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Lessons for Change Management and Software Implementation: An Ethnographic Study of Australian Small Business

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Certificate of Original Authorship

I, *Anita Gisch*, declare that this thesis is submitted in fulfilment of the requirements for the award of *Doctor of Philosophy*, in the *Faculty of Engineering and IT* at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Anita Gisch

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Contents

List of Figures and Tables

Abstract

Amidst the rapid technological advancements that continue to redefine the business landscape, the central question driving this research was: ‘What happens within small businesses when a product is introduced that challenges long-term work practice habits?’. Grounded in the context of Australian SMEs transitioning to cloud technology, this study delved deep into the multifaceted experiences of organisational change and technological adaptation. A critical insight was that even in established organisations, there are constant negotiations and shifts as individuals adapt, resist, learn, and refine work practices, which become particularly contested during organisational change. The particular themes explored in this paper are access, trust, power, infrastructure and work practice.

Adopting an ecological approach, this thesis weaves concepts of access, trust, power, and work rhythms, shedding light on the interplay between software design and usage, organisational infrastructure, and everyday work practices. In contrast to the more rigid, structured approaches of traditional change management, this ecological approach offers a deeper, more grounded exploration of the socio-political relationships inherent within organisational dynamics.

A key outcome from this research is the development of a 'HOME Improvement' approach. Moving beyond prescriptive frameworks, this approach is a synthesis of insights harvested from the ecological analysis of organisational dynamics. Rather than offering a rigid blueprint, it suggests an adaptive approach, resonating with the 'tacking' essence of boundary

objects. It stands as a reflective tool, enabling organisations to introspectively assess their dynamics and design contextual, fitting improvements.

This thesis presents a novel approach to understanding and navigating organisational change in times of technological disruption. By intertwining rich theoretical concepts with practical observations, it offers a fresh, adaptive perspective for both scholars and industry practitioners aiming for sustainable change management.

Chapter 1: Introduction

Whatever cultures are, they do not fit inside nutshells

(Shore.1998, p. 45)

In 2014 I embarked on this research project leveraging my previous professional experience as a software change management consultant and my familiarity with small business software implementation cycles. I was a seasoned consultant, concentrating on the technical set-up of *Clouded* (pseudonym), a cloud-based project management tool for use in Small and Medium Enterprises (SME) that functioned as an add-on product to the newly emerging Xero online accounting software.

Cloud computing, as defined by Mell and Grance (2011), is a way of enabling convenient, on-demand network access to a shared pool of configurable computing resources like networks, servers, storage, applications, and services, which can be rapidly provisioned and released with minimal management effort. This design approach is attractive to businesses seeking flexibility and scalability without the overhead of traditional IT infrastructure (Mell & Grance, 2011; Bisong, 2019).

During my time as a consultant, I observed a common sentiment among bookkeepers and accounts administrators – a desire for cloud software developers to understand user challenges and frustrations when implementing Clouded. The disconnect between the marketing messages of cloud software providers and the reality faced by those introducing new

platforms into their businesses was evident. Despite the promises of ease and convenience, many small businesses struggled with new software implementations, often leading to expensive delays and increased workloads. The most affected were typically mid-sized growing companies with cross-functional needs, where technical domains had to coordinate work, such as in the cases of architects collaborating with engineers and project managers.

As a consultant, my influence had been limited to empathy and understanding. However, my role as a researcher allowed me to encapsulate these frustrations and paint a picture of the collective experience, adding weight to the feedback I could provide software vendors and further develop strategies for digital transformation in SMEs. The aim was not to indicate universal struggle but to underscore the significant challenges faced by some businesses. Thus, my goal was to unpack these experiences, understand why these companies were struggling, and explore ways to ease their journey. In other words, my aim was to bridge my domain knowledge to better assist my clients with their change projects.

This goal led me to explore the field of Computer-Supported Cooperative Work (CSCW) in search of an evidence base to inform my practice. My focus centred on technology and work practice, particularly on the impact and influence of design on user experience. This exploration sought to understand how software design, like that of Xero, affects work practices and the lived experiences within workspaces, specifically during a socio-technical shift from on-premises to cloud-based project management tools. This inquiry led to the main research question of this thesis: **'What happens within small businesses when a product is introduced that challenges long-term work practice habits?'**

To answer this question, an extensive study was conducted over a six-year period from 2014 to early 2020, just before the COVID-19 pandemic began. The original focus was to challenge software company rhetoric about the 'ease' of moving to a cloud product. Even more, through a literature analysis I discovered a whole body of work on organisational infrastructure that was not being applied to the small business change management context. Recognising this gave me an idea to consider if adding infrastructure analysis could be helpful for a more effective approach to software change management in my consulting practice.

Star & Ruhleder's (1994) ecological approach to organisational analysis has been pivotal in framing my understanding of the challenges brought by the implementation of cloud software. Pushing beyond observations of static structures, Star's framework recognises the inherent dynamism within systems. It views systems as constantly negotiated and co-created by their users, encompassing a broad range of interactions between human actors, organisational culture, and existing infrastructures. Her perspective suggests that organisations can be seen as organic entities, influenced and shaped by all components of the system.

I have drawn Star's ecological approach into change management as a way of incorporating multiple viewpoints and flexibility to adapt to various user needs within the fluid boundaries of organisational practices. In my research, I considered how an ecological approach could be blended with the needs identified in change management, specifically with the context of digital transformations within SMEs. From this perspective, organisations can be analysed as complex, moving and interrelated components while the parts and the whole are also changing. In essence, Star's ecological approach takes organisational analysis from a static 2-dimensional view to a 3 dimensional one. And this work extends that analysis into the 4th dimension of change over time.

Therefore, it is from an organisational infrastructure perspective that my research aims to shed light on a specific technological shift: the migration from a combination of traditional spreadsheets, paper-based forms and whiteboards to newer cloud-based project management software, which were considered socially and technically disruptive at the time of my research.

In summary, the research design for this thesis was intended to draw on the benefits of my professional practice in a consulting firm, providing me access to a range of SMEs cutting across industries (e.g., accounting, architecture, engineering, and marketing) and with diverse levels of business maturity (e.g., small and agile, layered and hierarchical). It is, therefore, grounded in a consulting perspective. My experience in the consulting world allowed me to observe a wide variety of organisations going through a specific technology change period, providing me the consistency to link these diverse experiences together for analysis. Findings, discussed in chapters 5 and 6, indicate that even small shifts to add cloud software to existing organisational contexts require change management and, without effective planning, can lead to significant unintended consequences for work practice.

In the subsequent pages of this chapter, I will provide a comprehensive overview of how the specific focus and the research question for this research were built. Distributed in four sections, this chapter works as a foundation for this thesis. In the first section, **Sociotechnical Context: SMEs Shift Towards Cloud**, I describe the socio-technological landscape in Australia and the leading cloud software packages as a means to understand the background in which this research project was set. In the second section, **Organisational Context: SMEs Work in Practice**, I revisit the fundamentals of organisational infrastructure, its relation to my professional experience and how it connects to the research question for this study, which will

be developed and explained in the third section, **Research Question: Impacts of Disruptive Technology in SME Work Practice.** In the fourth and last segment, **Thesis Structure: Chapter Outline**, I describe the structure of this thesis with a brief summary and explanation of its chapters.

1.1 Sociotechnical Context: SMEs Shift Towards Cloud

This study began in 2014, during two major shifts occurring within the small business technology landscape within Australia. One shift was related to the planned improvement of the physical network access across Australia through implementation of the National Broadband Network (NBN), which has been anticipated and critiqued from a political and technical perspective (Alizadeh & Farid, 2017; Fisher, Freeman, Schram, Baum, & Friel, 2020). The other shift was related to an increase in cloud technology software options aimed at the small business market (Alismaili, 2020; Senarathna, 2018).

Led by the Australian Government, the NBN rollout made improvements to both wired and wireless network infrastructure in order to provide basic internet access to regional and remote communities. The original plan, promoted by Prime Minister Kevin Rudd and the Labour party in 2010, was “for a privately led joint venture using $4.7 billion of taxpayers' money to build a fibre to the node (FTTN) network serving 98 per cent of premises” (Smith, 2020). While there was support across the political playing field, the design and approach were hotly contested (Slattery, 2010). The NBN project and associated hype from industry, government and media outlets created a perception of high-quality, reliable access across the

country (Madsen & Percey, 2020). However, quality of service and access was still variable for end users working or travelling throughout Australia (Alizadeh & Farid, 2017).

Alongside this national technological landscape, there was an increase of products in the cloud technology market. Around 2010, cloud technology began to capture the attention and interest of the Small and Medium Enterprise (SME) sector (Voida et al., 2013). At that time, MYOB Accounting had 70% of the Australian SME market share. However, within a relatively short timeframe, a range of products and services were beginning to hit the market in direct competition with previously purely on-premises offerings. According to Timson (2010), MYOB was renowned for its tight licensing and software update practices, often requiring users to undertake courses to learn the software or pay to have initial records set up by a professional bookkeeper.

By 2014, Xero, Saasu and Rekon, presented a direct and specific challenge within the accounting software space to the existing market dominance of MYOB (Paff, 2016). MYOB's longstanding market dominance was disrupted by the emergence and competition of Rekon and Xero as market alternatives as the new lead cloud accounting packages. These new cloud-based competitors offered a cheaper, more user-friendly product which could assist business owners, bookkeepers and accountants to all access the accounting file in real time. Moreover, cloud computing facilitated collaboration and communication among employees, customers, and suppliers.

MYOB (2020) describes itself in their webpage as a "super simple" collaborative tool for small business management. It provides an 'all in one' solution, including inventory, Customer Relationship Management (CRM), invoicing, time sheeting, payroll, and job costing.

Rekon compares itself to MYOB as being a cheaper and easier to use alternative. As for Xero, they define themselves in their homepage as the “emerging global leader of online accounting software”.

Clouded, acquired by Xero in 2012, was originally an independent project management solution tailored for diverse work practices, further diversifying Xero's ecosystem. Its core purpose and presentation are to offer a structured platform for project tracking, budgeting, and invoicing, streamlining the project management process within the SME landscape. It caters to specific use cases, such as milestone tracking, time logging, and expense management, while also addressing broader SME requirements like team collaboration, task allocation, and project reporting. Designers of *Clouded* seem to have made assumptions that client businesses would have standardised operational procedures, expecting a linear progression from sales quotes to invoicing. *Clouded* design might not be flexible enough for companies with non-linear project workflows. For instance, companies with iterative project phases or those that incorporate feedback loops found it difficult to adapt *Clouded* linear approach, hinting at a mismatch between the software's design and certain real-world work practices.

Across industries, large enterprises have been quick to adopt this shift in cloud technology software, but smaller businesses, especially in Australia, have been slow (Gupta, Seetharaman & Raj, 2013). The emerging trend towards cloud productivity tools in Australian small businesses challenged people to imagine the future of contemporary work and social environments, depending on whether they perceived the adoption of these technological changes as beneficial (Anderson & Rainie, 2010).

Ross and Blumenstein (2015) describe the increasing interest and economic effects of cloud computing as a facilitator of SME entrepreneurship. Their findings suggest that SMEs are particularly suited to adopting cloud technology because of the reduced opportunity costs, scalability and access to a wide range of options through increased global collaboration and access to international markets. However, the authors recognised that there has been a lack of research into "their impact on management practices and organisational strategies remains an under-explored area to date" (Ross & Blumenstein, 2015, p. 89).

While Ross and Blumenstein's research delved into entrepreneurship, this thesis closely examines the daily experiences of office workers and the effect that new technology has on processes, organisational culture and articulation work. In the following sections, I will introduce how workspaces are affected by the implementation of new technologies and software. In addition, I will address how my professional experience as a consultant in the software industry led me to the development of an ecological approach for software management as well as the research question for this investigation.

1.2 Organisational Context: SMEs Work in Practice

By 2014, when the initial focus of this research was being defined, the shift in the technological landscape within SME was characterized by the introduction of cloud accounting packages, as described in the previous section. In this context, cloud technology was being described as *disruptive technology* (Voida et al, 2013). The concept refers to the introduction of simple and affordable new products or services that can transform a particular industry and it can be attributed to technological advancement, new business models, processes, and organisational structures. Disruptive technologies are characterised by their ability to provide

quality offerings at a lower cost, making them accessible to a broader audience that may not have been served by traditional consumers (Roblek et al. 2021).

Kuratko et al. (2014) identified some specific challenges within organisations when adopting disruptive technology, particularly in regard to new mindsets and cultural shifts that are necessary for this technological transition. In other words, disruptive technology, when implemented, creates a need for changes to broader systems and processes, creating a ripple effect in work practices. Planning and smoothly managing changes within SME contexts requires deeper awareness of the interconnected relationships between people, systems and processes. Set within the context of practice, my research endeavours to explore the implications of technological disruption, particularly arising from cloud technologies, on the work practices of SMEs spanning a range of industries. Rather than a narrow focus on the technical aspects, my research emphasises the disruptive potential of these technologies, framing them as transformative agents (Blok et al., 2020).

In my professional experience as a consultant with SMEs, I had access to the front lines of cloud software change and the opportunity to document the transition from one tool to another across multiple small businesses. The process of changing from one software package to another, also used more generally in business sales, is called *conversion* (Watson, 2019).

Documenting these conversions was overwhelming at the beginning, but I began to specifically focus on small businesses that were actively in the process of migrating part of their business to a particular cloud solution. Despite the marketing promises from the tech industry to improve user experience and business process in a ‘fast and simple’ transition from one software to another (JetConvert, 2020), during my work experience I observed that the

reality of moving one piece of software from desktop to cloud was challenging to work practices in SMEs. I noticed that the technological upheaval instigated by cloud accounting packages solutions upended established processes and practices, introducing new efficiencies and capabilities that challenged the status quo in the SMEs workspace. Even though cloud software facilitated, for instance, real-time access to financial data and ease of collaboration, these changes extended beyond mere practicalities; they called into question the very expectations of what constitutes a workplace, redefining how SMEs perceive their work practices and workflows.

Drawing on my observations as a consultant, I believe that an analysis of organisational infrastructures, enhanced with an ecological approach, can deepen the analysis of the adoption of disruptive technologies in the SME sector. Furthermore, these perspectives can function together serving as a framework contributing to the practice of software consultancy to facilitate and enhance companies' transition and adaptation to disruptive technologies.

Organisational Infrastructure connects individuals within and between organisations so they can pass information, responsibilities, and products across the spaces between each other. Changing a piece of the infrastructure requires an understanding of the implications of replacing certain elements with new ones. Infrastructure is semi-transparent—invisible enough so people are not constantly tripping over it but visible enough so people can recognise cracks and tears requiring attention. In the broad and diverse landscape of an organisation, Organisational Infrastructure acts much like the architecture of a house, linking individuals within and across teams, fostering seamless communication and collaboration. Just as a carefully designed house features strategic placement of doors and windows to facilitate movement and interaction, the same principle applies within the organisational structure. These

'doors' and 'windows' in the organisational structure symbolise the pathways through which information, responsibilities, and products are passed, bridging the spaces between different individuals, teams, and departments.

Meanwhile, an ecological approach provides a holistic lens for observing the interconnectedness and interdependence of various elements within a system, including human actors, artifacts, practices, and institutions. This perspective emphasizes the processes shaped by the relationships and interactions among the elements, rather than focusing solely on individual actors or specific artifacts. In this sense, an ecological approach examines the relational effects of software changes in organisational infrastructures as a *dynamic* entity at a particular moment (Gerson & Star, 1986; Star & Ruhleder, 1996; Star 2010). In other words, an ecological approach of infrastructures takes into account the spaces between connections and recognises that as one choice is made, another is discarded (Puig de la Bellacasa, 2016).

For the purpose of this study, I understand "dynamic" as the ongoing processes that characterise the interactions within and between organisations and their environments. It captures the essence of continuous adaptation and change in response to both internal and external influences.

Rather than just leaning on familiar structures or established pathways, the ecological approach is a proactive one. By consciously constructing the 'doors' and 'windows' of a house, an organisational infrastructure that promotes more efficient and effective communication and collaboration across various organisational entities can be crafted. In essence, this approach recognises that the researcher observes some aspects of work practice, misses others, and

interprets them based on the context of a particular moment (Star and Griesmer, 1989). As Puig de la Bellacasa describes, the ecological approach is:

> *Attentive to the capacity of relation-creation and how different beings affect each other, what they do to each other, and the internal poises of a particular configuration. This is not to say that focusing on networks necessarily overlooks relations that hold together as stable, but that extension remains the beating heart of network thinking. The very existence of the verb 'networking' exposes the quality of this dynamic mode of thought, as does the interest in alliances and connections (usually strategic) (2015, p. 6).*

Overall, an ecological approach encourages rethinking the approach to organisational design, not just in terms of the visible, tangible elements, but also the intangible aspects that facilitate interaction, collaboration, and the flow of knowledge. Just as each house requires a unique architectural blueprint to suit its occupants' needs and lifestyle, every organisation needs a bespoke infrastructure, tailored to its context, culture, and goals, to support effective operation and collaboration.

In conclusion, the crux of my research recognises that the introduction of any technological adaptation, such as onboarding cloud-based software, creates substantial impacts on both individuals and organisational processes. Given this, this research posits that technological transitions require the integration of a holistic *change management* methodology to ensure smooth transitions.

Change management, a structured approach to managing alterations or transformations within organisations, aims to facilitate seamless change implementation while minimising

disruption (Kotter, 1995; 2007). Change management equips individuals or groups with necessary skills and knowledge, preparing them to adeptly navigate transition processes. Therefore, in the context of my research, change management serves as a means to understand how small businesses can strategically adapt to new products, ensuring the successful incorporation of software with minimal disruption to operational processes.

1.3 Research Question: Impacts of Disruptive Technology in SME Work Practice

Cloud software vendors promote a conversion from desktop to cloud-based software as a way for organisations to experience productivity and efficiency gains while reducing costs. These vendors often espouse the idea that their products, thanks to their simplicity in configuration, can skirt around the requirement for traditional change management protocols. My thesis, however, questions such a claim. Drawing from participant observation in SME work practices, I examine the idea that the adoption of cloud technology does not require change management. I explore the interplay among work practices, software design, and change management, adopting an *ecological approach* to the analysis and design of process improvements.

In chapters 5 and 6, I will provide specific examples to illustrate how the design of cloud software impacts user work practices. A deeper understanding of the relationship between design, user experience, and work practice, can be helpful to both software designers and business leaders alike. For software designers, it can help them with the creation process of their software; while for business leaders, it can help them make more informed decisions about which tools and processes to adopt in their company.

My investigation is grounded in the belief that even apparently uncomplicated technological remedies necessitate meticulous contemplation of the corresponding human and procedural repercussions. I chose to focus on Xero, a leading cloud accounting package, as a representative example of disruptive technology being used across industries at the time of my research and professional experience. This choice led me to question how the conversion process affected the lived experiences of people using cloud technologies in work environments, and how they coped with the related changes.

These initial inquiries laid the groundwork for the primary research question: '**What happens within small businesses when a product is introduced that challenges long-term work practice habits?**' This question challenges the perception of policies and procedures as static artifacts.

I conducted this research during the years of 2014-2020. Interviews and in situ observations of 78 organisations were used for a deeper understanding of why some companies struggled to adopt cloud software. The interviews were centred on manager-employee relationship, their business information needs, and work habits. Observations of work practices expanded the lens of the research to an investigation of how business information needs (e.g., profitability and time management) and relationships influenced software choice and configuration.

Interviews and onsite engagements were wrapping up in December 2019, just before the major east coast bushfires and subsequent physical isolation periods due to COVID-19 in 2020-21. My supervisors and I felt that the ethnographic phases of this project were already

sufficiently concluded and further study into the impacts of current and future workplace changes could form the basis of a follow-on study.

Findings[1] from this research project are presented as rapid and deeper ethnographies that demonstrate the difficulties of adopting cloud software across SMEs in Australia, suggesting that a 1-1 conversion can leave companies with the same problems—or even more than before—because they have not accounted for the deeper organisational infrastructure layer that sits below the surface of work practice. These snapshots were not focused on a particular industry sector, but rather selected to demonstrate emergent themes across industries. Lastly, this research aims to contribute to the existing literature by providing a deeper ethnographic understanding of the challenges that SMEs face when adopting new technologies and the impact on work practices.

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[1] In the context of this research, I categorise findings using three descriptors: Aspect, Insight, and Theme. These descriptors are used with specific connotations to maintain consistency and clarity throughout the study: 1) **Aspect** refers to a particular component or element of the study being examined. For instance, when analysing the transition of Australian SMEs to cloud technology, an aspect might be the technical infrastructure required for successful implementation; 2) **Insight** is used to denote a revelation gained from the analysis of data and reflects a meaningful interpretation that contributes to the overall knowledge of the subject. For example, an insight might reveal that user resistance is often due to inadequate training during the implementation of new software in SMEs; 3) **Themes** represent the overarching topics or recurring ideas that emerge from the research findings. They are broader than aspects and insights, encapsulating multiple related observations under a unified concept that help to organise and present the various findings in a coherent manner. For example, a theme might be the impact of organisational culture on the adoption of new technologies, encompassing aspects like leadership support and employee engagement, as well as insights related to these aspects.

1.4 Thesis Structure: Chapter Outline

This thesis offers an exploratory dive into sociotechnical dynamics, drawing heavily on ethnographic methodologies to unearth insights into work practices within the frame of software change, especially as experienced within Australian SMEs. Following this introductory chapter, the rest of the thesis is organised and presented in five chapters

Chapter 2: Literature Review is a canvas of seminal works and concepts, touching on pivotal domains such as interaction design, boundary objects, articulation work, and more. This chapter provides the theoretical grounding and context for the subsequent analyses.

An in-depth exposition of the ethnographic lens employed in this research is explained in **Chapter 3: Research Methodology**. This chapter meticulously unravels the intricacies of navigating the insider-outsider dynamics and underscores the significance of research ethics. Meanwhile, an illumination of this study's multi-phased journey is described in **Chapter 4: Research Context**, spotlighting the exploratory and ethnographic stages across diverse contexts; from the structural world of building & construction, the precision driven realm of legal contexts, to the visionary corridors of architectural spaces.

In **Chapter 5: Research Insights** I delve into the heart of software change, presenting granular observations and reflections spanning interface designs to the broader sociopolitical tapestries of trust, access, and the innovative design of information bridges.

Lastly, a synthesising discourse offering an ecological approach on infrastructure is presented in **Chapter 6: Discussion & Conclusions**. In this section I draw tangible connections between research insights and actionable implications for both software and organisational constructs, whilst also casting a thoughtful gaze towards horizons of future research possibilities.

At the core of this endeavour is an intimate understanding of software change and its entanglement with the everyday operations of SMEs. The ethnographic narrative shares a perspective of stakeholders' lived experiences, charting both the challenges and eureka moments of those at the frontline of software implementation. Within this narration is the exploration of an approach encapsulated as the 'HOME' Improvement, wherein 'H' stands for Holistic Understanding, 'O' signifies Observing Work Practice, 'M' represents Mapping Procedures, and 'E' underscores Engaging Employees. This provides a conceptual framework, offering insights into the dynamics of software integration within the organisational milieu.

Chapter 2: Literature Review

The literature discussed in this Chapter provides a deeper understanding of the diverse aspects of organisational dynamics. Yet, there seems to be limited exploration of the relationship between the theoretical frameworks presented in these works and the practical consequences of introducing disruptive technologies to small businesses, especially in the Australian setting.

Introducing a new product or technology, such as cloud software, is not merely a technical endeavour. It is akin to introducing a new narrative or disrupting an existing one within the tapestry of a business's longstanding practices. To that end, my research seeks to unravel the nuances of this interplay, specifically through the lens of Xero's introduction across various industries; it suggests that static policies or procedures don't exist in a vacuum. They are intertwined with the broader organisational narrative.

The exploration ahead will focus on how even seemingly straightforward technological interventions, like Xero, require a deeper understanding of their cascading impacts on the larger organisational ecosystem. The intent is to reveal how a shift in one technological piece can reverberate throughout the organisational fabric, necessitating a broader comprehension of change and adaptability.

For this literature review, I drew out studies related to work practice in relation to six main fields and areas of study: Interaction Design & Human Practice, Computer Supported Cooperative Work (CSCW), Ethnographic Studies, User Experience (UX), Functional Design,

and Change Management. This literature review serves as a launching pad for my inquiry into the central question of this research: ‘What happens within small businesses when a product is introduced that challenges long-term work practice habits?’.

To answer this question, I have explored concepts that when linked together help guide my investigation into understanding the impacts that occur when small businesses introduce a product that challenges their long-established work practices, specifically cloud software. The principles of Interaction Design and Human Practice, explored in section 2.1, underpin our understanding of how people engage with technology, while the notions of shopping and tailoring illuminate how businesses customise software to fit their unique needs. The importance of organisational infrastructure, boundary objects, and articulation work becomes clear as we explore the challenges and adaptations involved in integrating new technology into existing workflows. The combination of these concepts supports an ecological approach to organisational analysis and change management in times of flux.

Central to my research is the field of CSCW, reviewed in section 2.2, which emerged as computers and other devices appeared within work practice settings. In those early days, the degree to which technology was entwined with work practice and our social lives would have seemed like a science-fiction fantasy. As our work and social realms have changed, so too has CSCW. However, one facet that has remained a constant is the need for immersive understanding and ethnographic-style studies to understand these evolving relationships and the consequences for people and practice. In this regard, the evolution from physical to digital shared views and common information spaces is particularly relevant to my research focus, shedding light on the decision-making processes affected by the introduction of cloud software;

while ethnographic perspectives, examined in section 2.3, provide a means of deep observation to enrich our understanding of small businesses.

The final areas presented in this chapter, User Experience, Functional Design, and Change Management (discussed in sections 2.4, 2.5, and 2.6 respectively), directly address the emotional and user-friendly dimensions as well as organisational shifts triggered by disruptive technologies. These sections provide crucial context for understanding how the transition to a new system like Xero can reverberate throughout a small business, disrupting long-standing work practices and requiring careful management of change. Paraphrasing Suchman (1987), the effects of technology within work practice settings extend beyond functionality, influencing users' interpretations and social experiences. The significance of understanding these impacts underpins my study's methodological approach, drawing on ethnography to investigate variances and actions in the context of software implementation.

2.1 Interaction Design & Human Practice

In this section, I will refer to key concepts derived from studies conducted by Robertson, Prior, and Star, focusing primarily on *Shopping & Tailoring*, *Infrastructure*, *Work Practice, Boundary Objects*, and *Articulation Work*. This collection emerged in the early research and development phase of this Thesis out of a deep reading series within the Interaction Design and Human Practices (IDHuP) lab at the University of Technology Sydney, which is the research context this project was born into. These are essential concepts I came across through assigned reading as a first year PhD student; they stood out as potentially the most relevant to my research interest and were helpful in my scoping process, ending up as fundamental parts of the findings in Chapter 5.

The authors presented in this section provide important perspectives on organisational change dynamics, offering useful knowledge for Australian Small Businesses. Their research serves as a means to enhance the comprehension in the adoption of technology among small enterprises and question the idea that cloud technologies can be integrated without taking into account the wider organisational consequences.

2.1.1 SME Software Adoption: Shopping and Tailoring

The idea of small businesses as *shoppers and tailors* of technology, as characterised by Robertson (1998), is an interesting perspective for understanding how these enterprises engage with technology. In this framing, 'shopping' refers to the process of selecting off-the shelf software, and 'tailoring' encapsulates the subsequent adaptation to meet particular needs, for example creating custom dashboards, reports and user-level setting configurations.

Digging deeper into the 'shopping' and 'tailoring' approach, the study by Hössjer and Eklundh (2009) provides another perspective. As with Robertson, the authors use a participant observation approach to SME business experiences to explore how design affects work practice, with a particular emphasis on how physical space affects communication and coordination. Their exploration of electronic messaging within a small newspaper office shows how various factors—social, physical, and technical—come together to influence communication choices in a co-located setting. For example, they observed differences in communication habits and tools based on physical proximity of individuals. They conclude that work roles were related to physical location, and therefore influenced behaviour:

> *For editing staff, photographers or other professional groups sitting within the office landscape as well as for the editors at the news desk, it is the interaction with colleagues at their own desk island that requires the least movement. The farther away a colleague is located, the longer the interruption of work is required when this colleague is to be approached for a direct conversation (Hössjer and Eklundh 2009, p. 16).*

Hössjer and Eklundh's study (2009) offers a deeper understanding of Robertson's 'shoppers' and 'tailors' concept by illustrating how these practices can manifest in real-world settings. It seems that the dynamic interplay between factors such as physical distance, roles and organisational hierarchies shapes the way technology is selected and used in the workplace, echoing the participatory nature of technology adoption envisioned in Robertson's model.

In this sense, Hössjer and Eklundh study aligns with the 'tailoring' side of Robertson's framework, where technology is modified and used in ways that align with existing social and organisational structures. In contrast to a purely 'shopping' approach, where technology is selected and used as-is, this 'tailoring' reflects a more participative use of technology. This adjustment suggests that the adoption and use of technology in the workplace is not just about selecting the right tools ('shopping'), but also about adapting them to fit the unique requirements of the context ('tailoring').

In my research, I consider Robertson's 'shopping' and 'tailoring' concepts in the context of Xero as an accounting platform that can be extended to meet particular business needs by, for example, connecting it to associated products like *Clouded* for Project Management. The

Xero model offers a flexible, customisable platform specifically designed with the unique needs of small and medium enterprises (SMEs) in mind. Through its emphasis on shopping and tailoring, Xero -and tools like it- have come to represent the continued relevance of participative practices in technology adoption among small businesses, even in an ever-evolving digital landscape.

However, the concepts of shopping and tailoring represent just one aspect of an organisational ecosystem. Such processes do not occur in isolation, and the choice of technology, whether it is an off-the shelf solution or a customisable platform, is entwined with the *organisational infrastructure*.

2.1.2 Organisational Infrastructure

Organisational Infrastructure refers to the tools, processes, rules, policies, and guidelines that underpin the work performed by a group within an organisation; it connects individuals within and beyond organisations, fostering information transfer, task delegation, and product exchange (Star, 2002).

Star and Ruhleder (1996) describe organisational infrastructure with five main characteristics. *Embeddedness* refers to the degree to which infrastructure is entwined into structures, norms and tools. *Transparency* addresses how natural or fixed systems or rules are. *Links with conventions of practice* determines how entangled the infrastructure is with other aspects, internally or externally. *Becomes visible upon breakdown* examines when infrastructure is taken for granted until it fails or causes issues. Lastly, infrastructure cannot be changed all at once due to the embeddedness and links with practice.

Building upon Star and Ruhleder, Prior and Leany (2020) emphasize a relational perspective of organisational infrastructure. The authors draw particular attention to the "mutually constitutive nature of organisational infrastructure and work practice" and describe the organisational infrastructure and work practice as "entangled" (p.5). This definition includes the technology, formal processes and standards that enable the primary work of a company as well as the social norms and practicalities of 'doing the work'. In this approach, organisational infrastructure is regarded as relational rather than a static supporting structure.

