

The Future of Work: An Organisational History Perspective

Author:

Dias, Malshika

Publication Date:

2021

DOI:

<https://doi.org/10.26190/unsworks/2281>

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The Future of Work: An Organisational History Perspective

Malshika Dias

A Thesis in Fulfilment of the Requirements for the Degree of Doctor of
Philosophy

School of Information Systems and Technology Management

UNSW Business School

2021

Thesis Sheet

Surname/Family Name	:	DIAS
Given Name/s	:	Malshika
Abbreviation for degree as give in the University calendar	:	PhD
Faculty	:	Business
School	:	Information Systems and Technology Management

<p>Thesis Title:</p> <p>The Future of Work: An Organisational History Perspective</p>
<p>Thesis Abstract:</p> <p>Emerging technologies are radically changing the future of work. From artificial intelligence for customer support to robotics for performing surgery, the change is unprecedented in the history of most organisations. This thesis aims to understand and contribute rich, empirically informed insights into the phenomenon of the future of work in the context of emerging technologies from an organisational history perspective. The thesis comprises three related but standalone studies that discuss organisational trajectories and the implications of emerging technologies in three distinct organisational contexts. To explore this emerging and intrinsic phenomenon in organisations, this work adopts the historical narrativist approach and the qualitative case study method. The first study explores the interplay between tradition and technology at a pre-digital organisation when new technologies are introduced. The second study delves into the strategies and practices of realising historically embodied process knowledge when adopting a robotic process automation technology at a digitally reformed organisation. The third study traces the evolution of a strategic path towards technology and data driven innovation, from the foundation to the implementation of artificial intelligence technologies, at a born-digital organisation. Each of the three studies provides a distinct but complementary understanding on the role of organisational history by contributing to the theories of imprinting, organisational memory and path dependence. Collectively, the thesis studies contribute to our understanding of “how history matters” in the future of work. The thesis discussion contributes to the literature by integrating the implications of surface- and deep-level effects of emerging technologies for the future of work and how they are shaped by the distant, intermediate and immediate histories of organisations.</p>

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Two research in progress papers have been published based on the studies of this thesis as stated at the beginning of Chapter 3 and 4. Chapter 3 contains parts from the paper entitled “Digital Imprinting: The Role of History in Digital Strategising at a Predigital Organisation” that is published in proceedings of the 23rd Pacific Asia Conference on Information Systems (PACIS 2020). Chapter 4 comprises parts from the paper entitled “Knowledge Embodiment of Human and Machine Interactions: Robotic Process Automation at the Finland Government” that is published in proceedings of the 27th European Conference on Information Systems (ECIS 2019). The papers have been significantly modified when re-writing as thesis chapters. The other authors have been acknowledged in the acknowledgements section.

Abstract

Emerging technologies are radically changing the future of work. From artificial intelligence for customer support to robotics for performing surgery, the change is unprecedented in the history of most organisations. This thesis aims to understand and contribute rich, empirically informed insights into the phenomenon of the future of work in the context of emerging technologies from an organisational history perspective. The thesis comprises three related but standalone studies that discuss organisational trajectories and the implications of emerging technologies in three distinct organisational contexts. To explore this emerging and intrinsic phenomenon in organisations, this work adopts the historical narrativist approach and the qualitative case study method. The first study explores the interplay between tradition and technology at a pre-digital organisation when new technologies are introduced. The second study delves into the strategies and practices of realising historically embodied process knowledge when adopting a robotic process automation technology at a digitally reformed organisation. The third study traces the evolution of a strategic path towards technology and data driven innovation, from the foundation to the implementation of artificial intelligence technologies, at a born-digital organisation. Each of the three studies provides a distinct but complementary understanding on the role of organisational history by contributing to the theories of imprinting, organisational memory and path dependence. Collectively, the thesis studies contribute to our understanding of “how history matters” in the future of work. The thesis discussion contributes to the literature by integrating the implications of surface- and deep-level effects of emerging technologies for the future of work and how they are shaped by the distant, intermediate and immediate histories of organisations.

Dedication

To my beloved mother, මලිනිකා.

