Large-sized hospital (Accountable for over 7,000 patients)

Hospital - 3 = Large-sized hospital (Accountable for over 7,000 patients)

Hospital - 4 = Medium-sized hospital (Accountable for between 3,000-7,000 patients)

Hospital - 5 = Small-sized hospitals (Accountable for fewer than 3,000 patients)

## APPENDIX E: SUMMARY OF THE OBSERVATIONS

### Description of the Participant Observations

| No.                                   | Title  | Date       | Place                  | Duration (hours) |
|---------------------------------------|--|------------|------------------------|------------------|
| 1                                     | Participant Observation Theme – District and Provincial office | 17/08/2023 | District Health Office | 2.0              |
| 2                                     | Participant Observation Theme – Community hospital             | 24/08/2023 | Hospital 1             | 1.5              |
| 3                                     | Participant Observation Theme – Regional office                | 25/08/2023 | Regional Health Office | 2.0              |
| 4                                     | Participant Observation Theme – Volunteer                      | 28/08/2023 | Village                | 1.0              |
| 5                                     | Interview Theme with HR department                             | 29/08/2023 | District Health Office | 1.5              |
| 6                                     | Participant Observation Theme with Programmer                  | 30/08/2023 | District Health Office | 2.0              |
| 7                                     | The use of big data application                                | 31/08/2023 | District Health Office | 3.0              |
| 8                                     | Participant Observation at a Dental Clinic                     | 04/09/2023 | Hospital 2             | 6.0              |
| 9                                     | The use of big data application                                | 07/09/2023 | Hospital 1             | 6.0              |
| 10                                    | The use of big data application and Showroom                   | 08/09/2023 | Hospital 3             | 3.5              |
| 11                                    | Antenatal Care (ANC) and Dental Care Clinic                    | 11/09/2023 | Hospital 1             | 6.0              |
| 12                                    | Participant Observation at a General Clinic                    | 12/09/2023 | Hospital 1             | 6.0              |
| 13                                    | Vaccine Clinic   | 13/09/2023 | Hospital 1             | 3.0              |
| 14                                    | Thai Traditional Clinic  | 13/09/2023 | Hospital 1             | 2.0              |
| 15                                    | Polio Vaccine with Volunteer                                   | 18/09/2023 | Village                | 6.0              |
| 16                                    | Health Fair 2023   | 22/09/2023 | District Health Office | 4.0              |
| 17                                    | Big data – A Super application                                 | 02/10/2023 | Hospital 1             | 3.0              |
| 18                                    | Preparing for a Provincial Contest                             | 26/10/2023 | Hospital 1             | 8.0              |
| 19                                    | Big data – A database system                                   | 01/11/2023 | Hospital 1             | 2.0              |
| 20                                    | Power Cut  | 21/11/2023 | Hospital 5             | 3.0              |
| 21                                    | Screening  | 08/12/2023 | Public School          | 3.0              |
| 22                                    | Tele-Med   | 19/12/2023 | Hospital 2             | 3.0              |
| 23                                    | Participant Observation at Emergency Ward                      | 08/01/2024 | Regional Hospital      | 2.5              |
| <b>Summary of Observation (hours)</b> |  |            |                        | <b>80.0</b>      |

**Description of the Meetings' Observations**

| No.                               | Title  | Date       | Place                  | Duration (hours) |
|-----------------------------------|--|------------|------------------------|------------------|
| 1                                 | Monthly meeting – Community hospital                         | 01/09/2023 | Hospital 1             | 3.0              |
| 2                                 | Monthly meeting of director                                  | 05/09/2023 | District Health Office | 6.0              |
| 3                                 | Board meeting of top executive                               | 06/09/2023 | District Hospital      | 3.0              |
| 4                                 | Quarterly Meeting – ANC Team                                 | 14/09/2023 | District Health Office | 8.0              |
| 5                                 | Quarterly Meeting – Programmer                               | 15/09/2023 | District Health Office | 8.0              |
| 6                                 | Sub meeting – Community hospital                             | 19/09/2023 | Hospital 1             | 3.0              |
| 7                                 | Monthly meeting – District Health Office                     | 20/09/2023 | District Health Office | 3.5              |
| 8                                 | Sub meeting – Community hospital                             | 20/09/2023 | Hospital 1             | 3.5              |
| 9                                 | Annual meeting – Supervision by the Provincial Health Office | 21/09/2023 | District Hospital      | 8.0              |
| 10                                | Sub meeting – Research                                       | 03/10/2023 | Hospital 1             | 3.0              |
| 11                                | Monthly meeting of director                                  | 17/10/2023 | District Health Office | 8.0              |
| 12                                | Monthly Meeting – Programmer                                 | 19/10/2023 | Hospital 1             | 8.0              |
| 13                                | Additional Meeting – Final Check for a Provincial Contest    | 27/10/2023 | Hospital 1             | 4.0              |
| 14                                | Additional Meeting - A Provincial Contest                    | 30/10/2023 | Hospital 1             | 4.0              |
| 15                                | Monthly meeting of director                                  | 09/11/2023 | District Health Office | 4.0              |
| 16                                | Monthly meeting of director                                  | 07/12/2023 | District Health Office | 3.0              |
| 17                                | Sub meeting – Community hospital                             | 07/12/2023 | Hospital 1             | 4.0              |
| <b>Summary of Meeting (hours)</b> |  |            |                        | <b>87.0</b>      |