Considering the relational perspective, comparing organisational infrastructure to the framework of a house can help clarify how organisational infrastructure functions. Following this analogy, organisational infrastructure, much like the frame of a house, provides the essential structure for connecting individuals within and between organisations. Just as the frame supports the walls, floors, and roof of a house, organisational infrastructure facilitates the flow of information, responsibilities, and products across the spaces between each other. Adjusting a piece of the organisational frame is like modifying a beam in a house, it requires consideration of the implications of removing certain beams and installing new ones. Since the frame typically remains unseen until there is a breakdown, predicting the consequences of altering it can be challenging. In this sense, the negotiation of space within the frame is as crucial as understanding the individual beams themselves (Puig de la Bellacasa, 2016).

Following the house analogy, the introduction of a new element to an existing structure, such as the transition to a novel cloud software product like Xero, has the potential to cause disruptions. Therefore, in the context of my thesis, the study of organisational infrastructure is relevant as it allows to observe and analyse the relationships and network between tools,

processes, and norms that underpin the work environment in any organisation, including small and medium-sized enterprises (Prior, 2007, p. 57).

The introduction of a cloud-based technology like Xero can act as a catalyst, necessitating modifications in established infrastructures. Xero, with its ecosystem approach, brings forth a new wave of adaptability and integration, potentially modifying pre-existing work practices. The transition to cloud technology is indeed a transformative journey, the challenge lies in appreciating the transition not as a hindrance but as an opportunity to transform and optimise the underlying organisational infrastructure. It is within this context of the interplay between organisational infrastructure and technological adoption processes that I find significant examining *work practices* in SMEs.

2.1.3 Work Practice

The ‘mutually constitutive' relationship between organisational infrastructure and work practices is deeply entrenched in a workplace, and tends to be overlooked by the very people it guides (Prior and Leany, 2020). In their comprehensive 20 months study of ‘Situated Software Development’, Prior and colleagues (2008) examine the work practices of software developers. The authors distinguish between "Patterns *for* Behaviour" and "Patterns *of* Behaviour", the first being prescriptive actions usually laid out in formal guidelines, while the second captures the spontaneous, often ingenious, activities that individuals undertake in their daily work. Their findings underscore that work practices go beyond abstract descriptions (patterns *for* behaviour; i.e., how work is documented) and are shaped by the underlying organisational infrastructure. In other words, the authors argue that the lived experience of work can differ from the theoretically 'correct' way to perform it. Therefore, illuminating that

infrastructure alone doesn't offer a complete understanding of work practices unless it takes into account the lived experiences of individuals. Prior and Leany's distinction between how work is described and how it is performed, provide a background for exploring how SMEs prepare for and/or undergo periods of change. Such findings invite the analysis of the relationship between an organisation's infrastructure and workplace practices when new technology, like Xero, is adopted.

In summary, the analysis of organisational infrastructure enables an understanding of the combined technological and work practice aspects within and between businesses. As I continue to explore how small businesses adapt to and incorporate disruptive technology, my next step is to explore the role of *boundary objects* and *articulation work*. These elements form constituent parts of an infrastructure by facilitating and bridging collaboration across different groups within an organisation. As such, I am interested in how they contribute to shaping work practices during technological transitions.

2.1.4 Boundary Objects

Boundary objects represent shared yet adaptable tools, enabling collaboration and information sharing across diverse organisational contexts, making them instrumental in understanding organisational dynamics. Characterised as "plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (Star & Griesemer, 1989, p. 393), boundary objects can serve as conduits for information flow across different organisational domains.

Star and Griesemer (1989) first introduced the concept of boundary objects whilst examining the collaborative efforts of scientists and amateur assistants. These individuals utilised maps, catalogues, and other tools to synchronise data for a comprehensive zoological study. They showcased that the coordinated employment of such tools across professional and physical divides permitted a vast cohort to effectively collaborate, obviating the need for uniform consensus or comprehension.

Star (2010) further elaborated on the utility of boundary objects by spotlighting their 'tacking' attribute. This innate ability to oscillate between abstract generalisations and precise instances underpins their efficacy in navigating varied organisational settings. "*Groups that are cooperating without consensus tack back-and-forth between both forms of the object*" (Star, 2010, p. 604–605). This 'tacking' nature is a core feature, which allows them to be used in both abstract and locally specific forms simultaneously.

When considering cloud technology in the context of SMEs, cloud-based tools such as Xero, serve as boundary objects in enabling collaboration and facilitating shared understanding among different users. Within my research, I observed that cloud technology was designed to collect, store and transmit data (i.e., client, project and or financial information); thus, functioning as a shared resource enabling diverse teams (such as finance, operations, and sales) within an SME to coordinate efforts despite differing professional perspectives.

For instance, financial dashboards in Xero can serve as 'coincident boundaries,' presenting different levels of financial data to various users. Finance teams might delve into detailed financial analytics, while a sales team might focus on revenue data or customer information. Moreover, the cloud platform's adaptability and capacity to 'tack' between abstract

generalisations and specific instances aligns with the dynamic nature of SMEs, where rapid responses to changing business environments are often required.

As businesses navigate the technological shifts brought by digital transformation, boundary objects within the cloud system can help different teams align their understanding, aiding effective collaboration. Boundary objects found in cloud accounting software (e.g., forms and dashboards) can therefore play a significant role in the analysis of the impact of disruptive technology. They are the connectors, the link between different groups, moulding themselves to everyone's needs while keeping their own purpose. Considering the role that boundary objects play in establishing shared understanding across diverse groups within an organisation, it becomes even more intriguing to explore how boundary objects intertwine with the concept of *articulation work*.

2.1.5 Articulation Work

Schmidt and Bannon's (1992) concept of Articulation Work emphasises the critical coordination and negotiation that make the 'doing' of tasks possible. This concept provides a framework to investigate how teams in small businesses collaborate, adjust, and adapt, particularly during transformative periods, such as the adoption of new technologies.

Additionally, Bowker and Star (1999) expanded upon Star and Griesemer's (1989) early ideas on boundary objects to offer a deeper analysis into their role in facilitating Articulation Work. Their influential work, "Sorting Things Out: Classification and its Consequences", explores how objects such as documents, software tools, or even jargon can act as conduits or translators between different groups or perspectives within an organisation, bridging gaps and

fostering alignment. The author's perspective allows for an analysis of the 'work arounds' and actions that occur to ensure that work is done, involving the coordination and alignment of diverse perspectives, goals, and practices within a particular context.

Within my research, for example, project managers would routinely bring coffees to project meetings to help 'set the tone' with their stakeholders, allowing them to run through potentially contentious items with less friction. There were no formal guidelines or processes articulating this approach, but common, unspoken practices known to seasoned project managers, which junior team members would only discover in practice.

While Bowker and Star reflect on the connection between boundary objects and articulation work, Suchman (1995) creates a link between the latter and organisational infrastructure. In "Making Work Visible", Suchman demonstrates how seemingly mundane or 'invisible' aspects of an organisation - its processes, tools, or even cultural norms - can impact how work is carried out. Orlikowski (2000) builds on that linkage by offering a perspective on the mutual shaping of technology and work practices. This mutual constitutive process, also observed by Prior, Robertson & Leaney (2008), illuminates how a new technology like cloud software is introduced, affecting the very structure and flow of Articulation Work within an organisation. Within software development and change management practices, there is a tendency to think of one aspect or the other, software developers are focused on the design of the software, while change managers are focused on the behaviour of its users. The relationship between the product and users can be easily overlooked if not actively included in the analysis.

In summary, the concepts presented up to this point can collectively offer an examination on how the diverse elements and processes within small businesses intersect and

shape one another during phases of technological disruption. Organisational infrastructure forms the foundation, reflecting established norms, rules, and procedures that underpin the work performed by a group within an organisation; it connects individuals within and beyond organisations, fostering information transfer, task delegation, and product exchange. Work Practices encapsulate the lived experience within an organisation, often revealing a stark contrast between theoretical procedures and actual execution. Boundary Objects serve as tools that facilitate collaboration and information flow across various organisational contexts; they act as conduits for information flow, allowing for negotiation and translation across different perspectives and interests. Finally, Articulation Work speaks to the unseen, yet critical effort required for coordinating tasks, ensuring the seamless continuation of daily operations.

My research brings these concepts together within the particular context of SMEs in times of technological change. They form the backdrop for my study as it explores the impact and management of disruptive technologies in the realm of small Australian businesses. Furthermore, my thesis underlines the evolving landscape in which small businesses navigate the technological environment, make selections, and integrate new tools into their existing operations. It further strengthens the argument for an ecological approach that takes into account the intertwined dynamics of work practices, software design, and change management. The ecological approach provides the capacity to see infrastructure as it currently sits and speculate on the broader implications for system and process change.

By adopting an ecological approach, researchers and practitioners can develop strategies for effective change management that account for the interplay between human actors, artifacts, practices, and institutions within socio-technical systems. Moreover, by recognising the interconnectedness of different elements within the organisational ecosystem,

businesses can better understand and address the challenges and opportunities presented by technological innovation and organisational change. An exploration of the ecological approach on infrastructure will be presented in Chapter 6, along with this thesis's contributions and actionable insights.

With these interconnected concepts as a guiding framework, I now transition to the examination of Computer-Supported Cooperative Work (CSCW), a field that offers a comprehensive analysis into the interplay between collaborative work and its computer-aided mechanisms.

2.2 Computer-Supported Cooperative Work

In this section, I explore three key concepts and areas of study within the field of Computer-Supported Cooperative Work (CSCW) and how they can contribute to my research: *situated action and knowledge*; *co-located and distributed work practice*; and *socio-technical connections and communication*. These concepts provide a framework to investigate how teams in small businesses collaborate, adjust, and adapt, particularly during transformative periods, such as the adoption of new technologies.

2.2.1 Situated Action and Knowledge

The notion of situated action, as introduced by Suchman (1987), provides a significant critique of the idea that work practices can be standardised based on pre-defined scripts, which underscores the importance of context. Suchman's study of interactions between people and a photocopier revealed that scripts, which predefined a limited set of actions, were often at odds

with users' real-world practices and needs. The photocopier followed the menu selections made by the users without understanding the intentions behind their actions. This misalignment between the script of the photocopier and the contextual situated actions of its users led to confusion and frustration.

Suchman's critique is particularly relevant when considering the introduction of disruptive technology in small businesses. Each business has its unique practices, needs, and circumstances, which are challenging to capture fully within a predefined technological script. Scripts, while providing structure, can lack flexibility and adaptability - traits that are vital in small business contexts. The concept of 'tacking' and boundary objects in Star's (2010) work provides a way of negotiating these challenges. Boundary objects are versatile and flexible enough to cater to the needs of different communities of practice, being abstract enough to span boundaries while also being adaptable to local needs. Drawing from these ideas, the introduction of disruptive technology in small businesses should follow a similar approach. Instead of creating rigid technological scripts, the design and implementation process should involve the creation of boundary objects, which retain enough abstractness to be flexible, yet offer enough concreteness to be utilised effectively within specific contexts. These boundary objects, much like the 'tacking' process in a sailing journey, should allow businesses to navigate the waters of disruptive technology adoption by facilitating the articulation and bridging of the space between the technology and their unique work practices.

In summary, rather than aiming for a direct mapping of technology onto pre-existing work practices, there is a potential for an iterative, reflexive process where the technology and the work practices can mutually shape each other, anchored around boundary objects that are

situated in, and adaptable to, the unique needs and context of each small business (Suchman, 1987; Star, 2010).

2.2.2 Co-located and Distributed Work Practices

Within the CSCW field, co-located work practices typically referred to team members interacting within a shared physical space. However, with the emergence of cloud technology, the conventional anchoring of ‘work’ in physical time and space has been redefined.

Traditionally, work has been defined by specific time and place constraints—a model that is increasingly being questioned due to advancements in technologies such as cloud computing. As Lee and Chandra (2009) discuss, the ability to share personal context information through mobile devices indicates a shift from centralised, location-bound operations to fluid, distributed engagements. This technological capability, championed by cloud computing's "work anywhere, anytime" (Xero, 2020) mantra, has the potential to free work from the constraints of physical space and office hours. The tools and resources facilitated by cloud technology can now be accessed ‘anywhere’ there is internet connectivity and ‘anytime’ that employers or employees desire to work (Lee and Chandra, 2009).

However, the experience of working “anywhere anytime” is affected by technical and social factors. Alizadeh and Farid (2017) illuminate how infrastructure developments such as the National Broadband Network in Australia, intended to support such technological shifts, are unevenly distributed, reflecting and reinforcing existing socio-economic disparities. This unevenness questions the egalitarian promise of cloud computing, revealing a landscape where some regions remain tethered to traditional work settings due to lacking infrastructure.

Moreover, while technology shifts suggest a looser attachment to the physical office, cultural and organisational norms within companies can resist such change. Blomberg and Karasti (2013) examine how physical co-location supports not just logistical needs but also social interactions and cultural practices that bind organisations. The disruption of these practices can lead to resistance or failure in adopting new work paradigms, as discussed further in **section 2.2.4 Common Information Spaces.**

The resistance to adopt new work paradigms is mirrored in the broader socio-cultural context. The marketing of cloud technologies often oversimplifies the transition to distributed work practices, not accounting for the human elements that underpin collaborative endeavours. As Ciolfi and de Carvalho (2014) articulate, technology mediates but does not supplant the human and cultural processes essential for effective work practices; it is a tool that must be integrated thoughtfully and contextually while also considering the experiences of individual workers and groups when adopting new technologies.

In this sense, Orlikowski's (2002) concept of 'knowing in practice' —the idea that knowledge is not a static commodity but something that is constructed and enacted in specific contexts—provides a lens through which to examine digital transformations. As Australian SMEs adopt cloud-based solutions, they are not merely incorporating new tools into their work; they are also engaging in a dynamic process of learning and adapting that reshapes their work practices and routines.

In summary, the transition to cloud technologies redefine the boundaries of time and place traditionally associated with work. The adoption of cloud solutions enables work to occur

'anywhere, anytime', breaking the constraints of physical office spaces and rigid work schedules. This shift reflects a broader trend towards flexible and remote work arrangements, where employees can access resources and collaborate virtually from diverse locations and at non-traditional hours. Thus, the examination of cloud technology adoption sheds light on how the restructuring of time and place shapes contemporary work practices within Australian SMEs. Consequently, the notions of proximity, distance, and 'knowing in practice' are redefined by the digital distance that cloud-based tools can span, where virtual collaboration becomes an integral component for understanding work practices.

In this sociotechnical scenario, where disruptive cloud software claims to be able to work ‘anywhere anytime’, I want to consider the potential aspects of communication in work practice for businesses looking to embrace these technologies. Cloud software solutions not only mediate collaboration, but communication as well by restructuring the ways knowledge is created, shared, and utilised within SMEs.

2.2.3 Socio-Technical Connections and Communication

In exploring the world of *synchronous communication*, a foundational context for researching the disruptive adoption of cloud technologies in SMEs is created. Synchronous communication is characterised by the real-time exchange of information, manifesting through various mediums such as face-to-face discussions, phone calls, or chat messages (Hrastinski, 2008).

However, with the increasing embrace of digital communication tools like Instant Messaging platforms (Kaufmann & Peil, 2020; Rajendran et al., 2019), we see a cultural shift towards cloud technologies. It's this backdrop that spurred my interest in SMEs' adoption and adaptation to disruptive cloud innovations. *Asynchronous communication*, where message exchanges aren't constrained by real-time responsiveness, offers a unique advantage. Especially in distributed teams scattered across various time zones, this mode facilitates collaboration without the need for synchronous interaction (Hrastinski, 2008). Given cloud's promise of working 'anywhere anytime' (Xero 2020), the question arises: how essential is asynchronous communication for businesses aiming to leverage this?

Olson and Olson (2000) provide some clarity, suggesting that tasks without a dependency on direct real-time collaboration are more suited for remote operations. Email remains a predominant tool for asynchronous communication in workplaces. Studies from Gutwin et al. (2004), Mazmanian et al. (2006), and Hössjer & Eklundh (2009) offer invaluable perspectives on the dynamics of email communication. SMEs initially navigated this landscape using individual asynchronous Excel spreadsheets, but the manual nature of this approach led to challenges. Ribes et al. (2013) touched upon the idea of "artifacts that organise," like spreadsheets which serve as central data repositories. While effective to a degree, the need for more synchronous platforms became evident. Technologies such as Google Sheets and Office 365 Online offered a blend of the familiar with the promise of real-time updates.

The technological arc from individual Excel files to comprehensive cloud systems, like Xero and WorkflowMax, outlines a trajectory towards real-time shared views and collaborative spaces. As SMEs continue to embrace these advancements, a shift from pure communication

to a robust *common information space* emerges, enhancing coordination and collaboration in digital workplaces.

2.2.4 Common Information Spaces

Common Information Spaces (CIS) are shared environments where team members exchange, access, and manipulate information, a concept developed within the field of Computer-Supported Cooperative Work (CSCW) to foster collaboration and coordination among distributed teams (Bannon & Bødker, 1997). These spaces serve as repositories that team members can access as needed, thereby facilitating effective communication and collective decision-making (Bossen, 2002).

However, establishing and maintaining a CIS is not without its challenges. One significant issue is the potential for shared objects to lose their context, leading to misunderstandings or misinterpretations (Ackerman et al., 2013). As such, the discourse surrounding CIS has evolved into a vital aspect of knowledge management, with an ongoing debate about how to address context-related complexities and recognise the roles of experts and objects (Steger et al. 2018).

In addition to CIS, other strategies can create *shared views*. This concept, as described by Schmidt and Bannon (1992), has long been integral to distributed work environments, particularly as teams strive to minimise productivity loss. This principle of shared understanding and knowledge manifests in numerous forms, from shared files and views to emails, computer conferences, and video conferencing. The evolution of this concept continues

to hold relevance in today's distributed workplace, nearly three decades later (Arminen & Poikus, 2009; Poole et al., 2009; Simone et al., 2012; Stefik et al., 1987).

As examined by Bayerl and Lauche (2010), shared views may include setting up video links between offices. The authors noted that while the technology was initially met with resistance, it eventually integrated into communication practices and even spurred spontaneous social interactions. Similarly, Bardram and Hansen (2010) investigated the use of 'context-based workplace awareness' technology in hospitals, a system designed to help staff track the location and availability of doctors. Yet, the evaluation methodologies were restricted to questionnaires and interviews, limiting the scope of understanding these solutions' practical impacts.

Significantly, the broader CSCW literature frequently attempts to replicate non-verbal interpersonal cues that are readily available in co-located offices, under the assumption that such cues are essential for coordinating work. Many cloud productivity tools include features like status sharing and availability, while others concentrate on scheduling, file sharing, and task progression. In the context of my research, exploring how shared views influences the selection of cloud-based technology solutions within a distributed small business context, we can critically analyse the implementation and use of CIS in these contexts. In this regard, this research can shed light on how these shared environments facilitate or hinder effective collaboration and coordination.

2.2.5 Analogue and Digital Coordination Mechanisms

One of the attractions of cloud productivity tools is the potential reduction in the overwhelming volume of emails employees have to manage daily. This struggle, confessed by clients who receive between 500 to 1000 emails per day, underscores the need for alternative communication and coordination tools. My ethnographic research will aim to provide insights into how participants (primarily Business Owners, Office Managers and Accounts Administrators) manage information and relationships through cloud software, email, and other communication modes in the disruptive technology landscape. Building on the exploration of synchronous and asynchronous communications, there is also an area of exploration around shared views and communication artifacts as boundary objects for the coordination of work.

In the broad range of communication and collaboration tools, the humble *whiteboard* continues to remain prevalent (Whittaker & Schwartz, 1990). Whiteboards serve as effective means of communication, capable of supporting both synchronous and asynchronous interactions. They facilitate real-time, synchronous communication during meetings or brainstorming sessions, acting as a visual aid to foster collaboration, spur ideas, and organise thoughts. However, their usefulness extends beyond these live interactions. They can also be used as a central coordinating point for sharing schedules and statuses. As a platform for displaying critical information, they provide an asynchronous mode of communication, allowing team members to engage with the content at their own pace, revisit ideas, and update information as and when required.

Yet, as Riley et al. (2007) identified, whiteboards are susceptible to workplace politics, becoming the stage for strategic manoeuvres such as the erasure of names to evade task allocation (Bjørn & Hertzum, 2011). Marking the completion of tasks can be used as a method

diffusing responsibility, with ticks replacing individual initials. These instances highlight the entwined relationship between context, personal dynamics, and physical artefacts in forming workplace practices. Although tools are intended to act as 'coordinative mechanisms' (Schmidt & Simone, 1996), people are the orchestrators of coordination. This realisation accentuates the importance of acknowledging the human element within any technological integration.

In summary, Computer-Supported Cooperative Work (CSCW) offers some particular concepts, and empirical research that can enrich our understanding of the dynamics of collaboration in distributed teams. As discussed above, the notion of situated action provides a significant critique of the idea that work practices can be standardised based on pre-defined scripts; rather than aiming for a direct mapping of technology onto pre-existing work practices, the concept of situated action offers a potential for an iterative, reflexive process where the technology and the work practices can mutually shape each other, and adapt to the unique needs and contexts of each small business (Suchman, 1987; Star, 2010). The adoption of cloud technologies, however, presents an interesting potential for disrupting preexisting co-located work practices and inter-personal dynamics. In this context, the concept of situated action also engages in a dynamic process of learning and adapting that fundamentally reshapes co-located and distributed work practices and routines. When considering work practices, the adoption of cloud technologies and its “work anywhere anytime” possibility also has the potential to restructure ways of communicating and sharing knowledge and information.

As technology continually evolves, understanding the impact of technological change on collaboration, productivity, and overall organisational function becomes even more critical. The examination of synchronous and asynchronous communication, shared views, common information spaces, and the enduring role of traditional tools such as whiteboards provides a

lens to evaluate these dynamics. By leveraging the lessons learned from CSCW research, SMEs can make more informed decisions about which technologies to adopt, how to use them, and anticipate potential challenges related to communication, coordination, and organisational politics.

Within the context of this research, the key concepts developed by CSCW studies underscores the role *ethnographic practice* plays in understanding the process of incorporating technological tools, such as cloud software, in workplaces. Understanding that the usage and acceptance of technology are often moulded by social, cultural, and political dynamics within an organisation, the need for a user-centred approach in implementing and designing cloud-based technologies for SMEs is starkly apparent.

2.3 Ethnography of Work Practice

My study, conducted between the years 2014-2019, was situated during the disruption of cloud technology in SME landscapes. Throughout this period, I examined the implications of the technological shift towards cloud-based software on work practices by using ethnographic methods such as participant observation.

Qualitative methods, such as ethnographic approaches, are particularly well suited to the studies of technology work practice (Karasti and Blomberg, 2018). As stated by Pors et al. (2002), the benefits of ethnographic research lie in its "*opportunities for interacting and engaging with the field studied*" (p. 4). Even more, Karasti & Blomberg (2018) argue that "intervening in the field" is not optional but rather "an unavoidable condition of ethnographic research" (p. 257).

In this section, I will consider workplace ethnographic research to further explore the benefits of “intervening in the field”. These studies provide rich avenues for exploring how human behaviour, culture, and social context play a part in the use and acceptance of technology. This understanding is helpful in exploring how disruptive cloud technologies, like Xero, are integrated within the fabric of SMEs.

A significant emergent theme in workplace ethnography is the relationship between humans and technology. Sharp, Robinson, and Petre's (2009) examine this link by exploring the role of physical artefacts in agile software development, shedding light on the tangible aspects of software work. In the context of my research, this presents an interesting perspective on how software like Xero, although digital, has tangible effects on work practices and organisational structures in SMEs. While often overlooked, the impact of technology adoption in an SME context can potentially introduce physical changes in workflows, job roles, and interactions within and between teams.

In this sense, an ethnographic analysis of the human-technology interaction can often make visible hidden patterns and relationships, such as participation, gender, power, and knowledge in IT design. In this regard, the design of IT is not merely a technical process but is intricately tied to social interactions and power structures (Sefyrin's, 2010).

In a similar vein, Prior, Ferguson and Leaney (2016) highlight the importance of context in the design of interactive systems, supporting the idea that cloud solutions like Xero need to adapt to the unique cultures, norms, and practices of SMEs they serve. Their study demonstrates how ethnography can help software developers gain a deeper understanding of

user needs, behaviours, and contexts, leading to designs that are more user-centred. This approach aligns with my research goals, as I endeavour to apply an ethnographic lens to better comprehend how cloud technology can be customised and implemented in ways that resonate with the distinct operational and cultural contexts of SMEs.

While examining the cultural contexts of SMEs, Gupta et al. (2013) found that larger corporations were swiftly incorporating cloud technology into their operations, while SMEs were adopting a more gradual approach. Their observation raises a critical question: Why are SMEs more hesitant in embracing this disruptive technology? Although Gupta et al.'s study did not delve into this matter; it offers a compelling area of exploration for my research. Understanding the root causes of this disparity can shed light on potential barriers or misconceptions that may be hindering cloud technology adoption among SMEs.

Clarke & Preece's (2018) work on digital ethnography suggests that a deeper understanding of user behaviour in their natural environments can address SMEs hesitance in adopting cloud-based technology. They suggest that an ethnographic knowledge of user behaviour can help in designing systems that align with users' needs and practices. Millen (2000) and Brinkmann & Tanggaard (2015) support this approach, discussing the use of rapid ethnography as a method well suited to the dynamic business environments of SMEs. Rapid ethnography enables the collection of in-depth data within a short period, which is valuable for understanding the rapidly changing world of SMEs. By employing tools and concepts from rapid ethnography, I aim to gain rapid yet rich insights that can inform the adaptive and responsive development of tools like Xero.

Moving from the benefits of ethnography in work practice settings, the next section will transition into the realm of User Experience (UX), which also considers the relationships and interactions between people, processes, and systems. UX, like ethnography, places a strong emphasis on understanding users in their natural environments, considering their needs, emotions, and behaviours. In this sense, the findings of ethnographic research can enrich a deeper understanding and application of UX principles.

2.4 User Experience

By merging principles from human-computer interaction (HCI) and design, research in User Experience (UX) examines how individuals interact with technology, processes, and systems. UX extends beyond traditional considerations of functionality, usability, and aesthetics, offering a holistic perspective on the entirety of an individual's interaction with a product, system, or service. Understanding UX is essential for comprehensively assessing how individuals navigate and interact with technology within organisational contexts, shedding light on the implications of cloud technology adoption for work practices and organisational dynamics within Australian SMEs.

In their influential work on UX, Hassenzahl and Tractinsky (2006) offer a comprehensive definition of user experience, highlighting the interplay between the user's internal state and the characteristics of the designed system within a specific context of interaction. The author’s human-centred approach underscores the importance of understanding users' predispositions, expectations, needs, motivations, and mood, along with the system's purpose, usability, and functionality. Furthermore, incorporating users as active participants rather than passive recipients in the design process encourages a user-oriented

perspective, promoting deeper empathy and usability considerations. By integrating these elements, designers can create experiences that are not only satisfying but also meaningful for users.

Hassenzahl and Tractinsky acknowledgement of the significance of user participation presents an opportunity to further explore the intersection of empathy and usability within the framework of user experience, bridging aspects of user-centred design.

In the context of SMEs transitioning to cloud-based technologies, understanding user emotions and reactions to change is paramount. Insights from Gisch and Robertson's (2013) scoping study on cloud computing practices, found that users' acceptance of new technology can be influenced by their emotional responses to the changes imposed. For example, the adoption of new technologies can elicit varied emotional responses from employees, ranging from excitement about new possibilities to anxiety about potential challenges. Gisch and Robertson's study conclude that emotions can impact users' interaction with cloud software, therefore changing workflows and practices.

In light of Gisch and Robertson's observations, the principle of *usability* holds particular relevance. Nielsen and Loranger (2006) define usability as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction. The authors indicate that even when cloud-based technologies offer substantial benefits, if they are not user-friendly or intuitive, their adoption can become a significant hurdle for employees. This acknowledgment further underscores the importance of usability in designing and implementing new software within SMEs.

In essence, empathy and usability, while seemingly disparate, are in fact two sides of the same coin when it comes to enhancing user experience. Acknowledging and addressing users' emotional responses, as well as prioritising usability in design, can improve system interactions, leading to more successful implementation of cloud-based technology within SMEs. By incorporating these principles into my study, I can gain valuable insights into how software design aligns with the needs and experiences of the users.

2.5 Functional Design

Functional design refers to the planning and structuring of a system or tool to ensure it meets specific user needs and operational requirements. It encompasses the layout and organisation of data input fields, the delineation of workflows, and the usability features that make the system intuitive and efficient for end users. According to Bowker and Star (1999), functional design involves categorising and classifying information in a way that aligns with user practices and expectations. It is a crucial aspect of software and interaction design that directly impacts user engagement and the efficiency of work processes.

Functional design also addresses the usability of a system, ensuring that the interface is not only functional but also user-friendly. This includes the visual and interactive elements that facilitate seamless interaction between the user and the system (Star, 1996). In this way, functional design bridges the gap between technical specifications and user experience.

In the context of this thesis, functional design is relevant to observations of how users interact with and adopt new technologies. The transition from traditional tools like spreadsheets to cloud-based platforms such as *Clouded* highlights the critical role of functional design in

shaping user experience and organisational efficiency. Functional design impacts user engagement by making systems intuitive and easy to use. A well-designed system reduces the cognitive load on users, allowing them to perform tasks more efficiently and effectively. For instance, the categorisation and usability of input fields in *Clouded* were critical in ensuring that users could manage project data without resorting to cumbersome workarounds (Bowker & Star, 1999).

Effective functional design incorporates flexibility to accommodate diverse user needs and operational contexts. This adaptability is crucial for SMEs that require systems to be both internally consistent and externally flexible to meet varied client and project requirements (Star & Griesemer, 1989; Star & Strauss, 1999). By designing systems that naturally fit into existing workflows and reduce the need for manual data manipulation, functional design can significantly decrease articulation work. This not only enhances productivity but also improves user satisfaction and system adoption rates (Star & Ruhleder, 1996). In summary, functional design can impact the successful implementation and adoption of new software systems in organisational settings.

In summary, understanding users' needs, emotions, and challenges, as well as intuitive design, is not only integral to the fields of UX and Functional Design, but also to managing change within an organisation. In the next section I will move from exploring how users interact with systems to discussing how changes are managed and facilitated within SMEs. In my professional experience, effective change management is critical for successful adoption of new technology, as it ensures that changes are implemented smoothly and with minimal disruption to workflows. It is a process that requires careful planning, communication, and an

understanding of the potential effects on all stakeholders, principles that I will delve into more fully in the next and final section.

2.6 Change Management

Change management focuses on navigating the shifts that occur in times of organisational change and transformation, which can impact established work practices (Leonardi & Barley, 2008). Bridges' (2003) work emphasises the importance of acknowledging the psychological and emotional aspects of managing change, particularly within small to medium enterprises (SMEs). In my observations of SMEs, a lack of formal change management training was evident, leading to a potential underestimation of the importance of effectively managing transitions. Disruptive technologies demand substantial adjustments in routines, roles, and processes, often evoking a range of emotions from fear to resistance, affecting individuals and organizational dynamics alike (Christensen et al., 2020). SMEs, with their limited resources and expertise, face additional challenges in navigating these transitions (Bouwman et al., 2005). Moreover, many SME stakeholders come from technical backgrounds, lacking the managerial skills necessary to navigate the emotional complexities of change.

Bridges' framework (2003) can provide strategies for SMEs to better navigate the emotional aspects of technological transitions, emphasizing clear communication, addressing individual concerns, and fostering a supportive transition environment. By understanding these components, SMEs can enhance their ability to manage technology-induced shifts effectively.