Acknowledgements

When I arrived at UNSW in February 2017, I began this PhD journey very nervous as I was trying to be confident and sound knowledgeable. Today, as I submit my thesis, I feel I have accomplished something and this is without a doubt a result of the people with whom I have had the privilege to work with.

I will start with the best and most impactful part of my experience: having Prof Shan Pan as my supervisor. In every research study I have conducted as a student, Shan guided me along the way, reading and providing feedback for a stream of ideas, presentations and draft papers. His feedback throughout, both constructive criticism and compliments, greatly contributed to my thesis as well as career development. From Shan I have learnt all a student can hope for about case study research, striving for impact with one's research and managing an academic career. In addition to being a master of the craft, what is most remarkable of Shan as a supervisor is that I have never left a meeting without knowing what to do next and a feeling of moving forward. Shan's mentorship has had an incredible influence on where I am today and what I will accomplish in the future. Thank you Shan!

I am deeply thankful to Dr Yenni Tim, for the time she has spent encouraging, challenging and guiding me over the last three years. Her insights on presentations and draft papers have been instrumental in pushing me forward. While I am indebted to her for mentoring me throughout the PhD, I am most grateful for the example that she set in her career as a researcher, educator and a colleague, producing work that both advances the field and has greater impact. Your academic journey has been a constant eyeopener to my way forward. Thank you Yenni! I am also indebted to Prof Daniel Schlagwein, for his insights and guidance that continue to influence my research. I will always remember the drawing you made in our first meeting. Thank you Daniel!

Prof Dubravka Cecez-Kecmanovic's classes on qualitative research and information systems theory, which I took early on in the program, shaped a lot of my thinking as a researcher. She is a brilliant scholar and a tremendous inspiration to all the UNSW Business school students. Dubravka taught me the fundamentals of doing research including how to comprehensively review literature, collect data, write field notes and memos, immerse myself in empirical data to deeply understand and theorise emerging

phenomena. I learnt a lot from her and I can say without a doubt that your class on the “Theoretical Foundations of Information Systems” is the best class that I have ever taken in my entire life. Thank you Dubravka!

I am also profoundly indebted to Prof Walter Fernandez, who has consistently provided thoughtful critique and helpful suggestions over the years as the chair of my PhD review committee. His advice has served not only to improve my thesis, but also as exemplars of the attention to detail needed to produce high quality research throughout my academic journey. Additionally, I learnt from his expertise in grounded theory research during research seminars and discussions in the school. Beyond the PhD, he continued to influence my career as he introduced me to the wider information systems community and served as a referee for my first job at the Queensland University of Technology (QUT). Thank you Walter!

Beyond my supervisors and advisers, the community at School of Information Systems and Technology Management (ISTM) has made coming to work every day both fun and productive. I owe a debt of gratitude to the PhD students that have shared feedback, experience and support over the years, particularly, Muhammad Priandi, Wenjie Huang, Dr Richard Rannard, Rora Puspita Sari, Silvia Lin, Alain Balaguer Mercado, Blair Wang, Yijing Li, Dr Khet Oo Tha and Dr Lin Yue. I express my special gratitude to Chona Ryan for guiding me to become a teacher in academia. At ISTM, I have also benefited from the many others who work hard to make PhD students successful, especially the always-helpful Prof Chung-Li Tseng and Margaret Lo. Thank you all!

Extra thanks go to my collaborators. Thank you Dr Lesley Land and Dr Toomas Tamm for your collaboration in the Australian building and construction industry. Thank you Dr Petri Hallikainen for taking me all the way to Finland to study robotic process automation. Thank you Dr Harry Nguyen, Dr LG Pee, Dr Wenyu (Derek) Du and Minh Duc Hoang for your cooperation in beautiful Vietnam. My sincere thanks go to all the participants of my thesis studies as it would not have been possible without them. I also acknowledge the service from Scribendi in proofreading my thesis.

UNSW is a wonderful place to be a PhD student, and ISTM, for a qualitative researcher with my research interests, it is among the best in the world. I acknowledge the UNSW Business School and Commonwealth Australia for the financial support I received

throughout my PhD. First, UNSW Business School Tuition Fee Scholarship and then, the Australian Government Research Training Program Scholarship.