## APPENDIX F: DOCUMENTATIONS COLLECTED

### Description of the Documentation from the research site

| No. | Title  | Source                             |
|-----|--|------------------------------------|
| 1   | National Health Security Act (2002)  | National Health Security Office    |
| 2   | The 20-Year National Strategic Plan (2017-2036)  | Thai Government                    |
| 3   | eHealth Strategy (2017)  | Ministry of Public Health          |
| 4   | Digital Government Act (2019)  | Thai Government                    |
| 5   | Revised National Reform Plan (2021)  | Thai Government                    |
| 6   | Lessons from COVID-19 of Health Region 12 (Online)   | Regional Health Provider Office 12 |
| 7   | Organisational chart, Mission statements, Vision statement   | District Health Office             |
| 8   | Manuals for IT Officer (Online)  | District Health Office             |
| 9   | Organisational chart, Mission statements, Vision statement   | Community hospital                 |
| 10  | Accounting Chart and Reports   | Hospital 1                         |
| 11  | A data management model  | Public relations manager           |
| 12  | Government Inspection and Supervision in Typical Cases, Ministry of Public Health - Submitted to Regional Health Office 12 | Provincial Health Office           |
| 13  | Research - Utilising innovation to mitigate challenges confronting hypertensive patients                                   | Hospital 1                         |
| 14  | NHSO Digital Master Plan (2023–2027)   | National Health Security Office    |
| 15  | NHSO Action Plan (2023-2027)   | National Health Security Office    |
| 16  | Accountability Plan (2024-2025)  | Public relations manager           |
| 17  | National Quick Win Policy (2024)   | Ministry of Public Health          |
| 18  | Infographic for patients who do not speak Thai   | Public relations officer           |
| 19  | A sample of patient detail cards (Blank data)  | Village health volunteer           |
| 20  | Digital Manual for Volunteer   | Village health volunteer           |

## APPENDIX G: AWARD AND CERTIFICATES

### Award: BAFA-AFEE Seedcorn Fund (£1,000 in total)

KJ

Kelum Jayasinghe&lt;afee-sig@bafa.ac.uk&gt;

To: Ⓛ Siripibarn, Sirisak

Cc: k.jayasinghe@sheffield.ac.uk; Ⓛ Wijethilake, Chaminda; Alaa Zalata &lt;A.Zalata@soton.ac.uk&gt;; Ⓛ Upadhaya, Bedanand

Reply | Reply all | Forward |  |  | ...

Thu 14/12/2023 11:53

You replied on Thu 25/01/2024 12:10

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Dear Sirisak Siripibarn

I hope you are doing well. Many thanks for your BAFA Seedcorn funding application. I wish to provide you with an update. The committee that reviewed your application were happy to support 50% your bid (£750) on the proviso that:

- a) you provide more details on your research methods and activities, i.e. how many interviews, which locations? and related costings. You should clearly provide a detailed breakdown of the costs incurred in the fieldwork.
- b) the project outputs must be clearly stated. I understand this is a part of your PhD project, but we expect the project to deliver a research paper or another form of tangible output. This planned output (e.g. a draft research paper) as well as the final report must be presented at the next BAFA SIG AFEE workshop that will be held in Poland on 1-2 July 2024.

As your project represents a part of your existing PhD work, the committee has decided to fund only 50% of its estimated costs through the budget. It means you will be offered £750 worth funding to cover your expenses. Please note that all funding should be committed for spending by 30th June 2024.

Kind regards,

Kelum

Professor Kelum Jayasinghe  
President  
BAFA SIG - AFEE



AZ

Alaa Zalata&lt;A.Zalata@soton.ac.uk&gt;

To: Ⓛ Siripibarn, Sirisak

Cc: k.jayasinghe@sheffield.ac.uk; Ⓛ Wijethilake, Chaminda

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Fri 27/09/2024 16:10

You replied on Fri 27/09/2024 16:28

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Dear Sirisak,

I hope you are fine and apologies for being late on this.

I can confirm that I have transferred to your account £1,000 for the SEEDCORN RESEARCH FUNDING.

Could you please confirm that you have received this amount?

Thank you and best wishes

Alaa

**Paper 1: The 25th BAFA-AFEE Workshop conference - Poland**



University  
of Economics  
in Katowice



**25 CERTIFICATE**

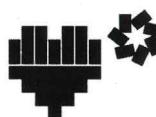
**SIRISAK SIRIPIBARN**

**University of Essex**

participated in the  
**25th Workshop on Accounting and Finance**  
**in Emerging Economies**  
 organised by the The British Accounting and Finance Association  
 Accounting and Finance in Emerging Economies (AFEE)  
 Special Interest Group  
 and presented the paper

*Big Data and translation on management accounting systems: a reform of  
 primary (public) healthcare services in Thailand*  
*(authored by Sirisak Siripibarn, Bedanand Upadhyaya & Chaminda Wijethilake)*

**Katowice, 1-2 July, 2024**



Europejskie  
Miasto Nauki  
Katowice 2024

**°CECC** | Centre for Economics  
of Climate Change

**Paper 2: The 17th CIGAR Workshop conference - Italy**



## Certificate of Attendance

This is to certify that

**Sirisak Siripibarn**

attended the

## CIGAR 2024 WORKSHOP

Digital and Smart Governance for Public Sector Accounting, Auditing, and Accountability

held in UDINE, ITALY  
12 - 14 June 2024

Prof. Andrea Garlatti  
Chair of the Scientific Committee

Prof. Giuseppe Grossi  
Chair of the CIGAR Board

**Paper 3: The 9th ICBE international conference - Indonesia**