In the context of SMEs transitioning to cloud software solutions, *leadership* emerges as an area of focus for effective change management, facilitating learning and innovation. As

described in Kotter's eight-step model (1995), leadership strategies begin by creating a sense of urgency, emphasising the need for change and why it's necessary. Next, a powerful coalition is formed, comprising influential individuals who can drive the change effort forward. A clear vision for change is then developed, outlining what the organisation will look like post-change. This vision is communicated extensively to all stakeholders to ensure understanding and buy-in. Employees are empowered to take broad-based action, with obstacles being removed to facilitate progress. Short-term wins are generated and celebrated to maintain momentum and demonstrate progress. These successes are then consolidated, and further changes are implemented to build on initial achievements. Finally, new approaches are anchored in the organizational culture to ensure their long-term sustainability. Together, these steps provide a roadmap for navigating organizational change effectively.

Leadership, as enunciated in Kotter's eight-step model (1995), emerges as a linchpin in the change management saga. His structured approach, underpinned by leadership's cardinal role, offers an understanding from creating a sense of urgency to anchoring changes in organisational ethos. Prosci's ADKAR model (Hiatt, 2006) further illuminates the change management process with its focus on five key elements: awareness of the need for change, desire to participate and support the change, knowledge of how to change, ability to implement required skills and behaviours, and reinforcement to sustain the change.

The cited management models, alongside other frameworks like Lewin's model (Burnes, 2004) and the PDCA (Plan, Do, Check, Act) model, provide valuable strategies into managing change through preparation, implementation, and continuous improvement phases. By blending change management strategies with concepts from UX, CSCW, and Interaction Design, along with ethnographic methods, my research endeavours to holistically comprehend

digital transformation in SMEs. The overarching aim is to dissect the cloud software vendors' claims of hassle-free setup, questioning the oversimplification of software shifts and underscoring the potential need for a structured change management approach (Burnes, 2004).

2.7 Chapter Summary

In this chapter, I explored and reviewed the contents of previously published studies on how small businesses adopt or shift to new practices whenever disruptive technologies emerge in the global business domain, topic that is directly related to my research question, '**What happens within small businesses when a product is introduced that challenges long-term work practice habits?**'

Borrowing from a set of related fields, including Interaction Design & Human Practice, Computer-Supported Cooperative Work (CSCW), Ethnography of Work Practice, User Experience (UX), Functional Design, and Change Management, the explored literature aims to contribute to the debate around the effects of introducing disruptive technology to Small and Medium Enterprise (SME).

I began this chapter with some key concepts from authors that have strongly influenced my research design and analysis. Robertson's (1998) work gives a detailed process that businesses follow when selecting and integrating new software. Specifically, she examined the 'shopping' phase— where business owners evaluate various communication tools—which provides a pragmatic view of decision-making during the consideration of off-the-shelf software solutions.

Meanwhile, Star and Ruhleder (1996) focused on the often-overlooked role of infrastructure within information systems. They suggested that infrastructure, despite being ubiquitous, plays a vital role in shaping information spaces. By conceptualising infrastructure as a dynamic entity entwined with the practices it supports, they highlighted the potential challenges businesses may face during the implementation of new information-sharing systems.

Expanding on Star's theoretical framework, Prior (2007) explored the concept of infrastructure in depth. In her ethnographic study of project teams within medium-sized businesses, Prior showed the relationship between infrastructure and work practice. Lastly, the concepts of boundary object and articulation work were introduced as central elements that within infrastructures help bridge collaboration efforts between different groups.

In the second section, I reviewed studies from the CSCW field, as literature from this area of study highlights the intersection of technology and human collaboration within organisational contexts, influencing communication and coordination among individuals and groups in work settings. The literature presented in this section led me to review, in the third section, the relevance of ethnographic practice within the studies of work practice.

In the fourth and fifth section, Functional Design and UX principles of empathy and usability are articulated to establish an argument in favour of an ecosystem approach in software design and change management. This approach acknowledges the interplay between users, processes, and systems. It advocates for software that is not just functionally excellent but also emotionally resonant and intuitive, making the transition smoother and more acceptable for users. UX and Functional Design studies provide valuable insights into the

dynamics of organisational change and its management, themes discussed in the sixth and last section.

In summary, while this chapter has examined existing literature on how small businesses adapt to technological innovation, it remains a gap in understanding the relationship between the introduction of disruptive cloud-based software and long-standing work practices within SMEs. Whereas prior studies have shed light on various aspects such as decision-making processes, infrastructure and collaborative work practices, and user experience functionality, there is still a need for empirical research that specifically focuses on the challenges and adaptative processes that SMEs go through when transitioning to technological innovations. This thesis aims to address this gap by employing a mixed-method research approach, combining ethnographic techniques, participant observation and targeted interviews to delve deeply into the dynamics of technological disruption and its impact on established work practices within the context of Australian small and medium enterprises. In the next chapter, **Research Methodology**, I will elaborate further my mixed-method research approach.

Chapter 3: Research Methodology

I embarked on this research project as a professional consultant in software change management dedicated to the implementation of *Clouded*, a cloud-based tool for use in SME's. During my five-year experience, I frequently observed a significant incongruity between the software companies' claimed ease of use of their products and the practical experiences of small business owners who were attempting to implement these tools within their unique local contexts. These observations suggested a potential correlation between the introduction of new digital tools and subsequent challenges with broader process design and work practices within these organisations. An example of such a challenge can be seen when a change to an accounting package unexpectedly leads to disruption and necessary modifications to sales processes.

These early observations helped shape the subsequent research trajectory, ultimately leading to the development of the main research question that guides this study. To investigate this potential connection, I narrowed the key question to **'What happens within small businesses when a product is introduced that challenges long-term work practice habits?**'

In response to this question, I structured my research project into two key stages: the initial stage, or Phase One, was an exploratory investigation that served as a preliminary study. The purpose of this phase was to sharpen the focus of my research, as well as to probe broader observations that had emerged from my time in the consultancy field. Phase One's insights, which were published in the article 'Working in the clouds: a study of contemporary practices' (Gisch and Robertson, 2013), then informed the design of Phase Two, a comprehensive ethnographic exploration.

In order to ensure the integrity of my research, I looked to the challenges identified by Passos et al. (2012) in their analysis of ethnographic applications within software practices. These challenges include obtaining access and acceptance, handling time management, dealing with the observer effect, and ensuring the accuracy of data interpretation. These aspects will be further detailed in the following sections.

In this chapter I will introduce the epistemological perspectives from which I approached this research and its phases. Section 3.1 introduces my research orientation, inspired by metamodernism, which evolved from modernist certainty through postmodernist scepticism to provide an approach that aims to blend locally relevant aspects that can be abstractly applicable to other contexts. Following this, Section 3.2 delves into the combination of autoethnography and rapid, multi-site ethnographic deep dives. This methodological approach was influenced by studies from Ellis et al. (2011) and Pink & Morgan (2013), which illustrate how these methods can facilitate navigation of insider-outsider dynamics (researcher/consultant tandem) and foster an in-depth understanding of organisational environments. Furthermore, Vindrola-Padros & Vindrola-Padros (2018) highlight the value of rapid and cost-effective data collection methods in contemporary research scenarios.

Section 3.3 examines the duality insider-outsider dynamic that surfaced during my consultancy work within SMEs. This dynamic is a common feature when conducting research in such settings (Breen, 2007). Both Hellawell (2006) and Brannick& Coghlan (2007) discuss the power relations and ethical issues arising from dual roles, underscoring the potential for bias when researchers develop close relationships with their research subjects.

Lastly, in Section 3.4 I will detail how this study was conducted within the Interaction Design and Human Practice Lab (IDHuP) from the University of Technology Sydney (UTS), which provided an overarching Ethics Program Approval for the period of the research.

3.1 Theoretical and Epistemological Orientations

In this research I utilise metamodernism, as outlined by Vermeulen and Van den Akker (2010), as the epistemological lens to guide my perspective and approach. The metamodernist perspective is a synthesis derived from modernism and postmodernism. Until 1960, modernism was a paradigm within ethnography; aligned with positivism, modernism valued objectivity and rationality as the scientific approach to understanding cultures (Giddens, 1990). It suggests a linear progression of history and the notion that there is an objective reality that can be measured and quantified (Harvey, 1989).

However, the limitation of this perspective lies in its tendency to oversimplify and ignore the cultural and societal nuances in favour of an overarching 'grand narrative'. As a critique of this modernist viewpoint, postmodernism emerged, advocating for a more subjective and relativistic understanding of cultures and society (Lyotard, 1984). Postmodernists challenge the notion of a single, objective truth, suggesting instead that truth is constructed and experienced differently by different individuals (Foucault, 1980). This perspective allows for a multiplicity of truths and realities, embracing diversity and complexity. However, the rejection of absolute truths and grand narratives can lead to scepticism and relativism, often resulting in difficulty in deriving practical, actionable insights from research (Best and Kellner, 1997).

Metamodernism situates itself between these two paradigms, attempting to synthesise their benefits. The term was first introduced by Vermeulen and Van den Akker in 2010, who proposed metamodernism as a paradigm that emerged in response to and beyond postmodernism, encompassing a simultaneous and continuous oscillation between modernist and postmodernist principles; meaning, objectivity and subjectivity.

As stated by Pipere and Martinsone (2022), one of the central characteristics of meta-modernist epistemology is its unique understanding and approach to truth. According to the authors, meta-modernism proposes that certain ideas can be 'objectively' true for individuals, while simultaneously being aware that they are not universally true; this requires both awareness and acceptance of individual activities and the differences of these activities from how others do. Following this principle, the stories we tell ourselves about our lives and their meaning are absolute truths for us, although this 'local' truth is not shared and understood by others. In this sense, the authors state that the key contribution of meta-modernism is that it stresses the constant situatedness of individuals in a communal or cultural context that limits our understanding of the world (Pipere and Martinsone, 2022).

In this regard, metamodernism formed the bedrock for my epistemological stance, since it allowed me to continually transition from modernism (objectivity; broader systemic views) to postmodernism (subjectivity; localised and contextual perspectives). This dance between the specific and the universal allowed me for a more robust exploration of the digital transformation phenomena within these entities.

My selection of the metamodernist perspective was not about rejecting other postures; it was an active choice made in response to the dynamics observed within SMEs undergoing digital transformation. The metamodernist stance enabled me to navigate the continuum of modernist and postmodernist perspectives, facilitating a uniquely balanced examination of cultural contexts and technical challenges that SMEs face during their adoption of cloud technology. In essence, this epistemological lens has shaped my perspective for understanding and interpreting the dynamics within small to medium-sized enterprises (SMEs) in the current digital era, following the metamodernist continuum between broader views and more localised ones.

Shore's (1998) cognitive anthropological perspective complements the metamodernist approach by offering a more comprehensive lens to examine the multifaceted nature of digital transformation within SMEs. He rejects the modernist approach to culture as a "neat packaging of traditions" (p. 209) that are experienced equally by all members of a group. Instead, he embraces a distributive view which "sees culture as a complex knowledge system unevenly appropriated in social and political time and space" (p. 209). He draws this view from Barth (1987), whose goal was to examine the variety of ideas, how they are expressed and:

> *... the pattern of their distribution, within communities and between communities; the process of (re)production in this tradition of knowledge and how they may explain its content and pattern of distribution; this the process of creativity, transmission and change (p. 1).*

A key difference of this perspective is the unequal distribution of knowledge and power. While culture may be something experienced by all people within a social context, that experience is not universal; echoing Pipere and Martinsone's (2022) explanation of metamodernism. In this sense, culture is nuanced, variable, and complex:

> *Whatever cultures are, they do not fit in nutshells. But while it is relatively easy to say what a culture is not; it is much more difficult to describe what culture is. Anthropologists have conceptualised culture and its constituent units in many ways, as a patchwork of traits, integrated configurations, constellations of symbols and meanings, symbolic templates, a web of meanings, taxonomic trees, measurable values and beliefs, sets of characteristic strategies for accomplishing a desired goal, and, more recently. a field on which a cacophonous cluster of diverse voices or "discourses" plays itself out…. This book adopts a view that a culture is best conceived as a very large and heterogeneous collection of models or what psychologists sometimes call schemas. To the extent that they are public artifacts, cultural models are out in the world, to be observed by outsiders as well as experienced by locals. In this sense, cultural models are empirical analogues of culture understood as knowledge… approaching culture as a collection of models has the advantage of showing that making sense of culture as an aspect of mind requires that we both distinguish and relate these two notions of model [cultural and mental]. (Shore, 1998, p. 44).*

His perspective of culture is grounded very much in time. Culture and knowledge do not exist perpetually in an abstract form; they are lived, developed, challenged, and changed in a fluid and dynamic way.

Shore's exploration of the intersection of cognition, culture, and meaning, reminds us that our interpretation of cultural phenomena is mediated by our cognitive processes and vice versa. Drawing from Shore's analysis, the metamodernist oscillation became an analytical tool for capturing the interplay of individual and systemic effects of technological change, keeping

in view the broader environmental currents influencing these SMEs. Ultimately, the metamodernist underpinnings combined with Shore's work, highlighting the link between cognitive processes and cultural phenomena, added further depth to the research, fostering a more comprehensive understanding of the digital transformation phenomena within SMEs.

Guided by the theoretical perspectives of metamodernism and cognitive anthropology, this research not only attempts to offer an understanding of digital transformation phenomena in SMEs but also to contribute to the development of more effective strategies for technology adoption. In this sense, Ethnography presents a fitting methodological design choice since it has the capacity to view phenomena from both a localised and abstract lens. This dual perspective that ethnography has to offer provides a means for capturing singularities while striving for coherence. In the following section I will expand on the different ethnographic approaches I used for my research and how (and why) I integrated them into my practice.

3.2 Integrating Ethnographic Approaches

To explore the integration of disruptive technologies into Australian SMEs, I designed an approach that hinges on the metamodernist perspective and Blomberg & Karasti's (2012) reimagining of the concept of 'field site' in ethnographic research within technological settings. This strategy incorporates multiple forms of ethnography, which not only offer different perspectives but also provide opportunities to delve deeper into specific areas of the study. In this section I will describe and situate the following types of ethnography: autoethnography, rapid ethnography and multi-site ethnography.

Ethnography is a hallmark of Anthropology; it draws primarily on intense fieldwork, participation and observation of a group in situ for the systematic analysis and interpretation of the collected data; it is not merely a method since it is also a written product and the byproduct of constant and iterative analysis between empirical observations and theoretical reflexion before, during, and after fieldwork (Geertz, 1973; Prior, 2007).

Drawing on the principles of Geertz's *thick description* (1973), ethnography provides a thorough exploration of practices, interactions, and perceptions within their respective contexts:

> *Ethnography is thick description . . . a multiplicity of complex conceptual structures, many of them superimposed upon or knotted into one another, which are at once strange, irregular, and inexplicit, and which [the ethnographer] must contrive somehow first to grasp and then to render* (p. 24).

According to the author, in order to fully comprehend and decode how a particular group experiences and structures their world and acts within it, it is the ethnographer's task to first make sense of these intricacies through thick description. For the ethnographer to be able to unveil these thick layers of codes, meanings and actions, the researcher must experience firsthand ("being there") the world of the group he is studying and make an effort to understand it through the insider's point of view, recognising their "local knowledge" (Geertz; 1973).

Suchman (1987) and Blomberg et al. (1993) emphasised the value of this immersion in studying human-machine interactions and cooperative systems design respectively. Dourish (2006) further contends that the strength of ethnography lies not simply as a tool for identifying

and addressing design issues, but in connecting those issues to broader sociotechnical dynamics.

Ethnography is often the methodology of choice for the study of work practices. Its use helps to explore work practices and the subtleties of technological integration in these settings. Guided by Dourish's (2006) critique, my ethnographic inquiry did not merely aim to guide technology design towards better alignment with user requirements, as described by Fiesler et al. (2019). Instead, it sought to provide a deeper understanding of how technology and work practices intertwine, constantly shaping and being shaped by each other.

To approach the studying of these dynamic processes and entities, such as contemporary organisations where conditions and contexts rapidly evolve, I embraced *Rapid Ethnography*, as it was beneficial to accelerate data gathering and analysis without compromising on the depth and reliability of traditional ethnographic techniques (Vindrola Padros and Vindrola-Padros, 2018). Characterised by Millen (2000) as a vital approach for quick, in-depth inquiries within specific organisational contexts, Rapid Ethnography was critical in focusing on both co-located and distributed, asynchronous groups within individual organisations.

As an extension of the rapid ethnographic techniques, there were some opportunities to engage more deeply with certain organisations to get a clearer understanding. For these specific situations, I utilised a more *intensive* ethnographic approach[2]. This method involved longer

[2] I have selected the description of 'intensive' ethnographies to provide a distinction from the rapid ethnographic activities. I refer to a more typical ethnographic approach and am not suggesting a new methodology.

stretches of engagement, often lasting more than three months, with particular organisations. The extended nature of this engagement meant I had regular and consistent interactions, creating an environment where we could work collaboratively to identify and address process challenges. While this approach demanded a more sustained commitment, it offered a fuller view of the organisational dynamics, supplementing the insights I gained from Rapid Ethnography. Using both methods provided a multifaceted perspective of the organisations I worked with.

Emmerson (2011) credits ethnography for its remarkable capability to weave together localised and abstract perspectives, facilitating the capture of intricate narratives, thereby deepening the comprehension of social realities within their unique contexts. Contributing to this field, Blomberg (2013) has considerably shaped the use of ethnography within CSCW by introducing foundational methods coupled with both theoretical and pragmatic enhancements. Notably, he advocated for the expansion of 'field site' conceptions to transcend physical office perimeters, further broadening the method's applicability and depth of analysis. My research followed this principle, scrutinising the interactions between individuals, practices, and technologies in their respective settings. The resultant multi-perspective ethnographic lens was instrumental in unravelling the reciprocal relationships between technological evolution and workplace practices within Australian SMEs.

In this sense, *Multi-Site Ethnographic* analysis allowed me the examination of phenomena across multiple locales or settings, as per the definition offered by Marcus (1995). One challenging facet of doing research in small organisations is that SMEs work in isolation from each other, making access difficult or expensive to engage. Additionally, they have widely variable skills and experiences, making observations difficult to generalise. In this challenging

context, multi-site ethnography was helpful in examining the realities that spanned across the numerous organisations involved in my research.

I triangulated these approaches by including *Autoethnography*, which provided a lens through which to view my six-year journey as a consultant experiencing Xero's transformation from a disruptive technology to a mainstream element of software infrastructure. This method of self-observation and reflexive investigation enabled me to track the changes in the perceptions, interactions, and adaptations of disruptive technologies within the Australian SME landscape over an extended period.

By examining these organisations through a multi-site lens, I was better equipped to understand the broader patterns that transcend individual businesses and settings. By blending these three ethnographic perspectives, I was able to tailor a methodological approach that tacks between the broad scope of a longitudinal study and the focused depth of rapid investigations. This approach proved effective in supporting my inquiry as both a researcher and consultant into the process of integrating disruptive technologies into Australian SMEs. In practice, my involvement in this research was characterised by a constant movement that was a by-product of the duality of my role, which oscillated between that of an 'insider' (expert consultant) and an 'outsider' (external researcher). In the next section, I will describe how I managed to put into practice this dual role.

3.3 Navigating the Insider-Outsider Dynamic in Ethnographic Practice

Ethnographic research has transitioned through various paradigms over time. Post World War II marked a prominent shift towards 'interpretive ethnography', where the emphasis

lay heavily on symbols, text, and language. This 'linguistic interpretive turn' has been well documented by figures like Clifford Geertz, who in his seminal work "The Interpretation of Cultures" (1973), delves deep into the nuances of cultural expressions through symbols. Victor Turner, in his exploration of symbols, rituals, and performances in "The Ritual Process: Structure and Anti-Structure" (1969), also stands as a cornerstone of this phase (Mullick et al., 2013).

As ethnographic methodologies have evolved, so has the conversation around the complexities of 'insider' and 'outsider' roles. Yeo and Dopson (2018) explore the intricacies inherent in these roles, especially within the framework of relational ethnography, suggesting that the juxtaposition, rather than a limitation, can add value to the research process. Building on this, Parikh (2020) articulates that the 'insider-outsider' paradigm is less about fixed positions and more about a fluid spectrum. This perspective is supported by Southgate and Shying (2014), who ponder the ethical and methodological dilemmas that researchers grapple with when oscillating between these roles.

Code switching can be used as a tool to assist with navigating the researcher-consultant role dynamic. It is a concept deeply rooted in sociolinguistic and anthropological studies. At its core, code-switching entails the conscious or unconscious switch between linguistic forms, reflecting different aspects of the speaker's identity or context (Gumperz, 1982; Poplack, 1980). Applied metaphorically to the researcher-consultant dynamic, codeswitching allows for the seamless transition between the analytic detachment of a researcher and the engaged pragmatism of a consultant. Such transitions are not merely linguistic; they encompass changes in mindset, approach, and the frameworks used for problem-solving (Myers-Scotton, 1993;

Auer, 1998). By adopting this versatile strategy, professionals can cater to the distinct demands of each role, ensuring that their interactions remain contextually appropriate. For instance, as Heller (2010) and Grosjean (1982) highlight, bilinguals often switch languages to align with the cultural or communicative norms of their audience.

Similarly, oscillating between researcher and consultant roles requires a distinct 'language' or approach, informed by the needs and expectations of the stakeholders involved. The mastery of such code-switching allows for richer and more effective interventions, as one can draw from the strengths of both roles while minimizing potential conflicts or overlaps (Milroy & Muysken, 1995).

Reflecting upon these scholarly contributions, my own ethnographic journey was influenced by these insider-outsider dynamics. Throughout the process, I found myself in constant reflection, discerning the implications of these roles on my research. My research was designed in two parts, each with a distinct focus and degree of involvement. The initial stage was a small, structured scoping study, during which I primarily wore the researcher 'hat'. This phase was more detached, providing me with an opportunity to establish a foundational understanding of the organisation's landscape from a relatively external standpoint. In contrast, the second phase of the study involved a longer, more in-depth exploration. Here, the duality of roles came to the forefront as I concurrently navigated my insider position as a consultant and my outsider perspective as a researcher. The interplay between these dual roles during these phases offered unique insights, contributing to an understanding of the organisational dynamics at play. The specifics of these two phases will be explored in more detail in the following chapter.

During the second phase, I drew on relationships with the 100+ consulting clients I worked with during that period. Each was asked if they would like to be considered as part of the study and 78 verbally consented. During this period, I collected general observations and took personal notes for all of these interactions. Engagements varied from brief individual interactions (1-2 sessions) to extensive, multi-month partnerships (3-6+ months). An initial challenge was the identification of potential long-term clients because most companies were not willing to commit to a 3-6 month project up front because the marketing messaging from cloud providers was so persistent that implementation was ‘fast’. However, as relationships matured, conducting follow-up interviews at three and six-month intervals with long-term clients became viable with certain participating organisations. For each new client, I disclosed my dual role and the intent to use the observations and notes for this study at the onset, specifically during the initial 'needs assessment' meeting.

In order for this role transition to be effective, *code-switching* (Gumperz, 1982; Auer, 1998) was utilised to differentiate between my roles as a consultant and researcher, indicating which role I was assuming in specific situations. Rooted in linguistics and sociology, codeswitching refers to the act of alternating between languages or interaction styles in differing social contexts (Nentwig-Gesemann, 2006). I used it as a mechanism to manage these distinct roles. To make this code-switching even more explicit, I used colour-coded notebooks: a purple notebook denoting my consulting role, and a black one for research notes. The use of these notebooks facilitated a clear distinction between these roles: specific observations relevant to improving systems and processes were recorded in the purple notebook, which were then abstracted and considered from a research perspective within the black notebooks. Any

thoughts, observations and links to literature that emerged during the course of a consulting session were documented in the black notebook but not explored during consulting time. They were then re-examined and further considered outside the consulting time. Specific, time-blocked and identified interviews were also conducted periodically, with all associated notes recorded in the black notebooks. These were specifically reviewed and considered during intensive research blocks one week per month.

An illustration of these dual hats in practice was my year-long collaboration with Southside Architecture, discussed in more detail within Chapter 5. Within certain social contexts, I became part of the team, included in office celebrations and gatherings. At the same time, I remained an outsider without a specific desk, internal email address, or core team. I could float between teams within an organisation that was extremely siloed and accepted equally into each space. This positioning allowed me to move freely among teams, fostering a deeper understanding of each one. Through code-switching, I was able to gain both an 'inside' and 'outside' view, enabling the uncovering of each team's underlying needs and processes.

The metamodernist approach, characterised by an insider-outsider dynamic and facilitated by code-switching, were critical elements of my research design. The symbolic representation of these roles through colour-coded notebooks permitted a seamless transition between them. As a consultant, my commitment was to remain locally relevant and deeply involved in the distinctive work practices of the organisation. In contrast, as a researcher, it was critical to observe and analyse these practices in an abstract form, ensuring the transferability and relevance of my observations across organisational and industry boundaries. This balancing act was a constant presence in my research, anchoring me in both the specific and

the universal. This dual role necessitated the visibility and improvement of my engagement infrastructure, as it aided in striking a delicate balance between the roles I embodied. This duality combining research and practice in SMEs provides a methodological approach to support rigorousness in qualitative work.

3.4 Research Ethics

My study was conducted within the Interaction Design and Human Practice Lab (IDHuP) at the University of Technology Sydney (UTS). From the outset, I was steadfastly guided by the IDHuP's comprehensive ethics protocol 2007-159P, which underwent rigorous evaluation and endorsement from the University's Human Research Ethics Committee (HREC). This approval was subsequently reviewed and confirmed every 3 years by the HREC.

I have only kept data on participants who have given me their informed and signed consent. All raw data that I collected — fieldnotes, interviews, recordings, photographs etc— is available only to me and to my supervisors, who are bound by the same ethics protocol, unless shared with express permission from the participants. Participants were also made aware that their choice was voluntary, and participation could be withdrawn at any time.

Prominent scholars like Blomberg et al. (2003) and Davies & Dwyer (2007), among others, have accentuated the paramountcy of trust and the rigorous ethical dimensions intrinsic to ethnographic research. Aligning with this approach, I went beyond the formal HREC reporting requirements to maintain open and transparent communication with participants,

continually reassuring them of the unwavering integrity underpinning my research methodology.

My methodological approach ensured that data collection was exclusively retained from participants who furnished their informed and unambiguously signed consent. The collected data, encompassing field notes, interviews, recordings, and photographs, remained exclusively accessible to myself and my supervisory committee. All parties were unequivocally committed to adhering to the stringent guidelines of the ethics protocol, signifying our collective allegiance to the sanctity and integrity of academic research.

My research was developed within the University of Technology Sydney's Graduate Research Education Framework (UTS GREF), which integrates faculties, research centres, and coordinated by the Graduate Research School (GRS). The framework's primary objectives are twofold: to foster the progression of knowledge through innovative graduate research and to cultivate graduate research students primed for careers in both academia and industry. The UTS GREF encompasses a diverse panel of expert supervisors, is directed by a comprehensive Graduate Research Study Plan (GRSP), and is segmented into three candidature stages, each with their respective assessments. An annual Review of Progress (ROP) ensures consistent oversight, whilst a blend of mandatory and optional training components deepens the academic foundation. It is paramount that the research strictly adheres to best practice research management.

Culminating in the submission of a final thesis, the UTS GREF fosters a supportive and robust research environment. There are three stages of progress in the thesis journey; Stage 1: Confirmation of Candidature, Stage 2: Confirmation of Advanced Progress, Stage 3:

Confirmation of Readiness to Submit for Examination. Throughout the journey, the Review of Progress (ROP) served as an annual checkpoint across all stages of progress. In collaboration with my supervisory team and the faculty, we undertook a rigorous appraisal of our research direction, ensuring our scholarly pursuits remained aligned with our delineated objectives.

The initial stage, termed 'Confirmation of Candidature', was both challenging and rewarding. A comprehensive blend of oral and written evaluations was complemented by essential modules aimed at embedding ethical considerations into the research. The Research Integrity Module for HDR students and the Respect. Now. Always module on Consent Matters were cornerstones during this period. Each evaluative outcome was meticulously catalogued in Research Master, setting a robust foundation for the ensuing stages.

During the 'Confirmation of Advanced Progress', the second stage, the emphasis pivoted to tangible research advancements. Immersed in refining data collection methodologies, I also secured necessary ethics approvals, building upon the insights from the prior stage. Key deliverables included the submission of preliminary research artefacts, such as nascent thesis chapters or draft manuscripts. Where applicable, conference presentations were aligned with faculty guidelines, ensuring their academic rigour.

The culmination of this journey was the 'Confirmation of Readiness to Submit for Examination'. This stage epitomised rigorous academic endeavour, capturing extensive data collection, in-depth analyses, scholarly publications, and the finalisation of my thesis draft. It concluded with an exhaustive written and oral presentation, each underscoring the novel and significant facets of my research contributions. Throughout the process, the sanctity of

participant data remained paramount. My commitment to ensuring confidentiality, upholding anonymity, and implementing rigorous data protection measures was reiterated at regular intervals.

3.5 Chapter Summary

This chapter has provided an in-depth account of the metamodernist and ethnographic approach adopted for this research, exploring the integration of Xero, a disruptive technology, within Australian SMEs. This lens allowed me to transition from modernism to postmodernism, and vice versa, oscillating between the specific and the universal in order to explore the digital transformation phenomena within these entities. The blend with the rapid, intensive and auto ethnographic approaches, with its capacity to view phenomena from both a localised and abstract lens, provided a means for capturing complexity while striving for coherence.

In essence, the metamodernist epistemological lens complemented with the rigorousness of ethnographic methodology, has shaped my perspective for understanding and interpreting the dynamics within small to medium-sized enterprises (SMEs) in the current digital era. In this scenario, Rapid Ethnography was beneficial to accelerate data gathering and analysis without compromising the depth and reliability of traditional ethnographic techniques; while Multi-Site Ethnography enabled the examination of phenomena across multiple locales or settings. Given that this study relies on my personal experience as a software consultant, Autoethnography provided a lens through which to view my six-year journey experiencing Xero's transformation from a disruptive technology to a mainstream element of software infrastructure.

To effectively carry out this research project as both a researcher and a consultant, I relied on Turner's (2015) examination of the 'insider/outsider' dilemma in ethnographic research, balancing these roles by 'code-switching'. This balancing act was a constant presence in my research, anchoring me in both the specific and the universal. In the next chapter, **Research Context**, I will describe in more detail how I conducted my research, focusing especially on my ethnographic journey.

Chapter 4: Research Context

This research project was divided into two main phases. Phase one was an exploratory pilot study which comprised a series of targeted interviews conducted within a 3-month window with the objective of identifying common themes in daily work practices in SMEs. The specific methods and insights from Phase One were presented and published in OzCHI prior to the development of Phase Two (Gisch and Robertson, 2013). Phase Two was a follow-up of this stage; it was built from the observations gathered from Phase One as a starting point to the main ethnographic research. The draft discussions have been presented to UX Australia 2022 and will be presented in full at the Australian Anthropology Society Conference 2023.

Within this chapter, I will first describe in section 4.1 the approach taken in Phase One, the scoping study that sets the foundations for Phase Two. Then, in section 4.2, I will delve into the methods used in the ethnographic study (Phase Two), which is the main focus of this research project. Lastly, in section 4.3 I will characterize some particular industry contexts (in relation to the implementation of *Clouded*, an add-on for the Xero ecosystem) that serve as illustrations and examples of the broader research context. The main findings that emerged from this research will be presented and discussed in the following Chapters, 5 and 6.