Before coming to UNSW, my academic journey has been inspired by all the teachers and my MPhil supervisors at the University of Colombo School of Computing (UCSC). Among others, my special gratitude goes to Dr Yamaya Ekanayaka and Prof Nihal Kodikara who significantly shaped the trajectory of my academic journey going forward. While some have doubted the academic validity of qualitative research and grounded theory approach, they have continued to support me. Thank you both! I am also thankful to all my friends and colleagues at UCSC. In particular, thank you Dr Kasuni Weerasinghe, Udeni Jayasinghe, Dr Nirandika Wanigasekara and Dr Maduka Subasinghage for sharing your experience that shaped my path in many ways and for the lasting friendship beyond work!

I owe the most thanks to my family and friends, both near and far, who encouraged and supported me throughout. My late mother Malintha Dias, whom I dedicate this thesis to, will always be my idol. Her memories still nurture both my professional and personal lives. My father Michael Dias has been extraordinary in his ways of expressing me that the sky is the limit. Words cannot express my heartfelt gratitude for them! I am forever grateful and indebt to my brother Milantha Dias, sister-in-law Malka Silva for their love and compassion! My nephews Mehesuru and Mahima always have a special place in my heart for their joyful and intriguing questions that enrich every second of my life. Thank you for the happiness you two are creating! Thank you uncle Mahesh Cooray, aunt Chandrani Cooray and cousins Dinuka and Nipuna for all your support. Thank you Ayani Hettige and Rusiru Boteju for always being there for me, back in Sri Lanka and in Sydney. And thank you SPIDERS, Hassini De Silva, Thivanka Dikkumbura, Thaluka Nishagi, Prashani Peiris, Supeshala Kothalawala, Soraya Miskin, Sonali Stephen and Vidushani Peiris for being such a lovely set of friends in my ups and downs for more than 20 years!

I started this journey without knowing where I was going. And then I met him on the way, Julian Prester. Since then, our searching conversations continue. Our relationship is inseparable from our passion for research. His kindness, intelligence and patience have made me not only a better researcher but also a better person every day. His sense of humour continues to dazzle me even when I do not get the jokes most of the time. I do not know what I would do without him... Thank you for everything Juls!

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Chapter 1.

Introduction

“History doesn’t repeat itself, but it often rhymes”

— Mark Twain

1.1. Research Background

Emerging technologies are increasingly changing the way we work and organise (Baptista et al. 2020; Colbert et al. 2016; Zuboff 1988). The future of work is defined by the substantially advanced and intelligent character of emerging technologies, such as artificial intelligence (AI) (Pettersen 2019), robotics (Pee et al. 2019), big data (Duan et al. 2019), business analytics (Tim et al. 2020), robotic process automation (RPA) (Lacity and Willcocks 2017), blockchain (Du et al. 2019), smart sensors (Newell and Marabelli 2015) and the Internet of things (Bygstad 2017), that makes these technologies different from prior workplace technologies (Bailey and Barley 2020). For example, hospitals have started using robotic tools for surgery, and when surgeons perform surgery with the support of a robot, the roles of the surgical team, including nurses and residents, change in unexpected ways (Sergeeva et al. 2020). AI as a tool in medicine helps pathologists diagnose cancer and understand unique complexities by allowing to collect and analyse unique data sets (Savage 2020). AI based robots help healthcare professionals to organise patients, retrieve past records, visually analyse medical images and recommend treatments (Pee et al. 2019). The use of analytics in government organisations for functions such as police work has introduced new intermediary roles to manage the technology, and its interpretations are reshaping police action (Waardenburg et al. 2018). Online newspapers use AI and big data analytics to automatically generate and publish news regarding big events, such as scores of Olympic sports, allowing journalists and news editors to focus on writing more interesting stories in today’s world of content-savvy readers (Karimi and Walter 2015; Kunert 2020).