Data collection and analysis were guided by an 'observe-analyse-amend' approach that echoes Orlikowski's (1993) iterative methodology and Kotter's approach to change management. This blend intertwines academic research and practical application, being responsive and adaptive to the shifting contexts of the study. In the observation stage, the existing practices and context were evaluated. The analysis stage, meanwhile, sought to

identify patterns and challenges to inform a vision for future states where Xero becomes an integrated element of the organisational infrastructure. Finally, the amend stage applied strategies for change, regularly assessing their effectiveness based on principles of change management.

4.1 Phase One: Exploratory Study

The study utilised a purposive sampling technique, recruiting participants across Australia who had a direct connection with cloud productivity tools, either as end-users or as intermediaries linking businesses and technology providers. The pool included business owners, IT professionals, bookkeepers, and workers from a range of industries, varying in their geographical locations. Employing semi-structured interviews, qualitative data was extracted about their experiences with cloud technology, focusing on its interaction with the National Broadband Network (NBN) – an Australian Government initiative improving internet accessibility nationwide.

The initial stage illuminated significant differences in relation to access and equity and the impact of the NBN between urban and regional participants, suggesting a disconnect between those who don't frequently experience access and equity issues and those who do. Urban participants, often accustomed to quality DSL or cable connections, saw the NBN as a benefit primarily for those in areas with poor internet connectivity. For instance, Steve, an employee at a global IT infrastructure company, noted that those with existing high-speed internet services might not notice a significant difference with the introduction of the NBN. However, he acknowledged that the NBN could enhance the reliability and speed of internet

access in areas currently grappling with low-speed DSL connections, thereby facilitating more efficient use of cloud services.

Conversely, regional participants were more intimately acquainted with network variability and regarded access as a critical concern. For example, Melissa, a participant from regional NSW, shared her experiences of navigating variable access conditions to continue using cloud tools in her business operations. Irene, a bookkeeper who relocated to Sydney from a regional NSW town, highlighted the stark disparities in internet access between urban and regional areas.

Insights from Phase One suggest that even with the full deployment of the NBN, substantial differences in bandwidth and consistency would still exist between urban and minor regional or rural areas. This inconsistency could negatively impact the usability of cloud-based technology. In assessing participants' perceptions of how cloud technology might influence future work practices, I found divergent views, reflecting the common utopian/dystopian narrative often present in teleworking perspectives.

Some participants held a very positive outlook on the potential of cloud technology. For instance, Tom, an intermediary from Brisbane, foresaw a future in which cloud technology's attributes could substantially reform the business landscape. In his words: *"With the cloud, we're unlocking limitless possibilities. It's not just about storing and sharing, but streamlining operations, boosting collaboration, and saving costs".*

In contrast, other participants expressed fears about the potential pitfalls of hastily adopting cloud technology. Concerns regarding data security, loss of ownership, and scepticism over technology's real impact on productivity were common. Marcia, a bookkeeper from regional NSW, encapsulated this sentiment by stating,

> *"My clients are cautious, and rightly so. They worry about what happens if the cloud fails, if their data gets hacked, or if the system just becomes too complicated to manage. There's a human element to all this tech, and sometimes, I think we forget that".*

In between these polarised views, we found a group of participants who exhibited what we term a 'techno-pragmatic' outlook. They focused on the practicality and appropriateness of technology rather than its potential for utopian or dystopian outcomes. These techno pragmatists were open to adopting new tools if they provided clear, demonstrable benefits over existing processes. As Marcia explained:

> *I'm not against progress, but it has to make sense for the business. If the tool makes us more efficient and doesn't introduce new headaches, I'm all for it.*

These aspects both validated and deepened our understanding of the disruption experienced by small businesses due to cloud technologies.

The Phase One insights directly informed the research question for the comprehensive ethnographic study that followed: 'What happens within small businesses when a product is introduced that challenges long-term work practice habits?' This question echoes the real-world experiences faced by small business owners, whom I encountered in my role as a cloud software change management consultant. The promises of 'ease of use' from software

companies often clashed with the practical realities of implementing these technologies, especially when they inadvertently disrupted established business practices.

The insights captured during Phase One set the foundations for Phase Two, where a comprehensive ethnographic study was conducted in order to delve deeper into the observed phenomena and explore its implications within diverse organisational contexts.

4.2 Phase Two: Ethnographic Study

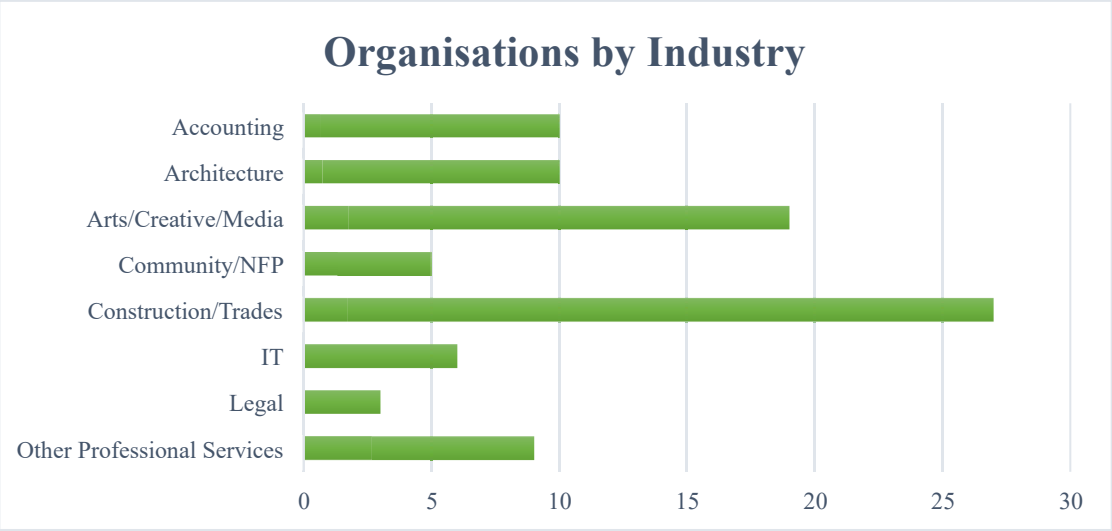
The second phase of my research involved the dual role where I operated both as a consultant and researcher outlined in the previous section. As a consultant, I engaged with a diversity of organisations across various industries. My role was multifaceted, from customising digital tools to fit local work practices, to overseeing the deployment and training of cloud software; specifically, the implementation process of *Clouded* (an add-on product in the Xero ecosystem). To handle the duality of this dynamic role, I adopted an approach that tacked between insider and outsider roles (discussed in Chapter 3, Section 3.3). The use of colour-coded notebooks and code-switching, the processes of modifying speech and behaviour patterns based on social context further supported this process.

In this phase, I invited all the organisations I consulted for to participate in the study. The recruitment process was organic and intertwined with my practical role as a consultant. Two types of engagements unfolded – a high volume of short 'outsider' engagements where I was more of an outsider, and a small subset of deeper 'insider' engagements where I was a

significant participant. These were not intentionally crafted at the outset but emerged organically as my relationships with the organisations evolved.

The participating organisations ranged across various industries - Accounting, Architecture, Arts/Creative/Media, Community/NFP, Construction/Trades, IT, Legal, and Other Professional Services - and sizes. A summary of the types of organisations I engaged with is presented in Figure 4.1.

Figure 4.1: All Organisations by Industry



The extensive range in organisation size and industry types cultivated a fertile ground for a comprehensive and multifaceted investigation. Factors such as industry sector, geographic location—whether urban, regional, or remote—, organisational size, pre-existing coordination mechanisms, changes in these mechanisms during the engagement, and the temporal context of the engagements all played crucial roles in shaping the exploration.

The combination of short, rapid engagements and longer intensive engagements has provided very rich data, but can be challenging to present in a linear narrative. In the following section, I will endeavour to paint a picture of the variation and dynamics during my research journey, considering the ethical dimensions of data management alongside the iterative analytical approach adopted in this phase.

4.2.1 Ethical Considerations and Data Management

Phase Two marked the most intensive period of my research journey in terms of both data volume and richness. I was careful to ensure I maintained accurate and secure information management practices to preserve the quality and rigor of the data. Primary data were derived from unstructured interviews, ethnography, and artefact analysis; participants provided verbal consent for the unstructured interviews and participant observations after a comprehensive explanation of the research purpose, methods, intended data use, and measures for ensuring privacy and confidentiality. Colour-coded field notes proved vital for effective data management and participant identity protection. All data were securely stored, and regular backups were maintained.

Data was stored as text files to facilitate easy searching and categorisation during the analysis phase. This data included transcriptions, field notes, and document analyses. The overarching goal was to encapsulate the depth of human-cloud technology interactions. Data was deemed valuable if it illuminated my understanding of how organisations and individuals perceive, adapt to, and influence digital technologies in their work.

Drawing from Star's (2002) emphasis on the significance of on-ground interactions, participant observation became instrumental in revealing discrepancies in work practices, thereby highlighting rich avenues for further research. This observational approach synergised well with consulting practices, which further illuminated the tangible effects of technological disruption across a spectrum of industries. From the unstructured interviews, three initial broad themes emerged: the friction point of timesheets, the necessity for differential information presentation to varied audiences, and the disparity between rigid formal processes and actual practice.

These broader themes were enriched by concepts from the literature, particularly boundary objects, infrastructure, and articulation work. These shared tools, artefacts, or concepts facilitated coordination among different work groups. Longer-term intensive engagements allowed for a thorough exploration of these concepts. I was involved in creating locally-tailored digital tools and work processes, or boundary objects, and observed their transformation over time. This process challenged implicit norms, views and perceptions governing everyday practices, shedding light on how organisations craft their unique 'infrastructures'—the foundational systems that bolster their operation and growth.

Having established the research setting for Phase Two, in the next subsection I will discuss the approach to analysis of the gathered data.

4.2.2 Iterative Approach to Analysis

To delve deeper into the initial broader themes, a semi-structured interview format was designed. A subset of six individuals was invited for these semi-structured, recorded interviews

and were followed up at three- and six-month implementation stages. The interview transcripts were thematically coded and the observations and implications were discussed with the participants within the subsequent prototyping activities.

Participants were selected through opportunistic sampling, an informal recruitment process based on the factors of willingness, availability, and engagement to participate in the study as it is being conducted. This method is not intended as a representative sample in the way that quantitative studies are designed, rather, it takes advantage of serendipitous timing and appropriate content for the topic of exploration (Honigmann, 2003).

The project approach was iterative in nature, meaning that I was consistently immersed in the field and data, facilitating real-time validation of process and results through continual modifications of the consulting approach. The iterative analysis was characterised by two complementary phases, one being inductive and, the other, reflective (deductive). This was reflected in my engagements with the participants; as I did a series of inductive engagements these were then followed by 1-2 reflective ones, which in turn led to more inductive ones.

In the inductive mode of engagement, which marked my initial interactions, I took the role of an 'outsider', observing and documenting the experiences and practices of organisations and individuals. The intent was to decipher the underlying structures, patterns, and rationales shaping these practices. **Figure 4.2** provides some characteristics from these participants to provide some context for the quotes and observations discussed in Chapter 5.

As the process evolved, I shifted towards a more reflective mode of engagement, often taking more of the 'insider' role. Here, my interactions became more active and collaborative

as I worked alongside participants to prototype tools and processes, engaged in problem-solving, and tested emergent concepts. These engagements offered a platform for my iterative and reflective interaction with the theoretical literature.

Figure 4.2: Deeper Ethnographic Engagements

Company	Industry	Size	Local Geographic Area	Engagement Style
Edgy Designs	Creative	Small	Inner Sydney	Inductive
Far North Building	Construction	Small	Northern NSW	Inductive
Irene's Bookkeeping	Professional Services	Sole Trader	Sydney and Regional NSW	Inductive
Journalist	Journalist	Sole Trader	Sydney	Inductive
Marla	Professional Services	Sole Trader	Sydney	Inductive
MidWest Accounting	Professional Services	Medium	Sydney	Inductive
NSW Gov	Non-Profit	Medium	Sydney	Inductive
Outsourced HR	Professional Services	Small	Inner Sydney	Inductive
Oversight Accounting	Professional Services	Sole Trader	Sydney and Regional NSW	Inductive
Sound Haven	Creative	Small	Sydney	Inductive
Southwest Fabricators	Construction	Small	Sydney	Inductive

Stacked Media	Creative	Medium	Sydney, Singapore	Inductive
Bayside Legal	Legal	Medium	Melbourne	Reflective
Eastern Legal	Legal	Small	Melbourne	Reflective
Far West Architecture	Architecture	Small	Adelaide	Reflective
Greener Construction	Construction	Medium	Melbourne, Sydney, Brisbane	Reflective
Southside Architecture	Architecture	Medium	Melbourne, Sydney, Brisbane	Reflective

This oscillation between inductive and reflective engagements embodied my research journey. As I oscillated between observing the specificities (inductive) and reflecting on and analysing the observations (reflective), my understanding of the key concepts and their applicability was continuously refined and improved. This cyclic process not only underlined the dynamic nature of my research but also enhanced my understanding of the challenges and opportunities inherent in the use of digital tools across a variety of organisational contexts. This iterative oscillation between inductive and reflective engagements allowed me to effectively consolidate and contextualise findings from both research phases.

In the next and final section, I will delve into specific industry examples, offering an illustrative picture of the main characteristics and challenges I encountered during my ethnographic journey.

4.3 Deeper Ethnographies and Representative Contexts

Within the set of all participating organisations, there were a sub-set of more engaged organisations where I conducted longer, deeper and intensive multisite ethnography supplemented by interviews. The full list of participants by context type is provided in Appendix 1. In this section, I will describe the contexts that were particularly representative for connecting work practice experience with concepts from the literature. These contexts were Building and Construction, Legal, and Architecture, and serve as examples for presenting the characteristics of the research context. The data collected during my research journey was drawn from these contexts as well as others, and will be further analysed and explored in Chapters 5 and 6.

4.3.1 Building and Construction

The construction industry is made up of 'builders' who project manage the construction trades and individual tradespeople who specialise in specific areas. Many building companies have a construction trade specialty (e.g., carpentry) and subcontract the remaining work. Due to the focus on construction project management, builders experience similar tendencies as architects regarding quoting and invoicing, with an added emphasis on:

- Managing a range of tradespeople as independent subcontractors who rely heavily on physical paper and can be unreliable with receipts and paperwork;
- An industry in which loose estimation at the front end and tighter controls at procurement are the norms (e.g., quoting a house based on square metre rather than a count of timber and nails);

- The fluidity between ‘labour’ and ‘materials’ elements, with a stronger emphasis on total price per phase.

While some builders were able to make *Clouded* work, many found it too different from their industry practices and impractical to use long-term. Ultimately, these builders went back to their customised spreadsheet approach.

Far North Construction (*pseudonym*) designs and constructs commercial and residential buildings in regional New South Wales. It is a family business, with two directors and two accounts people who coordinate all the projects from a small office. They have a small core team of construction staff and rely on a combination of internal staff and external subcontractors for the design and build components. When I encountered them in 2015, they had already been trying to use *Clouded* for about one year. Because of their regional location, all our communication was through email and Skype; I never met them in person or saw their office. Instead, I was provided access to their *Clouded* account and we emailed working documents back and forth. We also used TeamViewer to investigate information together in real time.

All my interactions were with the two accounts people, Tina and Tamara *(pseudonym)*. They used *Clouded* because their accountant preferred Xero and pressured them to switch accounting platforms. They proactively set the system up and spent a great deal of time learning what it could do and thinking about workarounds they could use. They engaged me as a consultant to assist them to refine the set-up process and discover ways to reduce the articulation work that had resulted from the implementation. It was clear that the system was

not a great fit for them. We discussed alternatives, but there were minimal options in the Xero ecosystem and the market at the time that fixed the problems they were having.

Southwest Fabricators ***(pseudonym)*** were the largest company I dealt with. They operate across Australia and incorporate the entire supply chain, including design, manufacture and construction within the retail industry. There are three office locations, with 'head office' holding very tight control of decision-making and process decisions. During the initial implementation planning meeting, the idea of 'collaborative design' was deemed inefficient and dangerous (i.e., disruptive to the existing internal hierarchy). Instead, there was a strong focus on visibility for control and 'performance management'. Even in this environment that was exceptionally financially driven, it was common practice to 'guesstimate' at the quoting stage based on a combination of prior experience and client price sensitivity. Ultimately, they decided it could not handle their needs because it was too flat (i.e., no subtotals) and too literal at the time of quoting. I included them in the analysis because it was interesting that the issues with the system being too rigid were not just a matter of builder companies being too small and family-run.

4.3.2 Legal

According to the study participants, lawyers are constrained by the financial reporting requirements in their industry. These constraints include:

- Strict legal reporting requirements for displaying certain information, such as GST, in a transparent and standardised format;

- High billable rates, leading to a tendency towards invoicing based on billable minutes and ‘productivity’ (defined as billable time);
- Client expectations and legal requirements to display specific time sheet information and details on invoices.

Legal firms had mixed results, primarily related more to internal organisational preferences for time sheet entry rather than specific technical issues. Because their industry relies heavily on billing by the minute, the experience of continuously entering small amounts of time takes on increased importance.

Eastern Legal (*pseudonym*) is a small start-up firm with two proactive legal practitioners. Coming from a large firm, they have strong expectations about the kind of information that should be available, and a solid understanding of the sorts of systems and processes needed to keep work organised. However, they want to balance this systemisation with the benefits of being small, nimble and not overburdened with unnecessary bureaucracy. Because they both come from an organised background and their industry is very standardised, they were quickly able to describe their requirements for timesheet categories, client reports and custom invoice templates. Unfortunately, many of the simple requests they made were frustratingly elusive (e.g., the system has a field available to display a subtotal of labour pricing before GST, but not the GST subtotal).

4.3.3 Architecture

With my first *Clouded* implementation in an architecture company, I immediately noticed some conflicts between the way the software was designed and how this industry organised their projects. According to the study participants, for example, within architecture there are usually:

- Externally driven formats for documentation (e.g., quote and invoice layouts and reporting requirements);
- Highly structured project scopes with deliverables linked directly to payment structures that can change significantly based on client change requests or unforeseen circumstances;
- A fluid workforce (jobs are quoted based on internal skills, but various parts can be subcontracted depending on resources at very short notice);
- A common view of how projects should be organised (architectural community of practice).

I worked with multiple architecture firms through the course of this project. Some were very short engagements to provide some simple advice and tweaks, while others were extended. Within Chapter 5, I drew primarily from the one participant organisation, Southside Architecture. I was heavily involved as a participant–observer for three years and worked closely with their accounts and management staff. In Chapter 5, I supplement and contrast them with examples from other architectural firms as a means of validating my observations. I also include a second firm, Bayside Architects, as the closest comparison.

Southside Architecture (*pseudonym*) is a large architecture practice with offices in two states, focused primarily on large-scale commercial projects. They employ internal architects and draw from a pool of sub-consultant architects on a case-by-case basis. For many years, they relied on individual architects to develop their own planning documents to manage progress and communicate with clients. Inevitably, documentation varied considerably between architects and projects. Each month, a director met with the project managers for a summary of work completed, activities outstanding and the billing status. He then manually collated this information into a spreadsheet on his computer, which took about one week to compile and format to present to the senior management team.

They engaged an external business consulting firm to provide strategic advice, who migrated them from a desktop accounting package to Xero cloud accounting. The shift to a cloud accounting platform caused the director to source a compatible project management solution. After an extensive search, they settled on *Clouded* because it integrated well with the Xero accounting platform. They attempted to set the system up themselves with the assumption that they could improve the accounting and managerial aspects of the business and allow the architects to continue to manage their work in the same way as before. They wanted to introduce the new system without disrupting the daily work of architectural design. While the architects managing projects were happy the system had not caused too many disruptions, the accounts team and senior managers continued to struggle with reporting and failed to gain any real benefit from the new system. Just as they were on the verge of giving up on *Clouded*, they decided to contact my consulting firm for some training assistance to try and determine where they went wrong.

Far West Architects (*pseudonym*) is a mid-sized architectural practice with a small core set of architects, a dedicated project manager and a director. At the time of the first interview, they were evaluating *Clouded* as an appropriate fit for their business. They were particularly interested in its potential for scheduling and capacity planning (i.e., ensuring enough people for the workload at particular times of the year). We discussed the benefits and shortcomings specific to their industry and they decided to proceed with using the software due to the limited options available within the Xero ecosystem. We designed the implementation to incorporate the existing project management spreadsheet because they had matrix-style projects similar to Southside Architecture, but on a smaller scale.

They have an external bookkeeper who was not present in the initial meetings. I explained that she would need to be included to ensure she had a good understanding of the system and was confident in its use. They assured me that she would be included at a later date. Based on experiences with other organisations, I flagged that it would be critical to the overall success if we obtained stakeholder contributions and analysis from beginning to end (i.e., sales, project management and invoicing) to have the smoothest implementation. I did eventually have a session with her. She was helpful and supportive but spoke a great deal about her fear of working with a new system and a lack of trust in the unknown. She tended to want to run two systems in parallel for an extended period and I could immediately observe that there was a potential for the new system to be underused due to a lack of trust and understanding. They have since managed to use *Clouded* reasonably effectively.

However, they have relied heavily on the project manager to translate information from the director into the quoting section before retranslating that information from the system into

the spreadsheet for the architects. On top of this, they have had to ensure the information is clear and easy for the bookkeeper.

4.4 Chapter Summary

Throughout the course of this research there was a continuous interplay between inductive and deductive analysis and the evolution of the implementation and change management processes. The iterative nature of the study allowed for the frequent testing and refining of ideas, yielding real-time validation and deeper insights into organisational norms and practices. In line with Susan Leigh Star's observation of studying 'boring things', this approach illuminated the seemingly mundane, yet integral, elements of everyday work practices that often go unnoticed.

The iterative nature of my research involved continually oscillating between local specifics and abstract conceptualisations. Through two phases of study—initial broad investigation in Phase One and a deeper, more focused exploration in Phase Two—my comprehension of theoretical concepts (such as infrastructure, boundary objects and articulation work) and their applicability, improved. This constant cycle of observation, reflection, and inductive investigation facilitated the understanding of the core research and informed the refinement of my research question.

The characteristics and patterns I observed during my research were not confined to specific industries, rather, they spanned across all sectors, revealing broader, cross-industry themes. Consequently, I have opted not to present the results of this thesis as industry specific conclusions. Instead, I utilise particular contexts serving as distinctive and illustrative examples

to reflect the broader observations gleaned from participants across various industries. This approach allows me to capture and convey the universal relevance and applicability of these themes, transcending industry boundaries. The blended approach of inductive and reflective engagements, and the interplay between theoretical understanding and empirical experience highlighted the dynamic nature of my research journey and enhanced my understanding of the multifaceted challenges and opportunities inherent in the deployment of digital tools across diverse organisational contexts. The results of this iterative and reflective analysis will be discussed in detail in the following chapter, **Research Insights**.

Chapter 5: Research Insights

In a shift from the formative stages of this study into the insights and discussions, I will briefly revisit the journey thus far. My research commenced in 2014 during two major shifts occurring within the small business technology landscape in Australia; one being the improvement of the physical network access across the country through the implementation of the National Broadband Network (NBN), while the other was related to an increase in cloud technology software options aimed at the small business market. This technological landscape led to me to the main research question presented in this thesis, '**What happens within small businesses when a product is introduced that challenges long-term work practice habits?**'

With this sociotechnical background in mind, I delved into how technology interfaces with the human experience, both on individual and organisational levels; examining how diverse elements like boundary objects and articulation work influence work practice. From an organisational infrastructure perspective, my research aims to shed light on a specific technological shift: the migration from a combination of traditional spreadsheets, paper-based forms and whiteboards to newer cloud-based project management software, which were considered socially and technically disruptive at the time of my research.

As organisations transition from analogue instruments like spreadsheets and whiteboards to digital cloud-based platforms, the design and functionality of software tools play a role in moulding work practices. In today's shifting workspace dynamics businesses can be identified as much as 'shoppers' as they are 'tailors' of technology (Robertson, 1998). SMEs endeavour to choose optimal off-the-shelf software ('shopping') while simultaneously adapting and personalising these tools to resonate with specific operational requirements ('tailoring').

The balance between 'shopping' and 'tailoring' accentuates that technology adoption in contemporary workplaces is not confined to mere selection ('shopping'), but extends to its adaptation, capturing the peculiarities of its operational context ('tailoring').

Using Xero as a platform exemplifying the synthesis between 'shopping' and 'tailoring' -specifically within the implementation of *Clouded*, an add-on for the Xero ecosystem software-, my research aims to illuminate the flexible and customisable nature of such software tailored for the specific needs of SMEs. Xero serves as a testament to the potential of participatory practices to enhance the processes of technological assimilation and integration; particularly as it emphasises on harmonising prevailing social and organisational matrices.

With ethnography as my main methodology choice, in this chapter I will explore the practices of workplaces across industries within Australian SMEs, delving into the multifaceted aspects, challenges, and observations derived from my experience implementing *Clouded*. In this context, four dimensions prominently emerge as findings of my ethnographic and consulting experience: *System Functionality and Design Frictions*, *Interface & Interaction Design, Digital Integration, and Technical and Socio-Political Access*. Within sections 5.1 to 5.4, I will analyse the insights derived from these dimensions following a change management logic, namely, describing work processes before, during, and after the implementation of a new productivity tool such as *Clouded*. From Section 5.5, I will explore the aspects that were persistent and constant along the entirety of the process. From there, I will turn to a broader discussion of implications and future research in Chapter 6.

5.1 Design Challenges: Frictions in System Functionality

In this section I will explore in more detail the observations I gathered from my ethnographic research regarding the impacts that functional design has on user engagement, shaping the efficiency of work processes. The analysis presented in the next pages will follow the observations I made before, during, and after the implementation of *Clouded*.

Functional Design, as detailed in Chapter 2 (section 2.5), explores the subtleties of how user data fields in the software are designated and delineated for data input, which resonates with Star's (1991; 1996) observations, highlighting the ripple effects stemming from categorising and classifying information. Additionally, the system's characteristics, including its complexity and usability, become core software and interaction design choices.

Within the context of the implementation of *Clouded*, some specific software design choices impacted users' practices, especially when there were variances between the established workflows of industries and the underlying assumptions of the software (Gisch and Robertson, 2013; Bowker and Star, 1999).

While relevant across all participant groups, there is a particularly clear example in the experiences of Southside Architecture, Far North Construction, and Far West Architecture during their implementation of *Clouded*. Their journeys elucidate the processes involved when the specificities of an industry's workflow collide with software design. The exploration into the specific challenges faced by these example organisations underscores the broader implications of software design assumptions.

5.1.1 Before Implementation: Reliance on Spreadsheet Customisability

Participants from the architecture and construction domains described a fluidity between internal and external labour dynamics. Companies commonly employ a mix of inhouse staff such as senior and junior architects, project managers, and drafters. However, due to external factors, unpredictable peaks and troughs in business can occur, such as sudden shifts in interest rates or material prices, leading to multiple projects either commencing simultaneously or being put on hold. To manage this uncertainty, companies traditionally operated on a hybrid capacity model. Here, they maintained a core internal team to meet standard deliverables and relied on external subcontractors during busier periods. This meant that functions like drafting could be undertaken by a blend of internal staff and contractors, depending on the situation.

Before the adoption of *Clouded*, these firms utilised spreadsheets to manage their budgets. The appeal of spreadsheets lay in their customisability. The lack of intrinsic design constraints allows users to structure their data flexibly based on the project's demands. **Figure 5.1** provides an abstract and simplified view of how pricing is derived for design and construction projects. It has been amalgamated from various spreadsheet formats used by multiple participants to demonstrate the common elements. In discussions with participants, I described the key elements as using a ‘matrix’ approach, which allows project managers to look at summaries across phases and/or between elements.

Figure 5.1: A Construction Project Cost 'Matrix'

Phase 1: **Concept Design**	**Phase 2:** **Schematic Design**	**Phase 3:** **Design Development**	**Phase 4:** **Construction**
Fees • Internal Staff • **External Contractors** Costs • Materials • Other Non-Labour	Fees • Internal Staff • External Contractors Costs • Materials • Other Non-Labour	Fees • Internal Staff • External Contractors Costs • Materials • Other Non-Labour	Fees • Internal Staff • External Contractors Costs • Materials • Other Non-Labour

When presented to clients and assessed from a profitability reporting perspective, the Internal and Contractor Fees were typically averaged or combined in a way that reflected assumptions about the estimated proportion between each domain. There was a recognition of the potential variability, however, and the project cost variations were typically calculated on that combined figure (e.g., Fees).

While the primary characteristic of the "before implementation" stage was the adaptability and familiarity of spreadsheet-based systems in accommodating the needs of architecture and construction firms, the following subsection will describe the practical effects of adopting software such as *Clouded*.

5.1.2 During and After Implementation: Navigating Conflicts Between Software Design and Industry Standards

The transition to *Clouded* brought to the fore a design limitation that was not congruent common practice and assumptions within the industry context. *Clouded*'s distinction between Fees (internal labour) and Costs (all other items) posed a data entry and management challenge. Two main design gaps in *Clouded* create notable friction: on one hand, the inability to represent labour fluidity; on the other, the absence of a matrix-style pricing framework. In contrast to the typical 'matrix' style project costing model, *Clouded* only has the capacity to develop a 'flat' structure (i.e. a list), which does not easily allow for the grouping of components (see **Figure 5.2**).

This flat design is not just at the visual interaction level, it is hard coded into the data collection, storage and analysis level. There is no way, within the system, to group and subtotal the common items (e.g., all Phase 1 Fees and Costs). These groupings, commonly used in the client Fee Schedules (e.g., 20% of Phase 1 on Initiation) have to be manually reconstructed, usually in the original spreadsheet format due to the familiarity. The project management software, in these scenarios, is not effectively used for project management, it becomes a simple timesheet tracking tool, supplemented by all the preexisting tools and processes. Essentially, nothing is removed, there is just an additional piece of articulation added on top.

Figure 5.2: A Construction Project with 'Flat' Pricing Calculations

Fees (internal labour only)
• Phase 1: Concept Design Internal Fees • Phase 2: Schematic Design Internal Fees • Phase 3: Design Development Internal Fees • Phase 4: Construction Internal Fees
Costs (all other items)
• Phase 1: Concept Design External Contractor Fees • Phase 2: Schematic Design External Contractor Fees • Phase 3: Schematic Design External Contractor Fees • Phase 4: Concept Design External Contractor Fees • Phase 1: Concept Design Materials • Phase 1: Concept Design Other Non-Labour • Phase 2: Schematic Design Materials • Phase 2: Schematic Design Other Non-Labour • Phase 3: Design Development Materials • Phase 3: Design Development Other Non-Labour • Phase 4: Construction Materials • Phase 4: Construction Other Non-Labour

During the implementation process, I observed that a disconnect between *Clouded's* rigid structure and design assumptions contrasted with the industry's fluid approach to labour;

highlighting the importance of flexibility in software design, especially for industries with specific operational workflows. Tamara from Far North Construction described how these assumptions affected their work practice, common in the construction industry, of providing total figures for fixed price portions as well as 'provisional sums', which are Estimated Costs for possible work that are not included in a fixed price contract:

> *I thought 'wouldn't it be great if I could just put the job manager'. For the job manager, we can't put it on a quote template… You know, all of that information should be done on the quote so I don't have to worry about changing something – The less I have to edit in Word, if that makes sense... So, something like that would be ease of access* **(see Figure 5.2).**

Despite being a common approach to project costing, *Clouded* does not have a concept of partially fixed price projects. This again gets to the assumptions that a project will either be fixed price (rigid) or based on Time and Materials (fluid), but it cannot be both.