Academic and practice discourse on the future of work is mainly focused on the macro-level socio-economic impact of emerging technologies and predicts that these technologies are increasingly replacing human employees in organisations (Brynjolfsson

and McAfee 2012; Hupfer 2020; Kaplan 2015; Manyika et al. 2017). This stream of research suggests that many people will lose their jobs consequently leading to a drastic transformation of work and society, similar to what happened in the era of industrial transformation (Autor 2015; Frey and Osborne 2017; Kaplan 2015). The discussion is central to societal concerns such as the increasing elimination of jobs that can be easily automated, declining labour markets that focus on routine tasks and skill gaps for emerging jobs in the technical domain (Autor 2015; Hupfer 2020; Kaplan 2015). Studies that collected and analysed mass responses propose advancing the education system to prepare workers for the impending labour markets and provide training to the existing workforce in organisations as potential solutions to address the problem of mass unemployment (Frey and Osborne 2017; Susskind and Susskind 2015).

More recent studies emphasise the need for in-depth research on the changing nature of work enabled by emerging technologies and subsequent surface- and deep-level effects in organisations (Bailey et al. 2019; Baptista et al. 2020; Forman et al. 2014; Newell and Marabelli 2015). Bailey and Barley (2020) suggest studies on the design, implementation and use of technologies in their actual contexts, as they have varied and disruptive effects depending on their specific contexts. Such disruptive effects are deeply embedded in organisations and are difficult to reveal in the studies that attempt to identify general trends in labour markets (Baptista et al. 2020; Silva and Hirschheim 2007). For example, Grønsund and Aanestad (2020) found that introducing AI in an international maritime trading organisation required the creation of new work roles and the reorganisation of expertise, which resulted in a new form of organising called “human-in-the-loop” organising. Pan et al. (2008) found that the introduction of new technology at the Singapore National Library Board resulted in organisation acculturation as a new culture emerged comprising new ideas, values, conventions and behaviours. Such a deep-level effect on work and organising and, in particular, its “evolution in scope, complexity and depth of integration into the fabric of organisations is not well understood” (Baptista et al. 2020, p. 2).

As work changes and complexities arise, the ways of organising the work managers’ attempts towards strategy making also change (Barley and Kunda 2001; Bharadwaj et al. 2013; Kaplan and Orlikowski 2013). Strategy making has become a prominent topic in information systems (IS) research because of the increasing adoption of digital technologies and the role of technology in every organisational process across industries

(Bharadwaj et al. 2013; Leonardi and Barley 2010). Emerging technologies not only support organisational processes but also help to create new processes, unique business models and innovative products (Nambisan et al. 2017; Yoo et al. 2012). For example, Chanas et al. (2019) investigate a traditional financial service provider in their attempt to develop a digital strategy and suggest the importance of managing both new and existing organisational processes. Oborn et al. (2019), in their study of a mobile money service, examine the dynamics of innovation processes when the service is used in a context different from the context it was developed. Such processes, often referred to as trajectories (Henfridsson and Yoo 2014; Kaplan and Orlikowski 2013), reshape over time and in different contexts; thus, a long-term evolutionary view of work and organisational strategy is useful in fully understanding the ongoing future of work phenomena (Allen 2017; Argyres et al. 2020; Suddaby and Foster 2017).

A useful perspective in understanding the future is to investigate the past (Allen 2017; Rahwan et al. 2019; Suddaby et al. 2020), as recognised by scholars in organisational history (Clark and Rowlinson 2004; Decker et al. Forthcoming) and strategy research (Argyres et al. 2020; Iglesias et al. 2020; Vaara and Lamberg 2016). Studying history enables us to develop a better understanding of change and how the world we live in today came to be (Allen 2017). In the context of IS literature, studying history would allow us to understand the changing nature of work enabled by advanced digital technologies (Baptista et al. 2020; Davison and Ou 2017). Adopting an organisational history perspective is useful to study the future of work because it can provide us with a long-term view of how historical conditions influence the design, implementation and use of technologies throughout an organisation's evolution (Suddaby and Foster 2017; Vaara and Lamberg 2016). Recent literature emphasises the strategic use of organisational history as a resource for future decision making (Argyres et al. 2020; Ingram et al. 2012). This strategic aspect of organisational history provides useful insights for digital strategy making towards the future of work. Therefore, an organisational history perspective can help the IS discipline to better understand the surface- and deep-level effects of intelligent technologies on the future of work.