To summarise, my observations during and after the implementation of Clouded highlights that the design within the software system can create friction for users accustomed to flexible spreadsheet-based tools. Prior to the adoption of *Clouded,* the use of traditional spreadsheet tools enabled users to structure project data flexibly according to specific project requirements. This customizability extended to budget management, where users could tailor their spreadsheets to reflect project costs, such as internal and external fees, materials, and other expenses. However, the introduction of *Clouded's* flat pricing structure and its lack to group and subtotal common items as in traditional matrix-style models, made it difficult for users to organize and manage project costs in a manner consistent with their established practices, making its use more rigid for user workflows.

Furthermore, the struggles faced by builders and architects in presenting project financials with its effects on categorising and classifying information were not just about presenting financial data, but ensuring it aligned with client expectations, particularly in line with contract pricing and schedule of fees. This observation led me to realize that users' experience is not only moulded by system functionality (Star, 1996), but also by their emotions, predispositions, and the context of their interaction (Forlizzi & Battarbee, 2004). This realization prompted me to take into consideration principles from UX into my analysis, especially those emphasising empathy and usability. Many of the complications I identified in functional design also directly impacted Interface & Interaction Design, which I will address in the next section.

5.2 Interface & Interaction Design: Transitioning from Analogue to Digital Workflows

Leveraging my understanding of UX, in this section I will unpack the observations I made before, during, and after the implementation of *Clouded* that were associated to Interface & Interaction Design, areas central to understanding user experience (UX). The exploration of user-centred design accentuates the importance of aligning with user needs on levels such as user engagement, accessibility, and efficiency to avoid the pitfalls of designs that overlook the user's perspective. In this sense, UX principles can illuminate a roadmap that spans from comprehending the multi-dimensional nature of user engagement -ranging from mood to expectations- to designing interactions beyond mere screen interfaces (Hassenzahl and Tractinsky, 2006).

5.2.1 Before Implementation: Presence of Whiteboards as Analogue Dashboards

One of the common reasons for implementing a cloud project management solution was a desire to 'do away with paper' and to provide a centralised digital dashboard. Nevertheless, *whiteboards* and *accumulations of papers*, reminiscent of Bannon & Bødker's (1997) notion of Common Information Spaces (CIS), were deeply ingrained in the daily work practices of many participant organisations. For many employers and employees, these tools offered comfort and familiarity, serving as reliable backups should newer technological systems falter. Much like the communal nature of CIS, the whiteboards I observed -usually stationed in communal areas and complemented by physical files- symbolised a shared space of information dissemination and collaboration. While their active use might have reduced over time, their symbolic presence stood as a testament to the perceived reliability and trustworthiness of traditional modes.

The hesitation in transitioning fully to technology mirrored concerns about shared objects losing their context in the realm of CIS (Ackerman et al., 2013). With a marked push by business managers and owners to pivot from these 'analogue' systems to digitised data management solutions, the underlying impetus wasn't just about augmenting operational efficiency. There was a distinct ambition to modernise, to align with the ceaseless forward march of technology. This transition journey, however, invoked a need to reconcile technology, trust, and longstanding methodologies.

Before implementing *Clouded*, many participating organisations used *whiteboards* as a type of analogue dashboard, usually in a prominent communal space, supplemented by physical

paper files. This practice was present nearly in every company as one of the primary ways to share progress updates and workload. Whiteboards were particularly common in companies that described themselves as ‘very busy’. These were usually organisations that had a high volume of small pieces of work of which to keep track rather than longer, more intensive projects. Typically, the intention was for people to provide updates on an ongoing basis to provide managers with a quick view of what was happening across the business.

Organisations with a more structured approach to a whiteboard system, such as Greener Construction, only allowed select people to make changes to it. As a result, they became information gatekeepers and a significant proportion of their time was spent on maintaining the whiteboards, despite managers often dismissing the activity as peripheral. In practice, typically only a few key projects received frequent updates, with others updated in more ad hoc time frames depending on staff willingness and availability to provide updates.

Consequently, most whiteboards were 10 to 20 days out of date at any given time. In some cases, whiteboards sat with projects that were months out of date or were left as relics from a former time when someone made a push for organisation and transparency that was not adopted by the broader organisation.

Figure 5.3 shows a prominently placed whiteboard at the Southwest Fabricator’s head office. This photo was taken at the main entrance to the factory floor. The construction staff come in through this door and access the materials they need for the day around the whiteboard.

Figure 5.3: A Typical Whiteboard Format and Placement

The coloured magnets and handwritten notes provided by the staff are emblematic of the analogue world's immediacy and flexibility. This freeform style of communication and coordination stands in contrast not only to the structured shelves that surround it but also to the digital systems heralded in the technological age (Whittaker & Schwartz, 1990). Administration staff's ambition to transition away from this manual whiteboard system highlights the drive towards digital solutions that promise more efficient, real-time updates. Yet, as identified in the literature, the journey from analogue to digital isn't always linear (Riley et al., 2007).

In summary, much like the spreadsheet scenarios mentioned in section 5.1, the comprehensive customisability and inherent flexibility of whiteboards often make them irreplaceable, even in the face of advanced cloud software solutions. Such software solutions,

while sophisticated, come with innate design constraints, sometimes necessitating a duplication of work practices or a redesign of existing processes to accommodate the software's limitations (Bjørn & Hertzum, 2011). This coexistence of whiteboards alongside emergent digital tools isn't just a mere technological choice; it's indicative of the interplay between function, familiarity, and flexibility in organisational practices. Even as digital dashboards bring advanced features to the fore, the unrestricted adaptability of analogue tools like whiteboards remains indispensable (Schmidt & Simone, 1996).

As was the case with the whiteboards, I could observe a similar dynamic with the use of *paper files* as a means for coordination and communication. In the following subsection, I will describe and analyse how paper files were still pretty much present in everyday work practices, as they guaranteed a perceived reliability to the participants in case cloud technology failed.

5.2.2 During and After Implementation: The Enduring Reliance on Tangible Artefacts

Despite the digital advances highlighted in contemporary workplaces, many organisations from this study still gravitated towards the tactile assurance of paper piles or files as markers of responsibility and progress (Whittaker & Schwartz, 1990).

In an organisational context, 'responsibility' can be defined as the obligation or expectation to perform a task or duty to a certain standard. While the practicality of certain paperwork, like legal documents requiring inked signatures, remains undeniable, an overwhelming number of respondents noted printing materials 'out of habit' or for the comfort they provide in a rapidly digitising environment. Such sentiments echo the continuing

prevalence of whiteboards and paper files in organisational communication, underscoring the deeply ingrained reliance on analogue tools (Riley et al., 2007). This reliance isn't merely about nostalgia or reluctance to change but, more importantly, reflects embedded views and perceptions in many workplaces: that tangible artefacts like paper are paramount in ensuring a clear transfer of responsibility across individuals or business units (Bjørn & Hertzum, 2011).

Sarah, a Payroll Administrator from Outsourced HR in a construction company, acknowledges the challenges for field staff in her company, both physically and socially:

> *They're putting all the fibre optics in and everything to build internet connections once the site is established, but when they get there, there is nothing. They're just taking a phone and their iPad or their laptop and a notebook. A lot of them have logbooks on the site so they have to physically sign things when they get on to the site, physically sign it when they go out so that everyone's accounted for, and so that if there is a mine collapse or a flood or something happens, they can account for everybody and that's where the paper timesheet becomes critical.*

In this case, the persistence of paper logbooks was related not only to the familiarity of experience but to the local environmental context as well, where internet and, by extension digital tools, were seen as unreliable.

Despite the overarching shift towards digital communication tools and Instant Messaging platforms (Kaufmann & Peil, 2020; Rajendran et al., 2019), the deep-seated comfort derived from tangible entities like paper files remained unshaken, as per my observations at

MidWest Accounting. In this organisation, paper files were more than mere repositories of information; they were symbolic touchpoints marking the progress and status of tasks.

Within MidWest Accounting, the tangible comfort of a paper-based file persisted, even amidst a digital transition. As noted by Hössjer and Eklundh (2009), certain physical entities continue to hold symbolic significance. In MidWest Accounting's approach, the paper file served not merely as an information holder, but as an indicator of a project's status and a bastion of reassurance. They set-up a workstation, complete with a physical in-and-out file tray. The receptionist would assign the overseas staff with pieces of work and send them an email and electronic copies of all the information. She would then print out a copy of everything and place it in a physical file and put it in their in-tray. When it was complete, she would move the file to the in-tray of the local accountant, who would then log in to the accounting platform and review the electronic documentation and discuss the work with the overseas staff over email. Once her review was complete, she would place the physical file in an archive room.

In spite of the effort of printing out copies and filing them, in many cases once the physical file was created, it was never referenced in the course of doing the work. It was just a symbolic representation of the status: '*that project is "with Margaret*"'. I discussed this approach with Midwest as part of the consulting process, pointing out that no one needed the physical file. The manager explained that:

> *"We will probably always keep the physical file. It's just more reliable in case something goes wrong with the technology. And it just makes it really easy to see who has that piece of work".*

In this case, they were fully aware of the symbolic nature of the physical file, and it just brought them comfort.

In conclusion, the parallel maintenance of physical and digital files, reminiscent of SMEs' initial foray using individual asynchronous Excel spreadsheets (Ribes et al., 2013), underscored the challenges of purely manual approaches. In my observations, Midwest's local accountant's involvement added another layer, where the review of digital documentation and email discussions with overseas teams epitomised Hrastinski's (2008) advocacy for asynchronous communication in bridging geographically dispersed teams. This digital engagement, juxtaposed with the traditional act of archiving physical files, mirrored the ongoing dialogue between the past and the present in workplaces.

My observation of the symbolic weight of physical artefacts, despite the evolving digital age and the changing landscape of asynchronous communication, became clearer in the relationship between bookkeepers and business owners. In the subsequent section, I will explore examples from the bookkeeping sector in an effort to offer more insights into the delicate balance between tradition (reliance based on familiarity) and innovation.

5.3 Digital Integration: Between Human Behaviour, Organisational Practices, and Software Design

In my research experience, the trust of physical objects and 'need for paper' was sometimes a point of contention between business owners and bookkeepers. During my research, I had access to a network of bookkeepers through the Institute of Chartered

Bookkeepers and the Xero implementer ecosystem. I went to multiple Xero roadshows and bookkeeping networking events to develop a professional network over time. Within the sector, the dichotomy between the tangible and digital realms is vividly illustrated through Marcia's experiences *(pseudonym)*. While she, a bookkeeper teaching the Certificate IV in Bookkeeping at a local TAFE, has wholeheartedly embraced electronic tools like Dropbox, her client remains steadfast in their reliance on traditional paper records. Marcia's perspective offers a firsthand elucidation of this prevalent tug-of-war in the industry:

> *[My client] likes paper I like electronic (smiles). I like technology if it's going to save me time. I got an electronic diary about 8 years ago and, well probably a bit longer than that, and I love it… he hates electronic diaries and reckons they break… He loves his paper diary; you know that sort of thing. So… you know, Skyping and Facetiming and we share our files using Dropbox you know, but I pushed for that because, to me, I was the only one who was going to access the files that we were creating together, which meant if I was working on them he couldn't work on them. Same with the data file. He had the data file for our company, I didn't have access to that. I'd have access to the manuals he wouldn't have access to the latest stuff. So early in January I went "that's it. You're getting Dropbox and we're going to start using it.*

This tension between the efficiency of digital communication and the deeply-rooted trust in physical documentation (Gutwin et al., 2004) mirrors observations by Carol *(pseudonym)*, a Junior Accountant from Oversight Accounting in Melbourne. Carol, who assists tradespeople wanting to move time sheet and receipt components to Xero, echoes Marcia's sentiment:

> *From my point of view, if they've got a physical timesheet, there's too many processes along the way in which issues can happen with the paper timesheet: they can't get it signed in time, they lose it, they email it over to us, they put the wrong data and we can't send it to the client, so it delays a process. It can get lost accidentally on its way to us or the bookkeeper might miss it, or type in the wrong hours. There are so many points of error, whereas if they can just log in weekly and put their exact hours in, it eliminates practically all of those points.*

In essence, accountants and bookkeepers equally tended to view paper statements and records as less efficient than electronic records and bank feeds.

Having accounted for the experiences of bookkeepers and accountants navigating between digital efficiency and their clients' comfort with more traditional methods, I will next describe the challenges I observed before the implementation of digital tools, specifically the management of paper-based records and outdated file-sharing practices.

5.3.1 Before Implementation: Frustrations on Asynchronous Collaborations

There were many discussions with bookkeepers that illustrate the frustrations in waiting for a company accounts file to arrive via mail. For example, Irene, a bookkeeper from Sydney, described some of her clients having "*six zillion little paper receipts*" which are often on thermal paper, and therefore tend to degrade over a few months. Many business owners present an unruly shoebox at the end of the year, with piles of receipts that may or may not be relevant. She and other bookkeepers I met through networking events hosted by Xero described challenges of working with an outdated file and the occasional story of corrupted USB sticks

or computers crashing with no backup. Irene described a particular issue with version control of the accounting file:

> *I'd been working in the file on a Sunday, and I hadn't expected him to be on the file on a Sunday morning. He does the payroll mainly on a Monday… so then we've had a conflicted copy… and that happened last night, actually, with my accountant. I was working on it, and I hadn't expected her to come in and work on a long weekend. So, I sent her an e-mail last night when I'd finished doing the work, and she said, "Oh, that's not a problem. I've hardly done anything." So, she'll just recreate what she's done. But it clearly shows there is a conflicted copy, that the two files have been opened at the same time.*

Olson and Olson (2000) remarked on the challenges in remote synchronous collaborations, which find an echo in the asynchronous setbacks that Irene faced. Ribes et al. (2013) elaborated on the pivotal role shared artefacts play in coordination. The essence of this theory is mirrored in MidWest Accounting's method of utilising physical files, as seen in the previous section. As the sector leans into digital platforms for effortless data sharing, the symbolic act of transferring a physical file between trays reinforces structured coordination, akin to digital collaborative spaces. However, the inherent lag in certain asynchronous workflows, such as posting USB sticks, can induce inefficiencies and potential overlaps in efforts. Irene's experiences underscored this, emphasising the sector's ongoing quest to ensure that real-time shared perspectives are standard practice.

In conclusion, as the accounting and bookkeeping domains progressively embrace digital tools, they remain tethered to the enduring nuances of human behaviour, trust, and tradition.

Having explored the frustrations of bookkeepers managing paper-based records, in the next pages I will delve into the phase of implementation and adaptation to *Clouded*, specially focusing on the software's built-in assumptions and its impact on workflows.

5.3.2 During and After Implementation: Unveiling Software Assumptions

A core challenge linked with *Clouded's* interface design is its embedded assumptions concerning work processes. This issue isn't unique to Clouded; as Goodman (2016) noted, tensions often arise between prevailing workflows and the design of new software. Clouded's design implies a clear-cut workflow, starting with the sales team developing a quote, leading to client approval, project tracking by the project manager, and finally, raising an invoice from the accounts department. While this process appears straightforward, the reality I could observe often diverged from this linear progression. Such deviations risk overly simplifying real-world processes in software designs (Norman, 2013).

To unveil the design choices underpinning *Clouded*, in 2016 I interviewed one of its co-creators. He shared that *Clouded's* genesis was in the accounting sector, with its design choices favouring simplicity and usability tailored to that industry. However, these foundational design choices struggled to adapt when *Clouded* ventured into diverse industry landscapes. **Figure 5.4** offers a distilled view, drawn from *Clouded's* support documentation. It showcases the potential placement of fields in user outputs, such as quotes, project status updates, and client invoices.

Figure 5.4: Data Field Availability

Field	Quote	Project	Supplier Invoice	Client Invoice
Project ID	✓	✓	✓	✓
Project Name	✓	✓	✓	✓
Quote ID	✓	✓		
Quoted Fees	✓	✓		
Fees Accrued		✓		✓
Costs Accrued		✓	✓	✓
Invoiced Fees		✓		✓
Quoted Costs	✓	✓		
Invoiced Costs		✓		✓

The impact of such design decisions is multifaceted and can significantly impede a user's experience, a key element of UX design as articulated by Nielsen (2012). The data table accentuates this challenge: early-stage project information, such as Client Quotes and Project Cost Estimations, is accessible during the quoting and project status phases. However, this data becomes conspicuously absent as users progress to invoicing. In a similar vein, invoicing details are not available to inform earlier quoting documentation, curtailing the continuity and coherence vital to optimal work practices (Harper & Maloney, 2016).

Clouded limitations are not merely about data entry or retrieval; they revolve around the contextual visibility of essential information. While *Clouded* offers a comprehensive

reporting feature, a holistic view necessitates the generation and external aggregation of multiple reports. Such design gaps compel users back to traditional tools, such as spreadsheets, reinforcing past research on the resilience of older methods despite technological advancements (Dourish, 2006). Such fallbacks, whilst resourceful, signify a missed opportunity in harmonising the relationship between users' work practices and the software's capabilities. It underscores the importance for software to more closely align with the fluidity and intricacies of work practice (Prior, 2007).

In the next subsection, I will describe my ethnographic experience at Far North Construction, where I could witness how work practices were affected by the gap in software design and user experience.

5.3.2.1 Far North Construction's Journey to Implementing *Clouded*

Tamara, from Far North Construction, described the convoluted processes she went through to display quote and invoice in the same view for clients. She would create a quote in *Clouded* with the contracted amounts and then export and edit it in MS Word:

> *Just to work out the quote, and what we need to provide our clients has made that process a little difficult.... I just want a total that doesn't include the [provisional] costs. [They] are not part of your actual quote, you know, they're extras so – or they're exclusions and so, to not be able to get a total excluding those items has been really frustrating… And the GST and the total and taking the cost of the quoted figure unless you change it….*

These workarounds stem from a limitation in the software infrastructure design, particularly the restrictions on where certain fields could be displayed to users. The design assumption that a project will either be fully fixed or variably priced, is one that does not sit naturally in the construction space. Minor problems and limitations cause bottlenecks and workarounds that resulted in a substantial increase in articulation work.

The software design assumptions also translated to the organisational infrastructure design of Far North Construction. They had been introduced to *Clouded* based on the recommendation of their accountant. The software was set-up through a third-party 'implementation partner'. Far North had invested approximately $10,000 in consultant fees and many hours of the accounts team's time. They were very frustrated they were still relying heavily on external spreadsheets because they could not display quotes and invoices in the format commonly accepted by the industry (i.e., a series of time and material elements grouped and subtotalled into phases). Despite these frustrations, they were determined to continue using the system (partially driven by the time and money they had already put into it). According to Tamara *(pseudonym)*, one of the accounts staff:

> *I wasn't about to walk away from something I'd already paid that amount of money to get started. So, if had it sat there myself, trying to figure it out on my own, then no I would've … But again, looking at all the other programs that I have looked at, I don't know that any of them would have been an easy transition for us. So, there was never going be an easy way out.*

As I worked as a software implementation consultant, my brief was to design some quote and invoice templates that would be suitable to present to Far North Construction. In order to do

this, I needed to investigate how they were entering information into the system to see if they could produce more reliable job profitability reports. Tamara described her key requirement as the way time and materials components are grouped in *Clouded* quotes and invoices:

> *I just want a total that doesn't include the costs. Costs are not part of your actual quote, you know, they're extras so—or they're exclusions and so, to not be able to get a total excluding those items has been really frustrating.*

Both the accounts people were competent with the Xero accounting software and could create and manage quite complex spreadsheets. They were forthcoming in workarounds they had previously tested and were very flexible and willing to try different scenarios to try and make the system work for them. Tamara described how she had to think outside the box to achieve the results she was looking for:

> *So, even like doing the invoices I'm putting together in Clouded, even that took a little bit of figuring it out. I definitely pushed the boundaries on how people might use their tasks in their quoting and even using the labels, so I think that has definitely pushed it on that.*

These stumbling blocks experienced at Far North Construction were related to how *Clouded* custom templates are designed. To create a custom Quote template, you open a sample layout in Microsoft Word and manipulate a series of Mail Merge fields to customise it into a suitable format. It is aimed at allowing "non-technical" users[3] to have the opportunity to add a personal

[3] I refer to users as "technical" and "non-technical" depending on whether they are less or more advanced software users as in knowledgeable enough with Xero and Clouded to know the consequences of changes made to the system (e.g., Setting Security Permissions, Report and UI Customisations, Creating Templates/Reports for others)

touch. However, these templates require specific versions of MS Word, may not be current with the different versions people may be using in small businesses.

Far North Construction has stunning quoting documentation that includes some SmartArt created using Word 2013. Because these elements were made in a newer version of Word than were the *Clouded* templates, it caused the templates to perform poorly. Whole sections of the quote would not display and needed to be manually replaced when a quote was produced from *Clouded*. As Tamara explained:

> *I'm finding that the setup of it for an existing business such as ours is quite intensive. Just to work out the quote, I think the way we should quote and what we need to provide our clients has made that process a little difficult … for a system that supposedly is with the times asking you to use a non-current Word version software to get your templates uploaded. You can't get 2010 or 2007 anymore!*

Luckily, that bug has since been rectified, but it took approximately two years from when we initially flagged it with *Clouded* technical support. Over the course of a few months, we eventually created a hybrid solution that still required considerable manual data entry into custom fields. I tried to work with them to take some of the manual processes away. However, they were comfortable and satisfied with the remaining manual data entry because they were

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and/or providing system support and advice to more generalist users (e.g. resetting passwords, fixing time entry errors).

confident in the reports they could produce using that approach. This hybrid solution was a specific local adaptation required due to the design assumptions by the software designers.

Likewise, in other organisations I observed similar difficulties and challenges faced by Far North Construction in regards to the software and infrastructure design.

5.3.2.2 User Adaptability and Software Functionality: Experiences from Multiple Sectors

In the architectural sector a common request from Architects was to provide a summary table showing invoiced amount to date, current amount to invoice and the remaining amount to be invoiced later. Within multiple architecture firms, there were challenges of assuming tasks would be performed exclusively by internal or external staff. Typically, a task (e.g., technical drawings) was costed with the assumption that internal staff would complete an activity, but with an awareness that it could be outsourced if the schedule conflicted with another project.

This resourcing 'fluidity' was very common in architecture. Paul, from Southside Architecture (*pseudonym*) described the typical process for obtaining and confirming this information, which is all in the system, but segregated into different reporting areas, making it impossible to build a simple table report automatically. Since the project data were minimal and often not up to date in *Clouded*, other teams could not reliably build reports to obtain cross-project information. Nina *(pseudonym)*, the accounts Administrator at Southside lamented the Report Builder functionality routinely:

> *Can't they just give us those fields on the reports? Why can't they understand how much work it is for me to generate three reports, bring them into Excel*

and pull them all together every month? Can't you make them understand how much extra work this is?

Though it did appear to impact the data duplication and articulation work most heavily in architecture and construction, these were common frustrations across industries. Indeed, the constraints in software design were not limited to the builders and architects, as is shown with the example of Phoebe *(pseudonym)*, the business owner of Eastern Legal.

Phoebe called me after spending an hour trying to figure out a problem with a staff member's time sheet. When she added the staff member's billable rate, she did not tick a box that appears below the field when you begin typing. This field intends to be able to set a date for a new rate, such as a pay rise. However, the labelling and position of this feature are ambiguous, and most participants either found it very confusing or simply did not notice it was there. When I showed Phoebe the tick box and explained how it worked, she threw her hands up and exclaimed, '*Well there's just nothing intuitive about this software at all*!'. Her statement demonstrates how interface choices that seem intuitive to software designers can seem completely foreign to users and become a barrier for users.

To circumvent these software constraints, some companies created generic user accounts to symbolise external contractors, then manually converted supplier invoices into timesheet entries within *Clouded*. However, another design assumption in *Clouded* meant that a single timesheet entry couldn't surpass 24 hours, leading to one contractor invoice potentially being fragmented into several timesheet entries. This makeshift solution, though innovative, was not without its complications. The real-world supplier invoice then had to be recorded outside of *Clouded*, usually in a separate accounting software. This division of data made

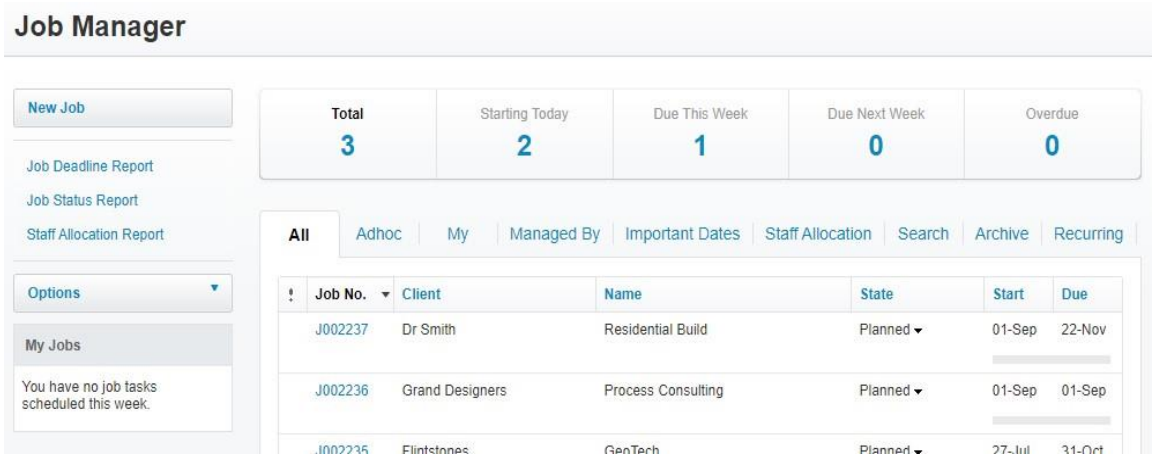
reconciling any cost variations with the project's profit and loss exceedingly challenging due to the levels of data abstraction involved.

The 'flat' approach to data extended beyond the project context as well. *Clouded* has the capacity to categorise projects into a customisable list of project types. If *Clouded* had allowed for a 'matrix' reporting style, it would be possible to create flexible views to suit variable user needs, for example projects by Manager and Type (e.g., a comparison of tennis courts managed by Ian and Susan). Mona *(pseudonym)*, the Client Manager at Greener Construction, described her challenges with sorting through the extensive flat list of projects:

> "*I still find it hard to look at the jobs and not know instantly what types of jobs they are ... So, instead of everything starting with J, do we have an option of saying, 'Let's call this AB job or a T job which is the tennis court or anything like that?' ... So, if I looked at the main screen, if I allocated a certain type of job, I could go ... look down the side and go, 'Oh. Yeah'. And look across and go, 'Oh. Yeah. There's a tennis court builder, maintenance' ... At the moment with all of them being Js, the whole screen to me all looks the same".*

She is referring to the Job prefix, which can either be set as a standard letter or word. The system can categorise Jobs into types in the way she describes, but the information is not available on the central Job Dashboard screen (see **Figure 5.5**).

Figure 5.5: A Rigidly Designed Dashboard



There is very little flexibility in this dashboard view and there are no options to configure it to meet the needs of particular groups (e.g., sales, project, accounts teams). To see a list of Jobs by category, a user needs to create a special report to display Jobs in this way. While not a complicated process, it adds a layer of complexity that feels unnecessary, especially when the information is in the system. Many users expressed a desire to have custom views, either at an individual or functional level, particularly Project Managers and Accounts teams. Tamara's (one of the account administrators at Far North) desire for filtering for relevant information was particularly common:

> *It is nice thing to be able to customise your own dashboard... in Xero, the dashboard is really customised for yourself... it could be more the specific information I want to look at that's sort of not relevant to others and then there's probably stuff that comes up on the dashboard that ... other people are quite happy with... but on my dashboard, I'd want to have the accounts in there.*

Other, less advanced software users, however, were often confused by the sub-menus, shown in **Figure 5.5**, often not even realising they were there. Many users thought the numbers above the menu (e.g., Total: 3, Starting Today: 2) looked like clickable options rather than the blue text options below them (the most applicable options for typical users were *My, Managed By,* and *Search*), which were actually filtering options.

Paul, from Southside Architecture (*pseudonym*) described the typical process for obtaining and confirming this information, which is all in the system, but segregated into different reporting areas, making it impossible to build a simple table report automatically:

> "*I just make sure that anytime there's a change to our fees, I check. So, I figure out what I think our fee should be, then I check what they've got on there. Then if there's a discrepancy, I double check mine and then if it's still a problem I call them and I'm like, I think your fees are wrong, because if the fees aren't right on that platform, then we can't claim extra. We have to get them to fix it first, which we've had to do a couple of times".*

There were consistent descriptions of participants needing to 'double check' and draw data out of the system to review it in more user-friendly ways. The labour-intensive task of constantly cross-referencing and extracting data underscores the system's inefficiency, forcing users to devise their own methods to ensure accuracy, rather than relying on intuitive software functionalities.

In summary, having explored some overarching challenges in Australian SMEs, I see a connection between software design and user experience. As was shown with *Clouded* case,

design choices that developers might deem intuitive often feel alien to the typical user, exacerbating their challenges. While the software might be constructed with certain work practices and information assumptions in mind, the reality I observed is that these assumptions might not dovetail with the operational realities of various organisations.

Taking into consideration my observations, Prior et al. (2008) can shed light on how a design's intuitive nature can be perceived as a blueprint—a "Pattern for Behaviour"— guiding user interactions and shaping effective work routines. However, as organisational dynamics often unveil, actual user behaviours—termed "Patterns of Behaviour"—may deviate from this ideal blueprint, echoing insights from 'Work Practice' literature. Suchman's (2002) musings on infrastructure in work practices resonate here. A design's potency isn't solely anchored in aesthetics or functionality; it's intrinsically linked to broader organisational infrastructure, spanning from processes to established cultural practices. These underlying system elements can dramatically steer work and, when introducing new technological interfaces, can recalibrate the very essence and cadence of Articulation Work (Orlikowski, 2000).

5.4 Access Variability Impacted Trust

One of the observations I made during my fieldwork and in interactions within SMEs when implementing *Clouded*, was that *access* determined its successful and effective use. In my observations, I could distinguish that access had two main dimensions; one was referred to socio-political dynamics within businesses (e.g., permission hierarchies and information sharing protocols), and the other to technical issues (e.g., internet reliability and user interface barriers). In the following pages, I will further describe how reliable internet connectivity and

suitable hardware, as well as organisational dynamics, shape the adoption and usage of Clouded in SMEs.

5.4.1 Technical Access

Throughout my research, I observed that the technical aspect of access was usually explicit in the selection process of cloud software. As a consultant, one of the first questions many clients considered about *Clouded* was, *'Will it be reliable?*' This concern led me to ask, do employees have a reliable internet connection and suitable hardware to access and use the software, both within the office and when working 'onsite' or 'in the field'? And if so, do they have staff that are capable and confident in using it?

These concerns were mainly related to the development and rollout of the National Broadband Network (NBN) to increase internet access across Australia. From a technical perspective, the promise of NBN to bolster physical network access across Australia was a key inflection point (Alizadeh & Farid, 2017; Fisher et al., 2020). This aimed to provide uniform internet reliability, a cornerstone for cloud technologies. Yet, as Alizadeh & Farid (2017) highlighted, the end-users' experiences, even amidst the heightened anticipation, were inconsistent across different regions of Australia. In particular, reliable internet connections and speeds are an ongoing practical consideration for companies with employees who travel outside the urban ring (Australian Computer Society, 2020). Moreover, for businesses that operate entirely outside that urban ring or employees hoping to work from remote locations, the challenges can be prohibitive (Australian Computer Society, 2020).

For example, Far North Construction had a distributed workforce, encountered technical issues regarding access and connectivity. The admin staff worked from home and sent relevant information to the construction staff on a weekly basis. Tamara (*pseudonym*) describes her experience of managing data download quota and associated costs:

> "*I live rurally. We just have one of those mobile internet dongle things and that seems to go ok. It doesn't seem to use too much data and considering that I was doing templates at the time, so that's uploading a lot, it didn't seem to use too much data…. I do find it's quite slow if you delete something. When I was doing the quote template and there were some things that I had to delete or reinstate or redo, it just seems to take a long time".*

At the time, mobile data plans were very restrictive and could become very expensive if too much data was downloaded by accident (Turner, 2013). Historically, this 'urban ring' has been a conceptual divide, with resources diminishing the further one gets from an urban centre. However, in 2020, it became a physical ring in Melbourne, in response to a COVID19 outbreak. There was a police-enforced blockade around metropolitan Melbourne for four months (Tuffield, 2020). In other areas, within Australia and internationally, similar (if less extreme) physical restrictions have been implemented throughout the COVID-19 pandemic, beginning with international and regional border closures (BBC News, 2020).

Connectivity and mobile data were not the only issues regarding technical access. For example, Irene *(pseudonym)*, a mobile independent bookkeeper working as an external advisor for companies in the construction sector, referred to the NBN:

> *It's the area that I lived in, a minor rural town … I couldn't get NBN because there was a couple of wires too close to the surface, and Telstra wouldn't*

change it out so we still on the old phone lines … And then a farmer ploughed up … and that happened three times … we'd have no phone line for four or five, six weeks, two weeks. So um, that … I mean, that's two hours from Sydney!

Irene's experience is in jarring contrast to the marketing hype of cloud software, which promises to let you 'log in online anytime, anywhere on your Mac, PC, tablet or phone to ... run your business and access your accounts from work, home or on the go' (Xero, 2020b).

Another example was within Southside Architecture. Kyle and Paul (*pseudonyms),* Joint Managing Directors of Southside Architecture, described the main factors in their decision making to move to a cloud-based project management solution. These considerations were related to: potential for real-time data entry for costs and time sheets; improved accuracy in invoicing directly from job tasks and costs; increased uniform data entry, allowing for easier reporting.

In Southside's case, the technical access was explicit during their selection process of *Clouded*, as they had the need to save large CAD files on a centralised server, with architects working from offices in two major cities. The files were too large to store and use practically via a cloud solution; instead, they were stored on a shared local server in each office. They could be accessed remotely via a virtual private network, if necessary, but most architects only accessed the files while in the office. Hard copies and PDF files were more practically available if plans needed to be reviewed onsite. Conversely, project files were shared and circulated to project teams and needed to be more readily available for client discussions. One of the aims for the project management software change was to have project files more easily accessible between teams and offices to assist with planning and coordination. *Clouded* was brought in to assist with project information sharing and comparative reporting.

5.4.2 Socio-Political Access

In my ethnographic observations, the interplay between individual attributes and organisational structure was a recurring matter in many workplaces. Individuals enter organisations equipped with distinct skills, biases, and tendencies, which can impact productivity and collaboration (Suchman, 1995). Depending on their degree of power, they have varying ability to facilitate or block productivity within an organisation. This power sometimes comes from status or position within the organisation, but in some interesting cases it can come from sheer force of personality and control over a tiny piece of the overall workflow and information sharing (e.g., a receptionist entering data on behalf of a sales person). In other words, in certain instances, influence is not determined solely by official rank. Instead, it can be wielded by individuals with strong personalities who control key junctures in the workflow (Orlikowski, 2000).

One such example was at Southside Architecture, where I could observe the interplay between individual attributes, organisational structure, and communication and information sharing.

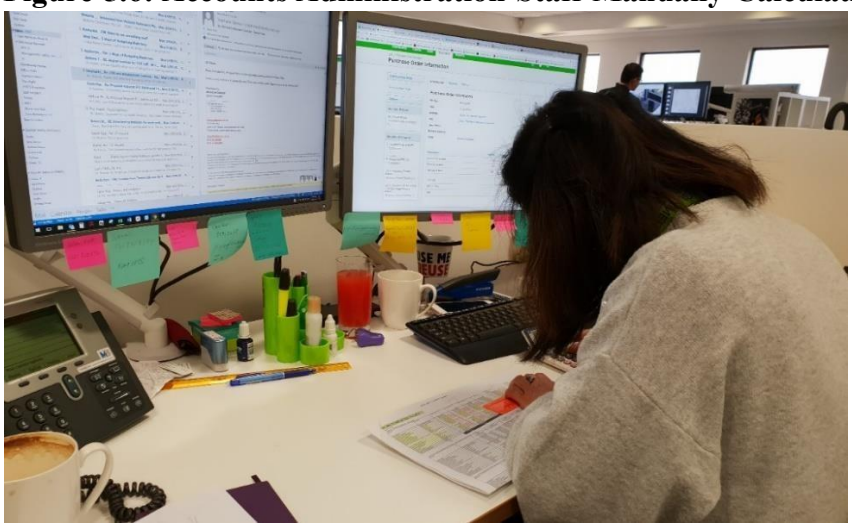
At Southside, the formal boundaries between areas were fairly loose, but the social boundaries were fairly strong. Even within an open plan office environment, there were zones for different functional areas. Project managers were in one area, and the accounts staff were in a separate area, with a partial wall between them. Even though each group had line of sight access to each other, their default communication was via email. These socio-political dynamics became apparent as I observed and questioned the ‘normal’ way of sharing

information and interactions between functional teams. I started the conversations by asking questions like “how do you typically do things around here?” I then probed for further understanding of ‘normal’ from the perspective of the participants.

When it came to communication and sharing of information, I observed barriers in how the information was being sent from project managers to the accounts team. Instead of sharing the financial spreadsheet, which would have been possible via their shared server folder, project managers were sending a PDF print view of the spreadsheet.

As I observed in one case project, the critical information required by Karen, Accounts Manager at Southside, was literally in the margins, hidden from her view outside the view provided. In order to get the required information, she would print the PDF then manually recreate the item lines and use a calculator to hand-write the totals in the margins of her physical paper copy (see **Figure 5.6**).

Figure 5.6: Accounts Administration Staff Manually Calculating a Printed Spreadsheet



I investigated further to identify if the challenges in this project were unusual and discovered they were not. In fact, this spreadsheet was used as a template for managing projects with at least 6 Project Managers. As one of Southside's Project Managers, Alex (*pseudonym*), explained:

> *I just take my notepad everywhere and if I'm in meetings and I've got my computer, I write myself a to do list while the meeting's happening in case people are asking me things…. My book is full of to do lists and then working out what our deliverables are that our client has given us, which was in our agreement and working out that we're making sure we got all those things done and et cetera…*

The project spreadsheet that Karen employed was designed with an assumption of being used to fill a particular, localized need for one Project Manager on one project. When I queried Bob, the Project Manager, it eventually emerged that he didn't trust Karen with his spreadsheet because he was not confident with her technical skills. He admitted that her Excel skills were not reliable and "she might break it". However, despite these assumptions, the spreadsheet was informally adopted by multiple project managers and was used as an attempt to communicate information across the boundary between one functional area (project management) and another (accounts).

Other project managers, who had adopted this spreadsheet format for their own projects, also adopted the method of sending PDF or email summaries of invoice requirements to the accounts team because it is how they have seen others communicate. Paul (*pseudonym*), one of two Managing Directors, explained the process from his perspective: *"I just send Karen an email saying, 'this is what we need to invoice, this is what is included'"*.

These kinds of interactions between one influential Project Manager and a member of the Accounts team, stemming from a lack of trust in that person's skills, resulted in a default communication style between functional areas creating inefficiencies.

The aforementioned practice of using very detailed spreadsheets to track the progress of each line item was also predominant with Project Managers at Greener Construction (*pseudonym)*. They used *Clouded* to track project updates and notes, but still maintained a physical file for each client. It contained a client brief that was printed from the project management software, printed emails and a form to be filled out in hard copy at the end of the project and signed 'to ensure accountability'. In contrast to Southside Architecture, Greener had a more profound socio-political dynamic. This company was highly political in nature, and there was a strong culture of blame and denial in cases when projects did not meet budget expectations. We had numerous meetings where examples from one department were brought up critically by other departments. The Operations Manager shared multiple examples of cost overruns due to issues arising from features and timeframes promised by the sales team that were impractical for the project delivery teams.

Rather than acknowledging the structural and social barriers between the sales and operations teams (in their open-plan office there was a two-metre-high partition wall between the two business units), they developed checks and processes that allowed them to track and assign blame to one another. The management staff were apparent and deliberate in their attempts to use technology to watch and control their employees. They struggled a great deal with the new software, which was built on a premise of shared visibility, accountability, and responsibility. They ultimately abandoned the system because staff felt too exposed and went

to more extraordinary lengths to hide their actions. At the same time, managers were unsatisfied with how much they could control and limit.

Project Managers at both companies (Greener Construction and Southside Architecture) had their own spreadsheet layout that developed organically or that is shared between people with similar projects. These spreadsheets act as boundary objects because they have a specific meaning to the Project Managers, which is then abstracted and reinterpreted in the context of the accounts team for invoicing and financial reporting. Each month, project managers review and update the percentage complete for each line item. This translates to an amount to invoice. Because *Clouded* was not explicitly designed for this purpose, however, it resulted in significant increases in articulation work. It is an example of how interactions with boundary objects can lead to the development of organisational infrastructure, in this case inter-team communications, can become established without conscious knowledge or effort. If not identified and corrected, these habits could have remained unnoticed indefinitely.

This particular example of how project spreadsheets passed through different parts of the company led me to understand that boundary objects facilitate collaboration and information sharing, making them instrumental in understanding organisational dynamics such as articulation work. I could see pieces of information in one spreadsheet within the sales team (for example client value rating and descriptions, design preferences, historical interactions) and a reconstituted version in the project managers spreadsheet (scope and quality requirements) and other pieces trickling through to accounts (timesheets and invoices). In contrast to the workflow assumptions built into *Clouded* however (*Sales > Project > Invoicing*), I could see these pieces of information coming together and being picked apart for

different uses in variable and sometimes simultaneous ways. In other words, the processes and practices were often non-linear. I will explore this idea further in the Discussion section where I elaborate on the potential to design infrastructure and work practice.

5.4.2.1 Gatekeepers: When Individual Roles Influence Workflows

Throughout my fieldwork, I could also observe that the boundaries between functional areas and its associated challenges in passing information were also dependant on human agency. Especially, in the face of technological or procedural inadequacies the importance of human agency within organisational infrastructure became evident. This was epitomised by personnel who took on the mantle of *bridging* informational gaps when automated systems fell short. Such roles, typically relegated to junior or administrative staff, bring to life Bowker and Star's (1999) assertion that "infrastructure becomes visible" primarily upon its malfunctioning.

Interestingly, these bridging personnel manifested in two key archetypes: *Facilitators* and *Blockers*. Drawing parallels with the seminal work of Levitt & March (1988), Facilitators can be likened to gatekeepers. They often mediate the boundaries, ensuring a continuous flow of information between different departments. These Facilitators, by virtue of their roles, take on the vital task of decoding, interpreting, and subsequently relaying processes, rendering them coherent to diverse business units. Their roles, although frequently undervalued, serve as the linchpin of an organisation's infrastructure. They provide a physical connection through the organisation and are part of the infrastructure for other staff. They absorb all the extra steps and hassle that comes with poorly designed processes that are necessary to keep the business moving. In this sense, they invariably shoulder the extra 'articulation work' (Star, 2010) - the

essential effort required to circumnavigate and rectify challenges thrown up by suboptimal processes.

When people in gatekeeping roles, such as accounts receivable/payable, are willing to facilitate information gathering and data entry into business management software, the process appears smooth and seamless. Any duplication and redundancies are simply absorbed into the administrative processes and become invisible to other parts of the administration.

For example, within Far North Construction, the two accounts administrators, Christine and Tamara, extensively tested and refined the quoting and invoice templates so that the directors 'wouldn't be troubled by it'. Because of the limitations described in sections 5.1 and 5.2, many other construction companies simply abandoned the software. Instead, Christine and Tamara worked tirelessly to configure the software in a way that would be easy for the directors to enter the information they had available:

> *The directors actually have new tablets that run business software and our 3D viewer on, so I'm hoping that having this with them, they will eventually learn how to do a quote and it's so simple that they should actually do it while they're out there with somebody. But also, being able to access the documents for a client. They can do that. They can update their notes in their database entry rather than waiting to come back and most of the time, forgetting to do it, they can actually do it while they're there more on the road.*

They would then interpret and re-enter the data into other parts of the system in a way that would result in the reports the directors ultimately wanted. Despite some severe challenges

and frustrations in using the system, Tina and Tamara both had a strong commitment to *Clouded*, which is ultimately why the company is still using the software. For example, Christine would often reformat documents and present information to the directors in ways that they preferred to see it:

> *They just send me the invoice, how they want it done … and just tell me how many hours they've done … I guess because of all these little oddities, it's the reason why I haven't got anybody else doing some of this stuff because by the time I explain to them all the little things they've got to change or do, I just think, 'No'. Too many chances of things going really wrong … I think on the whole, they'd prefer I do it, but sometimes when I'm not here, if they want to get one out in a hurry, yeah, it would be good if they knew how to do it as well. But at the moment, It's still a bit Hickory Dickory.*

She opted to make the experience as easy as possible for them, even if it meant twice as much work for herself because she had developed custom workflows for managing situations in which the software was a difficult fit for organisational information needs. This behaviour is similar to Mackey's (1990) findings of user tendencies to stick with imperfect but customised software interfaces.

In other cases, the bridging role was deliberately designed to accommodate known differences between the work styles and information needs of domain experts (e.g., architects and designers) and the central information sharing needs (e.g., quotes, invoices and profitability reports). Mary (pseudonym), a creative agency Operations Manager at Stacked Media, actively

manages and collates information for her team. She explained that it is a matter of efficiency and focusing on staff strengths:

> *If we're in a briefing session, I'll scribble everything down and then I'll sit back down at my desk and read through my notes. And then, I'll put that into a Word document which becomes the formal brief. I have visibility across the calendars. I'm the one that schedules everything. So, I'll set all of the invitations up for internal meetings and I'll also set up when the client meetings are, so that's a way for them to have visibility across what the point in time deliverables are. I also have a whiteboard with a calendar on it. And I—as well as sending an invitation on Google calendar, I write it on my physical whiteboard so that they can see over the next two weeks what meetings or when … I think it's just more my responsibility. I mean, we're a very small team and we sit literally in a pod all together. So, I'm sure it would be different in a sort of a large agency, but I'm lucky enough to have pretty clear visibility as to what everyone is doing because I'm right here so, it works for me to just keep that updated.*

Despite being one of the most senior people in the organisation, she situated herself between the business units and saw the 'bridging' role as critical to completing work in a way that suited the individuals and the organisation.

Gatekeepers are not always facilitators, however. Conversely to the facilitator's role, the *Blockers* align more with those individuals who, whether due to genuine concern or other motivations, introduce resistance within workflows, amplifying the visibility of infrastructural

elements (Bowker & Star, 1999) and, potentially, the articulation work (Strauss, 1996) required to address and overcome these barriers.

In the case of Southside Architecture, the accounts administrator, Karen (*pseudonym*), had not chosen the use of *Clouded*. She did not understand how to use it and did not trust its data. As a result, whenever information was entered into the system, she manually updated it in spreadsheets and the accounting software separately. Despite all the additional work that was required from the double entry of data from pdfs to spreadsheets, she was one of the strongest opponents of reducing the manual data entry. Since the trust dynamic was pulling both ways because she wasn't trusted by the Directors, she went to great lengths to justify her position. Karen compounded the manual data entry and made the process so convoluted that she was the only person who could undertake the spreadsheets, which, in her mind, made her irreplaceable.

According to Karen, she estimated 20 per cent of invoices were created through *Clouded*, with the rest being created manually in Excel. This was necessary because Southside's larger corporate clients have particular invoice layout requirements to make it easier for their accounts teams to process. As coworkers began questioning why things were done a certain way, Karen switched from evasive to hostile. She eventually refused to participate in anything related to *Clouded*. Up to this point, she had been the primary gatekeeper for information into and out of *Clouded*. She eventually resigned, prompting the directors to begin the set-up process again. A new accounts person was appointed to the head office and the other accounts person from the second office took over the lead role in defining the requirements and managing the set-up. As a result, there was a renewed energy and confidence

in the *Clouded* software. Thus, the project information became more consistent and available in real time to project managers.

In summary, my observations of these dynamics highlight the indispensable human element within organisational infrastructure, illustrating that beyond technological systems and processes, it's the people who frequently make the difference in the smooth operation of a business. In this sense, while considering work practices within organisational infrastructures, the roles of gatekeepers and blockers stand out for their capacity to influence workflows, information dissemination, and interactions across boundaries. These roles, whether they tend to facilitate or obstruct the fluid movement of information and processes within an organisation, can help understand how individual actions can amplify or reduce the articulation work required (Bowker & Star, 1999; Star, 2010; Strauss, 1996).

5.5 Constant Dynamics Throughout Clouded's Implementation

Up to this point, the discussion has detailed the shifts in work practices before, during, and after the implementation of *Clouded*. Attention will now shift to the dynamics that remained consistent across all phases of *Clouded's* implementation. This shift in focus serves to balance the narrative. While acknowledging the transformative aspects of *Clouded's* implementation, the forthcoming sections provide an opportunity to explore elements that have remained constant. Doing so allows not only for a deeper understanding of *Clouded's* impact, but also contributes to a comprehensive view for future implementations and evaluations, as will be explored in Chapter 6.

Specifically, in this section I will describe the collaborative process I engaged in with Southside Architecture, which gradually evolved from a participative workshop into a prototype co-design, resulting in the redesign of a project spreadsheet.

5.5.1 Information Bridges can be Designed

Throughout the course of this research relationships developed and evolved, especially with Southside Architecture. Even though Southside was already an active user of *Clouded,* I originally engaged with the organisation since staff being introduced to the software (IT Department, Accountants, CEOs) required some training sessions in order to improve the quality of data in their existing reports.

Initially, the organisation's needs seemed superficial, however, through the process of exploring their current state and needs, the relationship evolved into one of the most intensive deep dives, spanning 2 years. That evolution enabled the relationship to develop into more of a co-design approach. I was able to take observations from the initial few months of participant observation and analyse it within the context of other organisations and the literature and bring it back to Southside for discussion and prototype co-design. As part of that evolutionary relationship, Southside invited me to join their annual intensive strategic planning workshop activities, where the senior leadership stepped away from operational activities for a full week to review current status and collaboratively design strategic actions and solutions for the following year.

In essence, my collaboration with Southside Architecture was a significant part of my research journey. Inspired by our interactions, I co-designed along Southside's Managing Directors, Accounts Team, Project Managers and Consultants, a collaborative workshop, to-improve process and support boundary objects based on shared insights. This collaborative process, which I will elaborate on in the following section, aimed to merge functionality with aesthetics, ultimately leading to a tailored user experience that met Southside's specific needs and context.

5.5.2 Strategic Co-Design Workshop

The timing of this workshop was serendipitous. It occurred approximately a month after my thesis supervisor and I took an intensive deep dive into the draft themes and literature. I was able to bring these draft themes and observations to the strategic workshop and investigate the validity and implications for Southside's specific organisational context. I facilitated a session focused on drawing out assumptions and infrastructure we had bumped into in the initial few months I had engaged with Southside. During that time, the organisations' participants and I had improved isolated tools and processes but had been unsuccessful at creating wider and deeper improvements to operational effectiveness.

To find the relevant infrastructure and its associated work practices I drew attention to the tension of internal consistency and external flexibility, which had previously been part of the invisible organisational infrastructure (Star & Strauss, 1999). In order to achieve this, the main objectives set for the workshop were to redesign the process and map out both the custom and configurable parts of *Clouded*. This aimed to manage the conflicting industry requirements

while meeting the project managers' need for flexibility, as well as ensuring consistency in data for cross-functional and strategic reports required by management and accounts.

Due to the timing and context of the strategic design workshop, I was able to introduce the concepts of Infrastructure, Boundary Objects and Articulation Work to the participant group through the challenges and opportunities they were seeking to address. For example, we identified a recurring issue of reporting data reliability across projects. There was an internal drive, led by the accounts team and external financial consultants, for consistency of how data was captured and tracked across projects in order to develop comparison reports (e.g., profitability of private, public and commercial clients). The financial consultants were strongly advocating that financial data should be entered in a specific way because it was logical to them.

However, the client account managers each pointed out certain aspects that would be a problem for them because of the specific constraints that their clients were obligated to work within (e.g., government transparency obligations vs corporate confidentiality). I was able to contextualise this tension as similar to the *tacking* characteristic Star (2010) ascribes to Boundary Objects when certain elements within an organisational infrastructure go back and forth between groups that are cooperating without consensus. And by using that approach, it is potentially possible to design systems and processes to be externally flexible and internally consistent. By embracing Star's approach to infrastructure, we could then look at the organisational 'tools', like the project spreadsheet and the configurable elements of *Clouded*, as Boundary Objects.

As a first step, we then workshopped the divergent and convergent information needs for teams within the organisation (e.g., sales, project and accounts teams). We then drew out infrastructure and assumptions about work that was done within and between those teams. And then we drew a circle around those teams to signify a boundary between Southside and other organisations, recognising that Southside would have the same drivers for external flexibility and internal consistency and the same challenges of inter-team boundaries within their organisation. So, as a consequence, we were able to collectively recognise that the coordination of information from client to architect company is not a simple one-to-one relationship, it is potentially a many to-many relationships, where sales staff from Company A provides information to the accounts team of Company B which get translated and share back to the Company A project team, who then translate and share information with their accounts team. We mapped these known and potential relationships in order to develop and adjust processes that were designed to handle that dual role, external flexibility and internal consistency, diagrammed in **Figure 5.7**.

Figure 5.7: Strategic Co-Design Workshop

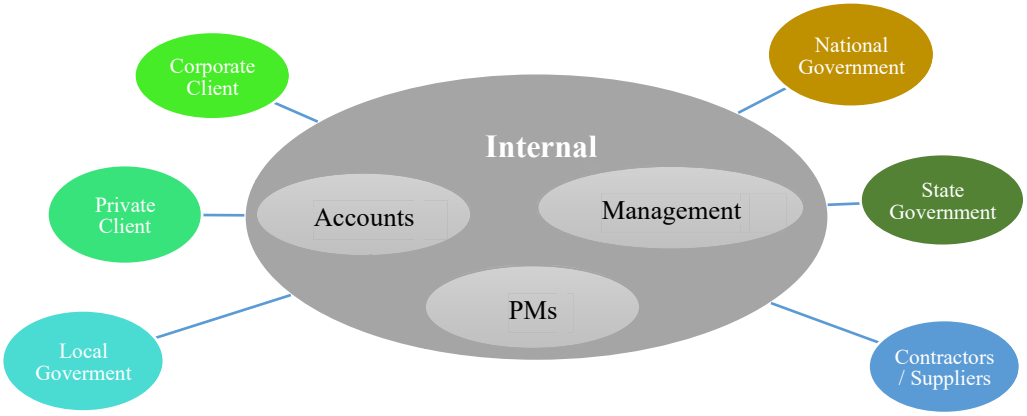
The image in Figure 5.7 is from an extensive planning session with senior management and external consultants from information technology, finance, and project management to determine how data should be entered to obtain the most useful management reports for multiple stakeholders.

5.5.3 Prototype Co-Design

Drawing on the ecological approach, that characterises infrastructure as continually evolving as opposed to linear and rigid (Gerson & Star, 1986, 1987; Star & Ruhleder, 1996; Star, 2010), I sketched out each of the stakeholder groups, internally and externally, that had variable (and sometimes competing) information needs. I have recreated the diagram in **Figure 5.8**, which illustrates the internal and external boundaries identified within the workshop. The

grey area represents functional areas with boundaries within the organisation. The coloured areas represent diverse, and sometimes conflicting, functional areas external to the organisation.

Figure 5.8: Internal and Internal Boundary Analysis



We used this diagram as a reference tool as we revised the organisational processes and Boundary Objects to improve coordination and work practice within and between the identified boundaries. Using the identified boundaries as a starting point, we redesigned the boundary objects with a specific view of reducing articulation work. There was also a recognition that information needs to pass from one area to another (Star, 2010). This can take the form of outside (e.g., client requirements) or internal functional units (e.g., sales, project managers and accounts). Boundary objects serve this function. Star and Griesmer (1989) presented the concept of boundary objects as a way of describing the forms, documents and other data

collection tools that were used to pass information from one group to another without the need to understand the inner workings of each other's domains fully.

Part of the process and boundary object analysis focused on the project management spreadsheet (introduced in section 5.1) that organically emerged and was informally used by several project managers as the basis for their plans. It is a prime example of how an object can be used to negotiate boundaries and exist simultaneously at multiple levels of abstraction. The original document from Figure 5.6 was designed based on the needs of **an individual project manager** to collect and monitor the progress of **a particular project**. It was then passed over to accounts for them to interpret into a different format, the accounting software, for their purposes. It was not deliberately designed as a coordination tool to be used across boundaries. However, because it was adopted by the accounts team and adapted by other staff members to become a familiar form, it resulted in increased articulation work.

Based on a series of interviews with project managers and the three-day workshop, I developed a new spreadsheet version that incorporated some of the missing pieces from the previous version. For example, I added some columns for per cent complete to explicitly indicate the prior month, current month and total percentages. This allowed the project managers a speedy way to document their updates that was clear and easy for accounts administration to read. Moreover, it required no manual calculations.

The revised project spreadsheet was developed in consultation with the project managers and accounts team to try to provide space for the needs of both teams. It was designed specifically to acknowledge organisational infrastructure and boundary objects:

> *"There needs to be an internal consistency across the company to allow for higher level trend analysis and management reporting. Leigh Star 'referred to this interpretive process as a tacking back and forth from the "Shared" general form of the thing or object being considered to the uniquely contextualized and constrained local form of it in a particular instance of deliberation'"* (Boland, 2016, p. 235).

With the updated spreadsheet, project managers were able to focus on the columns that indicate current and total progress, which they need to track concerning sub-contractor and client reports. The accounts team can refer to the payment claim columns, which now calculate automatically and provide a summary of income and expenses that they can match directly with their accounting software. This version was circulated back to the project managers and accounts team (one accounts administrator per office) for review. It was specifically designed to improve internal standardisation while still maintaining external flexibility to allow for reporting requirements from clients that are beyond their control.

The redesigned spreadsheet was not to be the answer to all projects in all places. Instead, it is an example of a boundary object created to suit particular coordination needs at a particular time. The 'tacking' aspect of boundary objects (section 2.1.4) becomes critically important to the design of the objects. A form was developed to address **particular** information needs at a **particular** time and with **particular** groups of people. But that form needs to also function simultaneously in an abstracted form within the broader organisational level to address similar

issues. Other groups within the organisation can then also adapt the form to their particular contexts and practices. The process for developing and refining the boundary object can be abstracted further to become generally applicable to software change management, which then become used and interpreted in particular, concrete ways for
different local contexts.

Rather than a specific answer to addressing issues of internal consistency and external flexibility, I am advocating an ecological approach (which will be further detailed in the next Chapter) to the process of uncovering organisational infrastructure, predicting where changes will disrupt it and redesigning the process to support that change. Specifically, some critical questions when considering a software change are:

- What are the assumptions about how information is collected and used?
- Who is instigating change, and why?
- What are the goals of the change?
- Who will be affected, and how?

In summary, what does the underlying organisational infrastructure look like, and how do the existing work practices relate to that? Once we can see those relationships, we can begin to make more delicate and deliberate organisational changes, like a surgeon with a laser.

5.6 Chapter Summary

This chapter explored aspects of how software design can influence the work practices of Small and Medium-sized Enterprises (SMEs). With organisations shifting away from traditional tools like spreadsheets and whiteboards, the transition to newer cloud-based project management systems offered a fresh perspective on these transformations. I observed the impacts of both Functional and Interface & Interaction Design in work dynamics. Drawing from past studies, such as those by Star, I analysed how the ways we categorise and design information can have ripple effects on organisational efficiency and behaviour.

The notion of 'access' during the cloud software implementation phase was also highlighted. Two distinct dimensions surfaced to consider *Clouded's* effectiveness: the socio-political and the technical. Additionally, I explored how many SMEs still gravitated towards tangible methods of communication and progress tracking, such as whiteboards and even piles of papers. Yet, over time, these very systems often found themselves at risk of becoming outdated.

In this regard, my ethnographic experience and observations suggest an underlying tension where organisations, even as they leaned into new technologies, often harbour latent reservations. The tangible nature of physical tools versus the digital quality of cloud systems made this tension even more visible. It is within this tension that individuals' roles also became important for my analysis. It appeared that while systems and processes set the stage, it was the individuals, with their unique biases and preferences, that often drove the narrative. Their reactions to change, be they embracing or resistant, can shape the trajectory of system implementations.

In the next and final chapter, **Discussion & Future Research**, I will present an in-depth theoretical analysis of the observations developed in this chapter and share some actionable insights for improving software change management I gained throughout my ethnographic experience.

Chapter 6: Discussion & Conclusions

This final chapter provides a comprehensive response to the central research question: **'What occurs within small businesses when a product disrupts long-standing work practice habits?'** The aim is to synthesise theoretical contributions with empirical data from chapter 5, resulting in a pragmatic approach to managing technological change within SMEs.

Section 6.1: An Ecological Approach to Understanding Organisational Infrastructure opens the discussion by adopting an ecological approach on organisational infrastructure. Drawing upon foundational contributions from Star & Ruhleder (1996), Star (2010), and de la Bellacasta (2016), in this section I will apply the concept of 'boundary object' as a useful tool for examining an organisation's current state. Figures 6.1 and 6.2 provide visual models that clarify the interactions between different organisational elements as they evolve during transitional phases.

Building upon this foundation, **Section 6.2: Implications for Organisational Analysis** presents an examination of the key pillars—Access, Trust, Infrastructure, Work Practice, and Power—that form the fabric of organisational structures and processes. This section moves the discussion from broad ecological concepts to focused, actionable elements integral to organisational dynamics.

With the theoretical background established, **Section 6.3: Implications for Design** shifts the focus towards practical applications. This section dissects the impact of my theoretical analysis on two critical domains: software design and organisational infrastructure. Here, I start to bridge the gap between theoretical understanding and real-world action, paving the way for an actionable approach to SMEs change management.

Section 6.4: A HOME Improvement Approach to Change Management operationalises these observations by introducing a comprehensive, empirically supported methodology for facilitating technological change in SMEs. This approach not only encapsulates theoretical understanding but also extends to offer actionable strategies grounded in real-life scenarios.