1.2. Research Question

Based on this background, this thesis is motivated by two primary research objectives. The first is, research into the future of work, in particular, the deep effects of emerging

technologies on the fabric of organisations. The second, and addressing the first, is research into the historical trajectories of organisations relating to the evolution of technologies for work and organising over time. The first objective was motivated by a general need to understand the impact of emerging technologies in organisational contexts. This need was made apparent by the increasing calls for research to understand the changing nature of work and organising as well as its further implications for organisations (Baptista et al. 2020; Forman et al. 2014). Relatedly, to understand the future of work changes in depth, we can adopt a historical perspective. The historical perspective is chosen as a suitable perspective among others because of the ability of historical research methods and theories (Kipping and Lamberg 2017; Rowlinson et al. 2014) in explaining the evolutionary aspects of work, organising and strategising when new technologies are continuously introduced. In combining these two objectives, this thesis seeks to answer the overarching research question: *How does organisational history shape the future of work in the context of emerging technologies?*

1.3. Research Design

To this end, three case studies are conducted, each focusing on a different organisational context of emerging technologies (see overview in Figure 1). All three studies broadly subscribe to a historical narrativist approach (Kipping and Lamberg 2017) and are conducted as qualitative case studies (Pan and Tan 2011) to consider both past and present organisational contexts relating to the emergence of technologies. The overall framework is focused on the future effects of technologies by recognising the times in organisational histories at which they were introduced, evolved and emerging into the future. Although the studies answer the overall research question and explore digital strategies and practices, they are individually focused on different and unique organisational contexts; in particular, the case studies are conducted at a pre-digital, a digitally reformed and a born-digital organisation.

This thesis, across the three studies, follows the historical *narrativist* approach (Kipping and Lamberg 2017, p. 306) and the qualitative case study method (Pan and Tan 2011; Walsham 1995) with historical for several reasons. First, the historical narrativist approach allows researchers to reconstruct historical events as narrative descriptions and interpret the “thoughts, motives and logics of past actors” (Kipping and Lamberg 2017, p. 306) by considering their contextual relevance backed up by archival data. Second, the

case study method allows us to study a phenomenon in its natural environment using qualitative data (Myers and Newman 2007). Interpretations of qualitative data can help us understand deeply contextualised patterns about a phenomenon for which relatively limited prior explanations exist. Finally, the combination of qualitative data and historical narratives of a phenomenon presents events in time, allowing researchers to distil the complexities from the context (Bucheli and Wadhvani 2014). Hence, the historical case study method offers a valuable toolset to explore the holistic view of the future of work. Considering the historians' recommendation for dividing time into "manageable chunks" (Buckley 2016; Rowlinson et al. 2014), the three case studies contribute to understand different time periods and contexts of history, in particular the distant (i.e. pre-digital), intermediate (i.e. digitally reformed) and immediate (i.e. born-digital) temporal contexts of the future of work.

The first study investigates **the work practices and digital strategy making at a pre-digital organisation**. The study is guided by the following research question: *How does a pre-digital organisation manage traditions and technology in its digital strategy making?* The study adopts the historical case study method, with data collected at a pre-digital organisation founded in 1960 in the Australian building and construction industry as a family business. Drawing from historical theories, in particular the imprinting theory (Johnson 2007; Stinchcombe 1965), the findings suggest that the pre-digital tradition, comprising the technological and hereditary history, imprints the digital work practice when a new digital technology is introduced and that this imprint conditions the ongoing strategy making of the organisation. Theoretically, this study contributes to the research on pre-digital organisations, by revealing the interplay between tradition and technology when new digital technologies are introduced for organising work and strategising (Chanas et al. 2019; Davison and Ou 2017). In short, the historical narrative of this study and the theoretical framework of digital imprinting allow us to understand the persistence and manifestations of pre-digital characteristics in organisations when adopting emerging technologies in the future of work.