Subsequent sections, including **Section 6.5: Limitations and Future Research**, will corroborate this new approach with empirical evidence and discuss potential extensions and limitations. In this manner, the chapter not only summarises what has been learnt but also synthesises a robust, data-backed argument for SMEs navigating technological transitions efficiently and successfully.

Section 6.6: Thesis Summary crystallises the research journey, explicitly tying it back to the core question: 'What happens within small businesses when a product is introduced that challenges long-term work practice habits?' Rooted in targeted interviews from 2013 and my own ethnographic work as a cloud software change management consultant, this research dives deep into this question, particularly at critical moments of organisational change. Observations revealed a gap between software companies' promises of simplicity and the actual problems

SMEs face during technology adoption. For instance, a seemingly minor accounting software update could necessitate unanticipated changes across departments, such as sales. These firsthand insights form the bedrock for my focused exploration of the challenges SMEs encounter when integrating new software and altering work processes.

6.1 An Ecological Approach to Understanding Organisational Infrastructure

When examining organisational infrastructure, the ecological approach offers a holistic lens, illuminating interconnections and dependencies. Star and Ruhleder (1996) were instrumental in introducing the approach, as they moved beyond perceiving infrastructure as static constructs, characterising it as continually evolving assemblages borne from numerous interactions, practices, and conventions.

In contemporary business contexts, management often leans towards establishing structured, segmented environments, commonly referred to as 'silos'. Tett (2015) delves deep into this phenomenon in "The Silo Effect," articulating that while silos can emerge as natural solutions for clarity and efficiency, they can inadvertently build barriers that impede communication and broader exchanges of knowledge.

Bento, Tagliabue, and Lorenzo (2020) contribute to the discourse with a scoping review, framing organisational silos as outcomes of specific behavioural patterns within systems and networks. To explore this dynamic, I have incorporated an ecological approach to infrastructure, drawing on Star & Ruhleder (1996) and de la Bellacasta (2016). This alternative view proposes that, rather than eradicating organisational "silos" as suggested by traditional

change management theories (e.g., Kotter, 1995), we could focus on designing permeable boundaries between them. Employing 'boundary objects' within the ecological framework enables organisations to swiftly understand their existing infrastructure, recognise current operational tendencies, and identify potential challenges. The ecological approach, therefore, streamlines the development of enhancements tailored to local contexts, covering both user experience and holistic change management protocols.

By advocating for an ecological approach, my research emphasizes the interactions and interdependencies within the business environment, akin to how ecosystems function in nature. Drawing on this understanding, there's an indication that while silos can serve functional roles, their mismanagement or overemphasis can present systemic issues affecting overall organisational performance and adaptability. Adopting a broader ecological approach – accentuated by the integration of elements such as boundary objects – can facilitate a more contextual awareness of organisational dynamics. This approach not only emphasises the significance of navigating across boundaries but also refines my grasp of Infrastructure and Boundary Object theories within Work Practice.

This study does not propose a one-size-fits-all remedy; instead, it elevates an ecological approach as a means to decode organisational structures, anticipate potential roadblocks, and customise processes for effective change management. Such an approach to design – centred on designing conduits across boundaries – signifies an evolution and deepening of my insights concerning the practical application of Infrastructure and Boundary Object theoretical frameworks within Work Practice. With this ecological lens applied to the analysis and design of organisational infrastructure, we can formulate tools, protocols, and work practices that

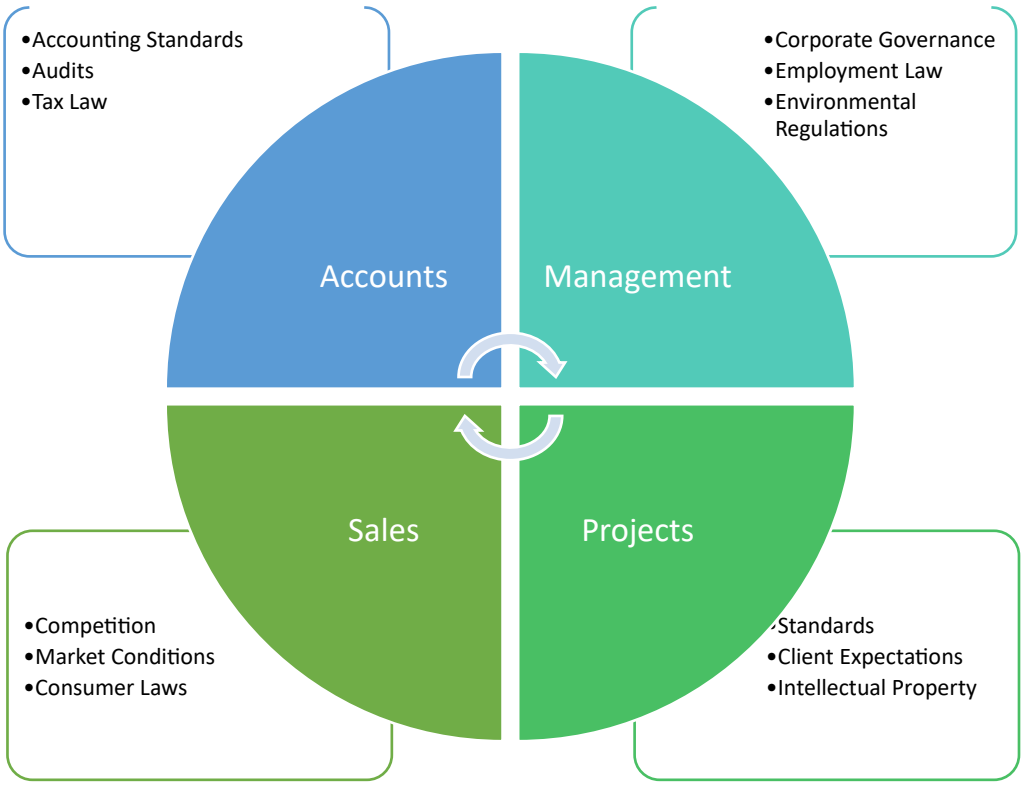
resonate both at the local level and maintain consistency across the broader organisational context.

Drawing on perspectives about organisational silos (Cilliers & Greyvenstein, 2012; Fenwick, Seville, & Brunsdon, 2009; Edwards, 2020; Motingoe & Langerman, 2019), this ecological approach suggests that 'silos' are not the enemy. Rather, they can serve functional purposes if the 'thickness of the walls' between them is designed to be permeable, facilitating effective coordination of efforts across organisational segments. These observations are particularly salient during organisational change, where existing silos can either be barriers to or facilitators of successful change, depending on their adaptability and the organisation's willingness to negotiate and shift its practices. The subsequent section will move to an exploration of boundaries within and between organisations.

6.1.1 Boundaries *within* Organisations

Within Australian organisations, teams and business units are formulated to manage specialised tasks and objectives. These units, colloquially termed 'silos', function within a milieu of external influences and constraints, as depicted in **Figure 6.1.**

Figure 6.1: Boundaries within an Organisation



Such influences could range from regulatory frameworks to societal norms, and they have considerable implications for the way these units interact with each other. For instance, an Accounts team operates within multiple layers of influence:

- Accounting Standards: Regulatory frameworks such as the Australian Accounting Standards Board (AASB) govern financial reporting and can restrict the team's latitude in how it carries out its duties.
- Auditing Requirements: These can vary but may include both external audits and internal scrutiny, which necessitate specific reporting standards and documentation.

- Tax Legislation: Australian tax codes and their updates can affect the accounting procedures, potentially causing friction with existing internal policies.

Similarly, the Sales team might be shaped by:

- Market Competition: The presence of rival firms and their strategies can affect how this unit approaches pricing and client engagement.
- Consumer Protection Laws: Legislation such as the Australian Consumer Law imposes constraints on advertising and data protection.
- Sales Channels: The chosen platforms for distribution, be they digital or traditional, can additionally impact the unit's operational freedom.

The Projects team may be influenced by:

- Industry Standards: Methodologies like PMBOK or Agile may not only offer guidelines but can also impose a particular modus operandi, potentially restricting innovation.
- Client Expectations: Contracts and Service Level Agreements (SLAs) serve as external frameworks, shaping the execution and outcomes of projects.
- Intellectual Property Concerns: Laws pertaining to patents and copyrights can affect the unit's methodological choices.

Lastly, the Management team are constrained by:

- Corporate Governance: The ASX Corporate Governance Council Principles and Recommendations can shape board structures and decision-making processes.

- Employment Laws and Regulations: Fair Work Act requirements and occupational safety standards, among others, inform personnel management and internal policy decisions.
- Environmental Regulations: Sustainability commitments and legislation like the National Greenhouse and Energy Reporting Act (NGER) can influence strategic directives.

Drawing from an ecological approach, silos are not viewed as isolated entities but as interconnected components within a broader system. This system not only includes the internal dynamics within the organisation but is also responsive to a complex web of external influences. Recognising and managing these factors could lead to more porous boundaries between silos, thereby fostering better intra-organisational communication and cooperation.

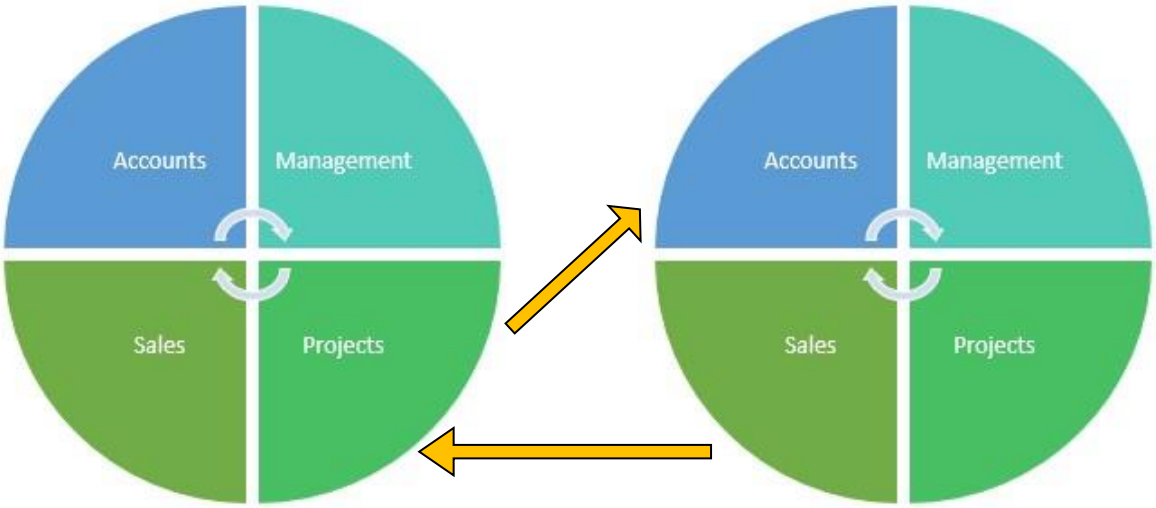
Understanding and strategically navigating these influences offers a significant opportunity for fostering permeable boundaries between units, thereby enhancing effective communication and collaborative potential within the organisation. By proactively considering how each unit adapts to its unique pressures, organisations can more fully appreciate the interconnected implications for other units as well as the entity as a whole. Embracing this understanding promotes an ecological approach, allowing organisations to interpret their structures in a more cohesive way, anticipate potential challenges, and tailor processes for more effective change management.

6.1.2 Boundaries *between* Organisations

Within the business ecosystem, organisations do not operate in isolation. Instead, they are part of larger, interdependent networks. Just as internal teams within an organisation are influenced by various external factors, organisations themselves are subject to influences from others in their network. Here, a deeper ecological approach proves invaluable. Incorporating theories of Infrastructure and Boundary Objects within Work Practice allows for the understanding needed to successfully navigate both internal and external organisational boundaries.

Figure 6.2 visually represents these external organisational interactions, extending the scope beyond just internal boundaries within a single organisation. It illustrates how various units such as Accounts, Sales, Management, and Projects within Organisation A can interact with corresponding or differing units in Organisation B. The two circles each symbolise an organisation, subdivided into four components: Sales, Accounts, Management, and Projects. Arrows indicate the flow of information or resources, connecting teams between and within organisations.

Figure 6.2: Boundaries within and Between Organisations



When Organisation A's Sales Team interacts with Organisation B's Projects Team, both are functioning within the context of their own organisational culture, policies, and pressures. They are also operating within the norms and expectations set by their counterparty in Organisation B. This reciprocity applies across units and organisations. Understanding these multilayered interactions is necessary for aligning strategies and work practices in ways that promote effective collaboration and minimise friction.

Applying an ecological approach to interpret these relationships holds promise for enhancing collaborative outcomes. This perspective enables organisations to identify synergies and potential roadblocks, thereby tailoring their approach for seamless interactions both within and outside their boundaries. By understanding the dynamics at play both within and between organisations, a comprehensive ecological approach can offer practical pathways for improving communication, collaboration, and overall organisational effectiveness.

In summary, Section 6.1 outlines an ecological approach for exploring the infrastructure within and between organisations, highlighting its impact on the ability to change work practice in specific local settings. By examining how 'silos' and boundaries function within and between organisations, we understand that processes or work practices impacted by disruptive technology are never truly isolated.

6.2 Implications for Organisational Analysis

This section aims to bridge theory and observation to offer a comprehensive framework for organisational analysis. Drawing from discussions in Chapter 5 on Access and Trust, and Chapter 2 on Infrastructure and Work Practice, I explore five critical elements that serve as the backbone of this analysis: Access, Trust, Power, Infrastructure, and Work Practice.

Section 6.2.1: Access, derived from Chapter 5, looks into the dynamics of availability, influenced heavily by relationships of power and trust. This concept will help understand how disruptions can alter resource accessibility within a small business.

Section 6.2.2: Trust, also rooted in Chapter 5, examines the role of confidence and familiarity within an organisation. The element of trust becomes important when a small business is adapting to disruptive technologies.

Section 6.2.3: Power, revisited from Chapter 5, explores the dynamics that dictate decision-making processes and user interactions within an organisation. This element offers a lens to understand how software adoption can either challenge or reinforce existing power structures, affecting not just logistical aspects like feature sets but also deeper issues like inclusivity and collective empowerment.

Section 6.2.4: Infrastructure, gleaned from Chapter 2, assesses the existing architectural frameworks within the organisation. Understanding the current infrastructure is important before new, disruptive technologies are introduced.

Section 6.2.5: Work Practice, similarly drawn from Chapter 2, delves into the day-to-day operational routines within a business. It stresses the necessity for adaptable training, smooth transitions, and open channels for feedback when dealing with disruptive changes.

6.2.1 Access

Technical access delves into tangible concerns, such as the availability and usability of software tools. It goes beyond merely asking if users can access the software; it explores whether they can do so seamlessly, without disruptions like glitches or server downtimes. This dimension also encompasses the user-friendliness of the software's design, ensuring that it doesn't just work, but works intuitively. Socio-Political access, on the other hand, digs deeper, reflecting the often-unspoken rules shaped by organisational hierarchies and cultural dynamics. It's about understanding who, within an organisation, has the authority or perceived right to use certain software features.

From the findings in chapter 5, the concept of access was a strong theme with participants when integrating software into work practices. Technical access, when viewed through the lens of user experience, highlights the immediate relationship between an individual and the software. It determines how smoothly a user can interact with, understand, and utilise software functionalities. Any hindrance in this dimension can swiftly lead to frustration, diminished productivity, or even outright rejection of the tool.

Conversely, Socio-Political access offers an analysis into the less tangible but equally vital realms of organisational culture and dynamics. It moves beyond merely enabling access to features and delves into permissions, norms, and interpersonal relationships that shape how and when the software is used. It implies that understanding and navigating these dynamics are crucial for successful change management. For example, introducing a new tool without addressing underlying team mistrust might result in low adoption rates.

In essence, both dimensions of access provide valuable insights into work practices, user experiences, and the larger framework of change management. To achieve an integrative and efficient software adaptation, strategies must be devised that cater to both these dimensions. In the context of my research, the dimension of Access emerges as a critical factor. Whether at the technical level of software availability and usability or the socio-political level of organisational norms and permissions, Access shapes how smoothly a small business can adapt to disruptive changes.

6.2.2 Trust

The concept of *Trust*, as discussed in Chapter 5 affects both individual and collective attitudes towards technology integration. Yuan, Olfman, and Yi (2020) highlight the interplay between institution-based trust and interpersonal trust in the context of organisational settings. Complementing this research, my study extends the idea that trust is not just an individual factor tied to personal experiences and familiarity with tools, but also a systemic feature influenced by institutional parameters. These forms of trust have independent and joint effects on user engagement with technology, paralleling their effects on interdepartmental knowledge sharing as per Yuan et al.'s model.

Ugwu, Onyishi, and Rodríguez-Sánchez (2014) further elaborate that organisational trust and psychological empowerment are significant predictors of employee engagement. In the context of technological integration, trust intersects with psychological empowerment, particularly when new tools are introduced that disrupt established norms. Employees are more likely to engage with new technologies when there's a higher level of organisational trust coupled with psychological empowerment.

Van De Walle and Six (2020) propose that trust and distrust are distinct concepts, each with different characteristics and determinants. Their work underscores the importance of studying both constructs, which my analysis supports. While traditional tools like whiteboards may be associated with deep-seated trust due to their tangible nature and historical reliability, new technologies often have to navigate through both institutional and personal levels of trust and distrust. Thus, understanding the dynamics of trust in technological integration is not

merely a matter of acknowledging its influence but dissecting its multi-faceted nature, informed by individual experiences, interpersonal relationships, and institutional structures.

Challenges associated with trust can arise from users' negative experiences with technology. A solitary adverse encounter with a new software or tool can precipitate a cascade of scepticism, not just confined to that particular tool but extended to related technologies. Gisch & Robertson's (2013) analysis of 'dystopian views of technology' in Phase 1 explores this phenomenon, elucidating how such experiences can skew perceptions, leading to resistance or outright rejection of innovative solutions.

Furthermore, trust is not merely a function of individual experiences but is also deeply embedded in organisational dynamics. When software transitions are perceived as top-down impositions, or when there's an opacity regarding decision-making processes, it can breed mistrust. If, for instance, there's an underlying sentiment that certain team members disproportionately influence tool-related decisions, it can lead to rifts and reduced team cohesion.

Trust, whether stemming from individual experience or institutional practices, serves as a foundation upon which a small business's capacity to adapt to disruptive technologies is built. A lack of trust can not only hamper the immediate adoption of a new tool but can also sow long-lasting seeds of discord within the organisation, further complicating any future attempts at technological integration. Conversely, a robust culture of trust can serve as a buffer against the destabilising effects of disruptive changes, enabling a more seamless transition. Therefore, strategies aimed at technological integration within small businesses must pay heed

to nurturing trust at multiple levels: among team members, between staff and management, and between users and the technology itself. This approach ensures not just the technical but also the socio-cultural success of incorporating new tools and practices.

Reflecting on the theme of trust, it becomes evident that trust is a lynchpin in the process of software integration. It is not enough to merely introduce efficient tools; it is equally important to consider and design for trust-related concerns. While ensuring the reliability and functionality of new tools is essential, fostering an environment of transparent communication and understanding how trust dynamics play a role in achieving successful software adoption. In summary, the cultivation of trust, both in the realm of technology and within organisational dynamics, stands central to the seamless assimilation of new tools and practices.

6.2.3 Power

Within the context of this research, the concept of *Power* surfaces as another important factor woven into the dynamics of technological adoption and user experience. Drawing again from Chapter 5, it becomes apparent that power dynamics operate on multiple planes, influencing not only decision-making processes but also individual interactions with and perceptions of technology. Power considers organisational dynamics, suggesting its profound implications on software adoption and systemic change (Star & Ruhleder 1996; Star 2002).

On an organisational level, power dynamics manifest in the decision-making processes surrounding software adoption and integration. Who gets to decide which software tools are used? Whose preferences are prioritised, and whose are sidelined? Such decisions can subtly

signal which voices and roles hold more sway within an organisation. The introduction of a new software, especially when decided without broad consultation, can be perceived as an exertion of power, potentially leading to feelings of alienation among those who weren't consulted.

But power doesn't just appear in the realm of decision-making; it also permeates user interactions with the software itself. Software often embeds and reinforces power structures, determining who can access what information, who can modify particular data, or even who can use certain functionalities. This software-enforced hierarchy can amplify existing power imbalances within a team or an organisation. If, for instance, a tool restrictively limits access or editing capabilities to a select few, it not only places additional responsibilities on those individuals but also signifies a trust differential within the team.

Power also finds expression in more subtle ways. Those who are tech-savvy or familiar with a particular software might find themselves inadvertently placed in positions of power, serving as de facto experts or go-to individuals for assistance. Such positions, while offering a form of social capital, can also burden these individuals with added responsibilities and expectations. Contemplating these observations, the significance of addressing power dynamics in the context of software change management becomes clear. It's not merely about the introduction of efficient tools; understanding and navigating power dynamics is paramount. For a harmonious technological transition, stakeholders at all levels need to be cognisant of these dynamics, working collaboratively to ensure that software adoption doesn't inadvertently exacerbate power imbalances but instead fosters an environment of inclusivity and collective

empowerment. Through this lens, technology adoption is not just a logistical challenge but also an exercise in fostering equitable organisational dynamics.

With my increased awareness of these elements and their dynamic relationships, software change management becomes a question of how well the new software aligns with, supports, or enhances existing work practices while offering avenues for future evolution. Software isn't just about features or capabilities; it is about how those features fit within the broader narrative of daily operations, collaboration, innovation, and growth within the organisation. Successfully integrating new software, then, is as much about understanding and catering to the particularities of work practice as it is about technical specifications and capabilities.

Returning to the research question focusing on how small businesses adapt to technological disruptions, the insights from chapter 5 suggest that Software adoption is never a neutral act. It is deeply embedded in power structures that govern decision-making, access, and workflow. As such, the concept of Power serves as a lens through which we can critically examine both the challenges and opportunities presented by new technologies.

Given that disruptive technologies can be agents of change, understanding existing power dynamics is essential for a smooth transition; failing to consider these could risk perpetuating existing inequities or even creating new ones. Therefore, effective change management must include an audit of these dynamics to foster an environment that is not only technologically adept but also socially equitable. Only when these power dynamics are

acknowledged, understood, and addressed can software be successfully and ethically integrated into an organisation's existing fabric.

For small businesses seeking to adapt to technological disruptions, navigating power dynamics becomes as crucial as navigating the technical aspects of new tools. Achieving a harmonious technological transition requires a balanced approach that accounts for both technical capabilities and the socio-political aspects rooted in power dynamics. This integrative approach ensures that software adoption not only meets logistical needs but also aligns with the broader values and dynamics of the organisation, ultimately supporting its long-term sustainability and growth.

6.2.4 Infrastructure

The discourse around *Infrastructure* in my study is not a mere backdrop against which activities unfold, but rather a dynamic and vital participant in shaping work practices and technological engagements. Star (1993) once playfully described infrastructure as the study of "boring" things – a sentiment which has since been embraced and explored in niche academic circles, such as in Van Eijk's (2018) dive into the anthropology of Insurance cards, medical codes, and Frequently Asked Questions databases. These explorations into the seemingly mundane might seem facetious at first, but it underscores the often overlooked yet critical nature of infrastructure. The exploration in Chapter 5 of organisational infrastructure uncovered its dynamic nature – being both an enabler and a constraint, background and foreground, often simultaneously.

In its most tangible form, infrastructure refers to the technical architecture underpinning a software – its servers, networks, and databases. Yet, when perceived through an organisational lens, it morphs into a complex web of interrelated systems, processes, and norms that facilitate or hinder operations. Robust, adaptable infrastructures act as enablers, supporting the smooth incorporation of new technological elements into the organisational ecosystem. It anticipates needs, scales in response to demand, and remains resilient in the face of unexpected challenges. Conversely, rigid or incongruent infrastructures can act as significant constraints. Systems that aren't interoperable, databases that don't communicate efficiently, or networks prone to frequent downtimes can derail even the most well-intentioned software adoption efforts.

Infrastructure extends into the socio-cultural domain of an organisation, intricately weaving itself into the cultural fabric, incorporating both the physical design of an office space and the unspoken rules about who gets to use the conference room or how information is disseminated during meetings. These intangibles are just as critical, if not more so, than the hardwired servers or network configurations. Established communication protocols are not just about which software to use for messaging or video calls; they encapsulate the etiquette and norms that guide intra-organisational interactions. Do teams communicate openly, or is there a hierarchical relay of information? Are there dedicated channels for specific kinds of communication? Similarly, entrenched workflows aren't just step-by-step processes to achieve tasks; they reflect the organisational views and perceptions, priorities, and even power dynamics. They determine who has a say in decision-making processes, the sequence of approvals, or the chain of accountability. Deep-rooted organisational habits, formed over years or even decades, become the silent scripts that employees follow, often subconsciously. They can range from how feedback is provided and received to how innovations are embraced or

resisted. These habits influence not just daily operations but also shape the organisation's responsiveness to change.

When introducing new software into this context, the challenge extends beyond mere technical integration. It's a delicate dance of understanding and negotiation, where the new tool needs to fit within the socio-cultural tapestry. Failing to recognise or accommodate these ingrained practices and norms can lead to resistance, misalignment, or even outright rejection of the software, regardless of its technical merits. On the flip side, software that is introduced with a deep understanding of this socio-cultural infrastructure stands a higher chance of seamless integration, acceptance, and optimised utility. By framing infrastructure as a dynamic participant rather than a static backdrop, organisations can tailor their software adoption strategies, ensuring they resonate with the unique infrastructural dynamics inherent to their environments.

6.2.5 Work Practice

In the bustling theatre of an organisation, *Work Practice* is akin to the choreography that directs the ballet of daily operations. It represents not merely the tasks that are accomplished, but the manner in which they're executed, influenced by the collective knowledge, habits, views, and dynamics of the workforce. A holistic comprehension of work practice provides invaluable understanding into the pulse of an organisation and how its heartbeat synchronises with the rhythm of its tools and technologies.

Work practice is informed by the historical evolution of an organisation. Past experiences, both successes and failures, shape current methodologies. It's a repository of tacit knowledge that has been refined over time and is often so deeply embedded that employees might not be overtly aware of why certain practices are followed – they just are. This embeddedness (section 2.1.2) provides stability but can also be a hurdle when introducing new systems or tools. As Prior (2007) and others have highlighted, the imprints of past practices often dictate current norms and habits, making change a dance of re-education and adaptation.

But work practice is far from static. It is a dynamic entity, continuously evolving in response to changing organisational needs, external market conditions, technological advancements, and even the diverse backgrounds and perspectives brought in by new employees. This fluidity offers opportunities for software change management. When introducing new technologies, understanding the current state of work practice isn't enough; one must anticipate its trajectory and potential future states.

Within the context of the discussions on access, trust, power infrastructure, and work practice emerges as both the playground and the battleground. It is where these elements converge, interact, and manifest. It is the lens through which the effects of these elements can be most directly observed. For instance, limited technical access can lead to fragmented work practices, while socio-political dynamics can either facilitate or stifle collaborative endeavours. This aspect of work practice opens up a new dimension of analysis: power.

Turning back to the research question, with a focus on the dynamics within small businesses during periods of technological disruption, the concept of Work Practice takes on significant relevance. Given its integral role in shaping how employees interact with each other

and with technologies, understanding existing work practices becomes pivotal in facilitating or hampering adaptation to disruptive technologies. Therefore, successful software adoption is not merely a matter of technical integration but requires a choreography that harmonises the new with the old. Strategies must be devised to not just implement new systems but to dovetail them with existing work practices, taking into consideration the subtleties that these practices entail. The deeply embedded nature of these practices can pose challenges, making it essential to approach change management not just as a logistical transition but as a reorientation of existing work patterns.

This section aimed to unite theory and observation to offer an ecological approach to organisational analysis. It sheds light on how small businesses can best navigate the multifaceted challenges posed by technological disruptions. Understanding each element in isolation is valuable, but it's their interplay and convergence in real-world settings that provide the most actionable insights. Through this integrated analysis, businesses, policymakers, and stakeholders can better prepare for the challenges and opportunities that lie ahead in an increasingly digital landscape.

6.3 Implications for Design

As my research journey through access, trust, power, infrastructure, and work practices crystallises, the academic impulse to delineate "implications for design" is strong. This common practice of distilling findings into actionable recommendations poses a challenge (Dourish, 2006; Suchman, 1987). The danger, as Dourish (2006) articulates, lies in

oversimplifying insights into a one-size-fits-all mould, losing their richness and context-specific applicability.

Dourish cautions against the reductionist approach that often characterises the transition from analysis to design implications. This echoes similar critiques in the literature that stress the importance of taking into account broader socio-cultural and material contexts in which design interventions take place (Star & Ruhleder, 1996; Norman, 2013). Therefore, this "Implications for Design" section will not serve as a laundry list of design mandates. Instead, it aims to offer a reflective space that weaves together the tapestry of insights from my study. This aligns with Dourish's plea for a deeper, interpretive understanding that informs design in a contextually grounded manner (Dourish, 2006).

The section is structured into two distinct yet interconnected subsections. The first, "Design of Software," focuses on the pragmatic aspects of software design, highlighting the need for an interdisciplinary approach informed by both ethnographic observations and technical imperatives. It provides a set of provocations rather than prescriptions, encouraging software designers to think beyond the superficial functionalities and delve into the experiences of the users.

The second subsection, "Design of Organisational Infrastructure," takes a broader view, examining how design decisions resonate at an organisational level. It probes the subtleties of work practices, trust mechanisms, and power dynamics, presenting a more holistic approach to design that goes beyond the user interface.

The goal here is to provide a roadmap for designers, developers, and stakeholders to thoughtfully navigate their unique organisational contexts. By dividing the discussion into these two areas of focus, the section offers a multi-layered perspective that helps ensure design decisions are not just data-driven, but also richly contextual and adaptable to specific organisational intricacies.

6.3.1 Design of Software

Rooted in an ecological approach, my findings illuminate the interplay of access, trust, power, infrastructure, and work practices. The convergence of these elements in software design doesn't just create a functional tool but shapes a cohesive and meaningful user experience (Norman, 2013). While there's no obligation for software designers to incorporate every research finding, evidence from this study suggests that doing so can considerably enhance user engagement and satisfaction (Tractinsky et al., 2000).

These observations, informed by ethnographic approaches (Hammersley & Atkinson, 2007), have been scrutinised through participant feedback and shared in various industry forums. Notably, they were presented to developers at Clouded and two other comparable software companies within the Xero ecosystem, reiterating the importance of a symbiotic relationship between empirical research and real-world application (Orlikowski & Baroudi, 1991).

The focus on infrastructure moves beyond mere operational logistics. While servers and API integrations ensure functional operability, it's an in-depth understanding of existing organisational practices and systems that is pivotal for integration (Star & Ruhleder, 1996;

Dourish, 2006). This resonates with Star's "study of boring things" (Star, 1999), highlighting the need to perceive software not just as a tool but as a key component in an organisation's operational matrix.

My ethnographic insights indicate that boundary objects (Star & Griesemer, 1989) play a crucial role in user experience. Far from being mere features, these are the elements that bind user perceptions and expectations. The research highlights users' desire for familiar landmarks within software landscapes, serving as anchors that foster trust and ease transitions (Erickson, 1996).

The research suggests that design should consider the evolving landscape of hybrid work practices (Nippert-Eng, 1996). Observations point out a delicate balance between security imperatives and the expansive capabilities offered by Cloud technologies. Coupled with the diverse work personas observed, software needs to be a functional entity that seamlessly integrates within the ever-evolving work ecosystem (Weiser, 1991). Some Recommendations for Software Design include:

- Identifying technical barriers emerging from design assumptions (Norman, 1988).
- Incorporating visual cues for responsibility and progress tracking, while allowing for flexibility to adapt to local cultural and political dynamics (Hall, 1976; Hofstede, 1984).
- Planning for information to be accessed for various purposes across the organisation in unexpected ways, acknowledging the 'interpretive flexibility' of technological artefacts (Pinch & Bijker, 1987).

Ultimately, software designers should be open to the multitude of ways users engage with systems (Suchman, 1987). This calls for a flexible design approach that avoids imposing barriers. Much like my research methodology, software design is a cyclical, adaptive dialogue, responsive to the evolving narratives of users (Bødker, 1996). The insights and recommendations presented here are not directives but provocations, urging designers to probe deeper into the potential for software to genuinely reflect and enrich users' lived experiences (Dourish, 2006).

6.3.2 Design of Organisational Infrastructure

While software design carries its own set of intricacies, the design of organisational infrastructure presents a broader, more encompassing challenge. In this vein, the organisational infrastructure serves as the canvas on which the art of work practices, trust, and power dynamics are painted (Star & Ruhleder 1996; Star 2002). If software is an entity within an organisation's operational matrix, the infrastructure is the matrix itself—a composite of both material and non-material elements that shape the organisation’s very skeleton and sinews (Dourish 2006).

The design should facilitate open channels of communication that are horizontal as much as they are vertical, helping to mitigate the concentration of power and enabling a more democratic distribution of trust. Moreover, mechanisms for collective decision-making could be established to ensure that no single voice dominates the narrative when introducing new technologies or changes (Star & Ruhleder 1996).

The technological aspects should also be rendered with subtlety. Our insights into access and trust can be implemented in the design of technological infrastructures, such as data warehouses or cloud storage solutions, to ensure that they align well with the prevailing work practices (Orlikowski, 2007). In fact, an effective technological infrastructure design would anticipate how work practices could evolve and offer the flexibility to adapt (Weiser, 1991). Just as boundary objects serve as crucial integrators within software design, the concept of 'boundary spaces' in organisational infrastructure acts as common ground where different departments or teams can coalesce (Star, 2010). These could be literal physical spaces like communal areas, or virtual platforms designed for cross-departmental collaboration. Such spaces serve as areas for dialogue, innovation, and conflict resolution, and they often operate outside the restrictive boundaries of hierarchy (Star & Griesemer, 1989).

Given the ever-evolving nature of work practices and the flux of organisational needs, the design should permit a fluid reconfiguration of both technological and social architectures. This adaptability ensures that the organisation remains agile in the face of both internal and external changes, be it shifts in team dynamics or new market challenges (Suchman, 1987). Some practical design considerations include:

- Construct transparent systems that make power structures and decision-making processes visible, enhancing accountability and trust (Zuboff, 1988).
- Implement fail-safes and redundancies in technological infrastructures to preserve data integrity and maintain operational continuity, thus cementing trust in the system (Luhmann, 1979).
- Create a versatile infrastructure that accommodates a wide range of software tools and technologies, enabling smooth transitions and integrations (Clark & Brennan, 1991).

- Employ participatory design methods involving employees from various departments and hierarchies, incorporating their input to create a more inclusive infrastructure (Robertson & Simonsen, 2012).
- Build avenues for feedback and continuous improvement, allowing the infrastructure to evolve and adapt to emerging needs (Schön, 1983).

Designing organisational infrastructure is not just a matter of engineering or architecture; it's an act of socio-cultural craftsmanship (Dourish, 2006). Much like the software design implications, these are not mandates but thought-starters designed to spur a more reflective approach (Dourish, 2006). It is about constructing an ecosystem—both technological and social—that resonates with the myriad elements that shape an organisation.

In summary, the "Implications for Design" section serves as a reflection of the multifaceted nature of design itself—an ecosystem that cannot be reduced to simple checklists or directives. By delving into the specificities of software design and broadening the scope to include organisational infrastructure, this section aims to offer a more comprehensive understanding of design in context. It invites those involved in the design process to engage in a thoughtful dialogue with both their material and their social worlds, drawing from a deeper, interpretive understanding.

6.4 A HOME Improvement Approach to Change Management

Despite the advantages[4] of cloud software, the integration of such technology within SMEs often encounters significant socio-technical barriers. These barriers include resistance to change, discrepancies in digital literacy among staff, and the challenge of reshaping traditional business processes to fit new digital models.

The socio-technical challenges inherent in deploying cloud solutions put to the front that the success of technological adoption relies not only on the tools themselves but also on the human and organizational elements surrounding these tools. In this scenario, the HOME approach with the guidance of specialist consultants can help SMEs into successful digital transformation.

The HOME Improvement Approach, derived from the ecological systems thinking introduced by Susan Leigh Star, provides a practical and transformative framework for Small and Medium Enterprises dealing with the integration of new technologies such as cloud computing. This approach goes deeper than traditional systems and change management methodologies, which typically view systems in static, linear terms. HOME encourages SMEs

[4] For instance, accounting software tools like Xero and QuickBooks revolutionizes financial management for SMEs by providing real-time financial data access, allowing businesses to manage their finances without the geographical constraints of traditional software. Project management tools, such as Trello and SmartSheets, enable collaboration across different geographical locations, enhancing communication within project teams, crucial for SMEs where team members operate across various locations. Cloud storage solutions, like Google Drive and Dropbox, offer flexible, scalable options for data management, ensuring that documents and media are accessible from any device, anytime, enhancing operational flexibility and supporting a mobile workforce.

to move away from the rigid, prescriptive processes typical of traditional change management towards more adaptable, responsive practices that are better suited to the fluid nature of modern business environments.

The HOME approach was developed through rigorous research and real-world application to manage technological transitions effectively from a holistic approach; it encompasses:

- **Holistic Understanding**: Analysing the interconnected impacts of new technologies across different business areas; emphasising a holistic view that integrates human elements into system design and implementation.
- **Observing Work Practice:** Observing the nature of the work and the real-world steps and solutions that are used, which are sometimes in contradiction of written or assumed process; assisting integration of new technologies across various departments and stakeholder groups, enhancing system integration and functionality.
- **Mapping Procedures**: Tailoring the technological integration to align with the unique workflows and cultural norms of the SME.
- **Engaging Employees**: Focusing on the human element, ensuring that the staff understands and supports technological changes, which is crucial for minimizing resistance and enhancing adaptation; extending the ecological approach's emphasis on inclusivity, HOME ensures that all parts of an organisation are considered during technological implementations.

The following example illustrates how the concept of boundary objects and the HOME approach can be utilized to design, for instance, a Project Management Office (PMO) that

supports varied methodologies while promoting effective collaboration, communication, and achieving successful technological integration.

Consider a project aimed at developing a new software product. The project team comprises project managers trained in different methodologies:

- **Agile Project Manager:** Focuses on iterative development, regular feedback, and adapting to changes quickly.
- **Waterfall Project Manager:** Emphasizes a sequential approach, where detailed planning upfront is crucial and changes in scope are less frequent.
- **PRINCE2 Project Manager:** Stresses on structured management with strong governance and clear templates and stages.

Despite their differences, all three managers aim to answer common project concerns: progress tracking, budget adherence, and resource allocation. However, their approaches to addressing these matters differ significantly, influenced by the terminologies and interaction styles specific to their training.

By abstracting the common goals that all three managers share, we can identify core functionalities needed in our PMO tools and systems. An example of this design coordination, can include:

- **Unified Dashboard:** Implements boundary object principles, providing real-time project metrics (progress, expenses, resource usage) adaptable to display information relevant to the methodology being used. This dashboard acts as a "window" into the project's health, configurable to suit the detailed requirements of Waterfall, the flexibility of Agile, or the structured stages of PRINCE2.

- **Collaborative Tool Design:** "Doors" in our PMO home, these interfaces are designed to facilitate communication and document sharing across methodologies. Developing common meanings and formats for sharing and presenting relevant information creates closer connections without challenging individual domains.
- **Integrated Risk Assessment:** These tools should be designed to evaluate risks in a manner that is compatible with the varying focus areas of different methodologies. For instance, while Agile might require a more dynamic risk tracking system that updates with each sprint, Waterfall could benefit from a more static risk assessment at each major phase.

In conclusion, the strategic application of boundary objects and the HOME approach in our PMO allows for the design of systems that accommodate different project management methodologies while ensuring effective collaboration where it matters most. This approach not only improves operational efficiency but also enhances the adaptability of our project management practices, ensuring that our PMO is equipped to handle diverse projects. By focusing on common goals and designing flexible yet structured interfaces, we can create a more cohesive and efficient PMO that serves as a robust foundation for successful project delivery.

6.5 Limitations and Future Research

Ethnographic research inherently imposes its own constraints, akin to an explorer scrutinising the rooms and corners of an unfamiliar mansion. The current study is confined to the specific rooms—represented by SMEs in an Australian context—that I investigated during

a limited timeframe. Consequently, the insights gathered may echo other organisational structures but remain deeply contextual, rooted in specific circumstances.

Cultural limitations further bound the scope of this study. While an ethnographic approach offers a thorough analysis of certain facets of the organisational 'house', it doesn't promise an exhaustive mapping of the mansion. The organisations I studied presented only a limited number of 'rooms' for exploration, with certain recesses beyond the scope of my observation.

The Australian landscape has been shaken by challenges such as devastating bushfires and the COVID-19 pandemic, both altering perceptions of 'home' in different ways. These events serve as a backdrop to the study, reinforcing the need for adaptability and connectedness within organisations. The dynamic nature of these events highlights the necessity for resilience and agility in any organisational blueprint.

The increase of remote work adds a new layer of analysis, serving as an 'extension' to the organisational house. Although it introduces advantages like flexibility and cost efficiency, it simultaneously presents challenges around work-life balance and mental wellbeing. Future research could deeply explore how Artificial Intelligence (AI) may intersect with these remote work dynamics, offering both opportunities and challenges in terms of power distribution, productivity, and employee engagement.

While I contemplate about the facets of ‘power’ regarding work practice in remote and distributed settings, gender issues surface as an intriguing social topic that may influence

software adoption and use. In this sense, gender dynamics remain a relevant topic, further complicated by the transition to cloud technology and remote work environments. In this scenario, AI presents another variable that could either mitigate or exacerbate existing gender disparities, warranting comprehensive exploration.

As technology seeps into our domestic and professional lives, the concept of 'boundary management' gains renewed significance. The merging of work-life demarcations raises new questions that interdisciplinary research, bringing in knowledge from sociology, psychology, and technology, could help address.

Future research avenues are rich and varied. The integration of AI into organisational practices, the challenges of remote work in an Australian context, and the gender dynamics interwoven with these transitions, all offer fruitful grounds for further investigation. As we remodel our organisational homes with emerging technologies, the aim should not only be to achieve functional efficiency but also to create more equitable, inclusive, and adaptable environments.

6.6 Thesis Summary

My research question was: ‘What happens within small businesses when a product is introduced that challenges long-term work practice habits?’. From within the context of Australian SMEs making the transition to cloud technology, I explored a diversity of experiences and developed some insights that could be extrapolated to broader discussion. What emerged was clear: even in established organisations, there are constant negotiations and

shifts as individuals adapt, resist, learn, and refine work practices. These elements become particularly contested during organisational change.

This study takes an ecological approach to explore some key concepts from the literature in order to draw out themes that can be used to improve industry practice. It considers dynamics of access, trust, power, and work rhythms, offering a lens into the interplay between the design and use of software and organisational infrastructure and work practice. In contrast to existing, structured change management methodologies, this ecological approach provides the opportunity for a deeper, more grounded exploration of organisational dynamics, exploring the correlation of technology, organisational infrastructure and socio-political factors.

A core focus of this journey is the blending of theoretical concepts and practical observations. It culminates with the development of a 'HOME Improvement' approach. Rather than being a rigid blueprint, this approach is a synthesis of the insights distilled from an ecological analysis of organisational dynamics. It does not prescribe; instead, it embraces the 'tacking' nature of boundary objects, serving as an abstract guide, which can be tailored, embedded and contextualised within specific localised work practice. It can be used as a reflective mirror, allowing organisations to consider their existing dynamics and design improvements to suit their unique dynamics and circumstances.

The 'HOME Improvement' approach is a new perspective that recognises the fluidity of organisational dynamics and emphasises adaptability. While traditional methods might seek to standardise and dictate, this approach listens, adapts, and offers a flexible scaffold. This

adaptability ensures its resonance with diverse organisational contexts, from startups to established entities, from tech giants to grassroots initiatives. As our business landscape continues to evolve, beset by technological advancements and shifting work paradigms, the importance of a flexible, responsive approach to change management becomes paramount. By emphasising adaptability, this research contributes a refreshing perspective. It invites industry practitioners, scholars, and organisations at large to approach change not as a daunting challenge but as an adaptable journey, one that requires reflection, and above all, a keen understanding of the tapestry of human and organisational dynamics.

This thesis comprehensively explores the research question, 'What happens within small businesses when a product is introduced that challenges long-term work practice habits?' Starting with an introduction that sets the contextual and organisational stage, it proceeds to a literature review that scaffolds the research with academic theories from interaction design to boundary objects. The research methodology chapter ensures a rigorous and ethically sound approach, utilising ethnographic methods to explore the realities faced by SMEs during software adaptations. In a two-phased investigation across diverse industries, the study offers a rich contextual understanding of how software changes intersect with work practice and organisational dynamics. The Research Insights chapter provides an empirical lens to examine how new software disrupts existing work practices and impacts organisational elements like trust and access. Finally, the discussion and conclusions weave these diverse strands into a coherent analysis, offering a holistic view of the challenges and implications SMEs face when adopting new software or modifying existing processes.

In summary, this research contributes a fresh perspective to the field, inviting stakeholders—scholars, practitioners, and organisations—to approach change not as an insurmountable challenge but as an adaptable journey. It provides a flexible yet robust framework for navigating changes effectively, bridging a notable gap in the existing literature. The thesis ultimately enriches our understanding of the complexities faced by SMEs in an ever-evolving technological landscape, providing actionable insights and tools for effective change management.

Appendix 1: Participants by Type

Industry	Professional Services	Professional Services	Professional Services	Professional Services	Professional Services
Company	Outsourced HR	N/A	N/A	Oversight Accounting	MidWest Accounting
Interviewee	Sarah	Marla	Irene	Carol	Alexander
Consent Type	Written	Written Notification & Verbal Consent	Written Notification & Verbal Consent	Written Notification & Verbal Consent	Written Notification & Verbal Consent
Mode	Face to Face	Face to Face	Face to Face	Face to Face	Face to Face
Geographic Perspective	Urban	Urban	Regional	Regional	Urban
Local Geographic Area	Inner Sydney	Sydney	Sydney and Regional NSW	Sydney and Regional NSW	Sydney
Role	Admin	Bookkeeper	Bookkeeper	Bookkeeper	Accountant & Business Owner
Size	Small Business	Sole Trader	Sole Trader	Sole Trader	Medium Business
Research Timing	Inductive	Inductive	Inductive	Inductive	Inductive
Organizing Mechanisms	Word, Excel, Contracts	Paper folders, Excel, MYOB, Xero	Paper folders, Excel, MYOB, Xero	Paper folders, Excel, MYOB, Xero	Paper folders, Excel, Xero & WFM, Whiteboard
Issues or Challenges:					
Hesitation to transition from paper-based processes	x			x	
Problems related to internet connectivity	x	x	x		
Perseverance with faulty products despite unsatisfactory experiences		x	x	x	x
Dependence on physical signatures	x		x	x	x
Adhoc approach to new technology			x	x	x
Fear or apprehension towards novel technology	x				x
Anxiety about unfamiliar processes					
Outdated manual processes inadequate for current scale	x	x	x	x	x
Substantial change management efforts needed for software implementation	x	x	x	x	x
Quoting/invoicing needs exceed standard software offerings	x				x
Compatibility issues across document versions		x	x	x	x
Inconsistent functional features		x	x	x	x
System changeover could necessitate dual entry for historical data retention		x	x	x	x
Desire for color customization options				x	x
Utility in customizable dashboards		x	x	x	x
Split between 'creative' and managerial/administrative work styles					
Low confidence in reporting				x	x
Necessity for compartmentalized access	x	x	x	x	
Continued relevance of paper (for physical records/approvals)	x	x	x	x	x
Continued relevance of paper (for user-friendliness)		x	x	x	x
Negative experiences leading to system rejection	x	x	x	x	x
Desire for more flexible templates	x	x	x	x	x
Timesheets entry a barrier	x				x
Positive Experiences or Hopes for Improvement:					
Satisfactory internet speed and reliability	x			x	x
Collaborative digital space for project information	x	x	x	x	x
Emphasis on teamwork		x	x	x	x
Appreciation for the convenience of monthly subscription models	x	x	x	x	x
Anticipation of time-saving benefits from new systems, even if imperfect	x	x	x	x	x
Improved business decision-making with accessible information	x	x	x	x	x
Ease of information sharing without additional burden		x	x	x	x
Potential business expansion with the implementation of new processes		x	x	x	x
Accessible software simplifying tasks for business owners/managers	x	x	x	x	x
Convenience of remote access	x	x	x	x	x
Shared access enabling distribution of responsibilities		x	x	x	x
Streamlined payroll processes		x	x	x	x
Neutral: Description of Ways of Working:					
Large, delegated work segments	x				x
Utilizing video calls as a face-to-face substitute	x				x
Individual communication preferences	x	x	x		x
Visible progress due to physical proximity		x	x	x	x
Video medium not appropriate for spontaneous discussions	x	x	x	x	
Less disruptive messaging compared to calls	x				x
Video calls serving different purposes than email or phone	x			x	
Investment in existing systems reinforcing commitment, despite issues				x	
Necessary blend of office and fieldwork	x	x	x	x	
Designated spaces and times for various tasks (e.g., office for paperwork)				x	x
Sustaining changes demands consistent monitoring and persistence		x	x	x	x
Offline working capabilities	x	x	x		
Technology for specific purposes (e.g. Instant Message for Casual)	x	x	x	x	

Industry	Legal	Legal	Creative	Creative	Creative
Company	Eastern Legal	Bayside Legal	Edgy Designs	Sound Haven	Stacked Media
Interviewee	Nina & Emily	Laura	Laura/Mary	Cindy	Mary
Consent Type	Written Notification & Verbal Consent	Written Notification & Verbal Consent	Written	Written	Written
Mode			Skype	Face to Face	Face to Face
Geographic Perspective	Urban	Urban	Urban	Urban	Urban
Local Geographic Area	Melbourne	Melbourne	Inner Sydney	Sydney	Sydney, Singapore
Role	Business Owners	Operations	Operations	Operations	Operations
Size	Small Business	Medium Business	Small Business	Small Business	Medium Business
Research Timing	Reflective	Reflective	Inductive	Inductive	Inductive
Organizing Mechanisms	Word, Excel, Paper Folders	Word, Excel, Paper Folders	Word, Excel, Project Templates, Whiteboard	Word,Excel	Word, Excel, Paper Folders
Issues or Challenges:					
Hesitation to transition from paper-based processes		x	x		x
Problems related to internet connectivity					
Perseverance with faulty products despite unsatisfactory experiences	x			x	
Dependence on physical signatures					
Adhoc approach to new technology	x			x	
Fear or apprehension towards novel technology	x	x	x	x	x
Anxiety about unfamiliar processes	x			x	x
Outdated manual processes inadequate for current scale	x	x	x	x	x
Substantial change management efforts needed for software implementation	x	x	x	x	x
Quoting/invoicing needs exceed standard software offerings	x	x		x	
Compatibility issues across document versions	x	x		x	
Inconsistent functional features	x	x		x	
System changeover could necessitate dual entry for historical data retention		x			
Desire for color customization options	x	x		x	
Utility in customizable dashboards	x	x		x	
Split between 'creative' and managerial/administrative work styles			x	x	x
Low confidence in reporting		x		x	
Necessity for compartmentalized access	x				
Continued relevance of paper (for physical records/approvals)					x
Continued relevance of paper (for user-friendliness)			x		x
Negative experiences leading to system rejection	x	x	x	x	x
Desire for more flexible templates	x			x	x
Timesheets entry a barrier			x		x
Positive Experiences or Hopes for Improvement:					
Satisfactory internet speed and reliability	x	x		x	
Collaborative digital space for project information	x	x	x	x	x
Emphasis on teamwork	x		x	x	
Appreciation for the convenience of monthly subscription models	x				
Anticipation of time-saving benefits from new systems, even if imperfect	x	x		x	
Improved business decision-making with accessible information	x	x	x	x	x
Ease of information sharing without additional burden	x	x			x
Potential business expansion with the implementation of new processes	x	x		x	x
Accessible software simplifying tasks for business owners/managers	x	x			x
Convenience of remote access	x	x		x	x
Shared access enabling distribution of responsibilities	x	x		x	x
Streamlined payroll processes	x	x		x	
Neutral: Description of Ways of Working:					
Large, delegated work segments	x			x	
Utilizing video calls as a face-to-face substitute					
Individual communication preferences		x		x	
Visible progress due to physical proximity			x		
Video medium not appropriate for spontaneous discussions	x	x		x	
Less disruptive messaging compared to calls	x	x			
Video calls serving different purposes than email or phone	x	x		x	
Investment in existing systems reinforcing commitment, despite issues		x			
Necessary blend of office and fieldwork				x	x
Designated spaces and times for various tasks (e.g., office for paperwork)	x	x		x	
Sustaining changes demands consistent monitoring and persistence	x	x		x	x
Offline working capabilities					
Technology for specific purposes (e.g. Instant Message for Casual)			x	x	x

Industry	Construction	Construction	Construction	Architecture	Architecture
Company	Far North Construction	Greener Construction	Soutwest Fabricators	Southside Architecture	Far West Architecture
Interviewee	Tamara & Christine	Mona	Steve	Kyle & Paul, Alex, Karen, Bob, Nina, Pete	Written Notification & Verbal Consent
Consent Type	Written	Written	Written Notification & Verbal Consent	Written Notification & Verbal Consent	Yes
Mode	Skype & Email	Face to Face	Face to Face	Face to Face	
Geographic Perspective	Regional	Urban	Urban	Urban	Urban
Local Geographic Area	Northern NSW	Melbourne, Sydney, Brisbane	Sydney	Melbourne, Sydney, Brisbane	Adelaide
Role	Admin	Operations	Admin	Operations	Operations
Size	Small Business	Medium Business	Small Business	Medium Business	Small Business
Research Timing	Inductive	Reflective	Inductive	Reflective	Reflective
Organizing Mechanisms	Word,Excel, Whiteboard	Paper folders, Excel, Xero & WFM, Whiteboard	Word,Excel, Whiteboard	Paper folders, Excel, Xero & WFM, Whiteboard	Paper folders, Excel, Xero & WFM, Whiteboard
Issues or Challenges:					
Hesitation to transition from paper-based processes		x	x		x
Problems related to internet connectivity			x		x
Perseverance with faulty products despite unsatisfactory experiences				x	x
Dependence on physical signatures					
Adhoc approach to new technology	x		x	x	
Fear or apprehension towards novel technology	x	x	x	x	x
Anxiety about unfamiliar processes			x		
Outdated manual processes inadequate for current scale	x		x	x	x
Substantial change management efforts needed for software implementation	x	x	x	x	x
Quoting/invoicing needs exceed standard software offerings	x		x	x	x
Compatibility issues across document versions	x		x	x	
Inconsistent functional features	x		x	x	x
System changeover could necessitate dual entry for historical data retention	x		x	x	x
Desire for color customization options	x		x	x	x
Utility in customizable dashboards	x		x	x	x
Split between 'creative' and managerial/administrative work styles			x	x	x
Low confidence in reporting		x	x	x	x
Necessity for compartmentalized access					
Continued relevance of paper (for physical records/approvals)		x	x	x	x
Continued relevance of paper (for user-friendliness)		x	x	x	x
Negative experiences leading to system rejection	x	x	x	x	x
Desire for more flexible templates	x	x	x	x	x
Timesheets entry a barrier	x	x	x	x	x
Positive Experiences or Hopes for Improvement:					
Satisfactory internet speed and reliability	x			x	x
Collaborative digital space for project information				x	x
Emphasis on teamwork				x	x
Appreciation for the convenience of monthly subscription models			x	x	x
Anticipation of time-saving benefits from new systems, even if imperfect	x		x	x	x
Improved business decision-making with accessible information	x	x	x	x	x
Ease of information sharing without additional burden				x	x
Potential business expansion with the implementation of new processes			x		x
Accessible software simplifying tasks for business owners/managers			x	x	x
Convenience of remote access				x	x
Shared access enabling distribution of responsibilities				x	x
Streamlined payroll processes				x	x
Neutral: Description of Ways of Working:					
Large, delegated work segments				x	
Utilizing video calls as a face-to-face substitute	x			x	
Individual communication preferences				x	
Visible progress due to physical proximity			x	x	x
Video medium not appropriate for spontaneous discussions					
Less disruptive messaging compared to calls					
Video calls serving different purposes than email or phone					x
Investment in existing systems reinforcing commitment, despite issues	x			x	x
Necessary blend of office and fieldwork	x		x	x	
Designated spaces and times for various tasks (e.g., office for paperwork)			x	x	x
Sustaining changes demands consistent monitoring and persistence			x	x	x
Offline working capabilities					
Technology for specific purposes (e.g. Instant Message for Casual)		x	x	x	x

Industry	Non-Profit	Journalist
Company	NSW Gov	Journalist
Interviewee	Monica	Sholto McPherson
Consent Type		Verbal
Mode	Face to Face	Skype Interview
Geographic Perspective	Urban	Urban
Local Geographic Area	Sydney	Sydney
Role	Project Management	Journalist
Size	Large	Sole Trader
Research Timing	Inductive	Inductive
Organizing Mechanisms	Word,Excel	Unknown
Issues or Challenges:		
Hesitation to transition from paper-based processes		
Problems related to internet connectivity		x
Perseverance with faulty products despite unsatisfactory experiences	x	
Dependence on physical signatures	x	
Adhoc approach to new technology		
Fear or apprehension towards novel technology	x	x
Anxiety about unfamiliar processes		
Outdated manual processes inadequate for current scale	x	
Substantial change management efforts needed for software implementation	x	x
Quoting/invoicing needs exceed standard software offerings		
Compatibility issues across document versions	x	
Inconsistent functional features	x	x
System changeover could necessitate dual entry for historical data retention		
Desire for color customization options		
Utility in customizable dashboards	x	
Split between 'creative' and managerial/administrative work styles		
Low confidence in reporting		x
Necessity for compartmentalized access	x	x
Continued relevance of paper (for physical records/approvals)		
Continued relevance of paper (for user-friendliness)	x	
Negative experiences leading to system rejection	x	x
Desire for more flexible templates		
Timesheets entry a barrier		x
Positive Experiences or Hopes for Improvement:		
Satisfactory internet speed and reliability	x	
Collaborative digital space for project information	x	
Emphasis on teamwork	x	
Appreciation for the convenience of monthly subscription models		x
Anticipation of time-saving benefits from new systems, even if imperfect		x
Improved business decision-making with accessible information	x	x
Ease of information sharing without additional burden		x
Potential business expansion with the implementation of new processes		x
Accessible software simplifying tasks for business owners/managers		
Convenience of remote access	x	x
Shared access enabling distribution of responsibilities	x	x
Streamlined payroll processes		
Neutral: Description of Ways of Working:		
Large, delegated work segments	x	
Utilizing video calls as a face-to-face substitute		
Individual communication preferences	x	x
Visible progress due to physical proximity		
Video medium not appropriate for spontaneous discussions		
Less disruptive messaging compared to calls	x	
Video calls serving different purposes than email or phone	x	x
Investment in existing systems reinforcing commitment, despite issues		
Necessary blend of office and fieldwork		
Designated spaces and times for various tasks (e.g., office for paperwork)	x	
Sustaining changes demands consistent monitoring and persistence		
Offline working capabilities	x	
Technology for specific purposes (e.g. Instant Message for Casual)		

Appendix 2: Key Terms

Articulation Work: The coordination and negotiation required to perform daily tasks, particularly in how teams collaborate, adjust, and adapt during transformative periods such as the adoption of new technologies.

Boundary Objects: Artifacts and tools that can be adapted to facilitate effective collaboration and information sharing across various organisational contexts. These objects play a crucial role in understanding complex organisational dynamics.

Change Management: A systematic approach employed to oversee alterations or transformations within organisations. It's pivotal in achieving smooth change implementation while curbing disruptions.

Cloud Technology: Products or services hosted online and delivered on-demand to users, enhancing various aspects of business administration.

Clouded: Pseudonym for a project management solution developed by an independent third party, which was acquired by Xero in 2012.

Customer Relationship Management (CRM): software for managing an organisation's relationships and interactions with potential and current customers.

Disruptive Technology: The emergence of simple, accessible, and affordable products or services that have the potential to revolutionise a specific industry. This can stem from technological advancements, innovative business models, processes, or organisational structures.

Ecological View: An approach that perceives infrastructure as continually evolving, rather than linear and fixed.

Functional Design: An exploration into the intricacies of how fields are designated and delineated for data input.

Goods and Services Tax (GST): A tax levied on most goods and services sold for domestic consumption. It is paid by consumers but is remitted to the government by the businesses selling the goods and services. In essence, GST provides revenue for the government while representing a cost for the consumers and producers.

Interaction Design: A focus on the system's features, where aspects like its complexity and usability become primary considerations in software development.

MYOB (Mind Your Own Business): An Australian multinational corporation that offers business management solutions covering accounting, payroll, payments, retail point of sale, CRM, and more. MYOB provides tools for businesses to manage their finances, be compliant with tax rules, and facilitate the process of accounting in a streamlined manner.

National Broadband Network (NBN): an infrastructure project in Australia designed to improve internet speeds and connectivity.

Organisational Infrastructure: The foundational elements of an organisation, including norms, procedures, tools, processes, rules, policies, and guidelines that support the work carried out by its members.

Reckon: An Australian software company known for its range of accounting, payroll, and bookkeeping software solutions for small to medium enterprises. Reckon offers tools for accounting, payroll, payments, invoicing, and more, providing businesses with comprehensive financial management capabilities.

Saasu: An online accounting software company that caters to small and medium enterprises. With features such as invoicing, expenses, payroll, and inventory management, Saasu simplifies accounting tasks and provides an overview of business financial health.

Shopping: The evaluation process business owners undertake when assessing communication tools, considering practical decision-making aspects during the selection of off-the-shelf software solutions.

Small and Medium Enterprise (SME): businesses that have particular size standards in terms of employees or annual revenues.

Tailoring: The subsequent adaptation of the "shopping" process to cater to specific needs.

Technical / Not Technical User: Users with varying degrees of familiarity with Xero and Clouded, specifically concerning understanding the ramifications of changes made within the system.

Work Practices: A concept capturing the real-world experiences within an organisation, often highlighting the differences between theoretical procedures and their practical application.

Xero: A New Zealand-based software company that offers a cloud-based platform for small- and medium-sized businesses to manage their accounting, invoicing, bank reconciliation, and other financial functions. Xero's platform emphasises real-time data and integrations with various financial services and apps.

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