The second study investigates **the human-machine work practices at a digitally reformed organisation**. The study is guided by the following research question: *How can an organisation realise its historical process knowledge for managing RPA?* Through a historical case study conducted at one of the largest service centres that provides finance and human resource (HR) services for the Finnish government, the article investigates the

reformation of services using emerging technologies, particularly the RPA technology (Willcocks and Lacity 2016). Drawing from the concepts of organisational memory (Walsh and Ungson 1991) and knowledge embodiment (Clark 2006), the findings suggest that the process knowledge of employees and existing information technology (IT) systems can be realised for automation by embodying organisational memory. Theoretically, the contribution of this study is twofold: First, it offers a better understanding of how past process knowledge and experience can be recollected and embedded into software systems. Second, by unpacking different forms of human-machine interactions (Grønsund and Aanestad 2020; Lyytinen et al. Forthcoming), it reveals the deep effects of emerging technologies on the future of work.

The third study investigates **the innovation trajectories of a born-digital organisation**. The study is guided by the following research question: *How is a strategic path towards technology- and data-driven innovation created?* Again, through a historical case study conducted at one of the largest and most innovative online news media publishing companies in Vietnam, the article explores the trajectory of a long-term strategy towards technology- and data-driven innovation from the time of organisational formation. Drawing from the theories of path dependence (Sydow et al. 2009) and creation (Garud et al. 2010), the findings suggest that the organisational strategy was introduced based on the founder's interests in innovating with technology and news content, which were imprinted during the founding period and evolved over time as decision spaces. These decision spaces provided the ground for path creation in the era of AI- and data-driven innovation (Gregory et al. Forthcoming). This study contributes to theory by developing a model of an evolving strategic path that takes into account how an innovation trajectory emerges through historically established contexts of strategic decision making. It also unfolds specific implications for how three strategic mechanisms shape the innovation trajectory by diversifying or converging the range of options in the decision spaces.

Taken together, the three empirical studies draw from and complement each other in answering the overarching research question of this thesis. The first study of a pre-digital organisation (which was founded in 1960 with limited technologies) emphasises the impact of the technological history on the future of work, whereas the third study of a born-digital organisation (which was founded in 2000 with digital technologies) emphasises its foundational advantage for utilising emerging technologies for innovation. In bridging the two studies, the second study of a digitally reformed organisation (which

was reformed in 1990 using digital technologies) emphasises the transition from pre-digital to digital era, thus shows the changing nature of work from the past to the present. The three studies together explain the distant (i.e. pre-digital), intermediate (i.e. digitally reformed) and immediate (i.e. born-digital) time periods and the relevant contexts, thus provide a holistic view of the future of work.

Theoretically, the three studies contribute to the development of an organisational history perspective on the future of work. The concepts of imprinting, organisational memory and path creation draw from and build on the fundamental theories about history (Suddaby and Foster 2017). The concept of imprinting, developed in study 1 (in Chapter 4), demonstrates the persisting role of founding characteristics and their reproduction throughout the lifetime of an organisation (Boeker 1989b). While focusing on other aspects, the other two studies draw from the imprinting assumptions when investigating the foundation and reformation phases of the organisations in different times of history. The concept of memory, developed in study 2 (in Chapter 5), is a clear differentiator of the past from the present because the memory has been used to reconstruct the prominent elements of the past (Decker et al. Forthcoming). The other two studies build on the collective memories of the founding generations and their reconstruction, to provide evidence on an inverted past, for the imprinting and path creation to occur. The concept of path creation, developed in study 3 (in Chapter 6), draws from the original concept of path dependence, which assumes that early events both determine later events and restrict alternatives (Schreyögg and Sydow 2011), as well as the extended view of path creation, which foregrounds the managers ability in modifying the interpretations of the past (Garud et al. 2010). Thus, the managers ability in modifying the organisational future, considering the past decisions and path dependencies, has been taken into consideration in the other two studies. Collectively, these three concepts develop an understanding of the past, present and the future of work in the context of emerging digital technologies.

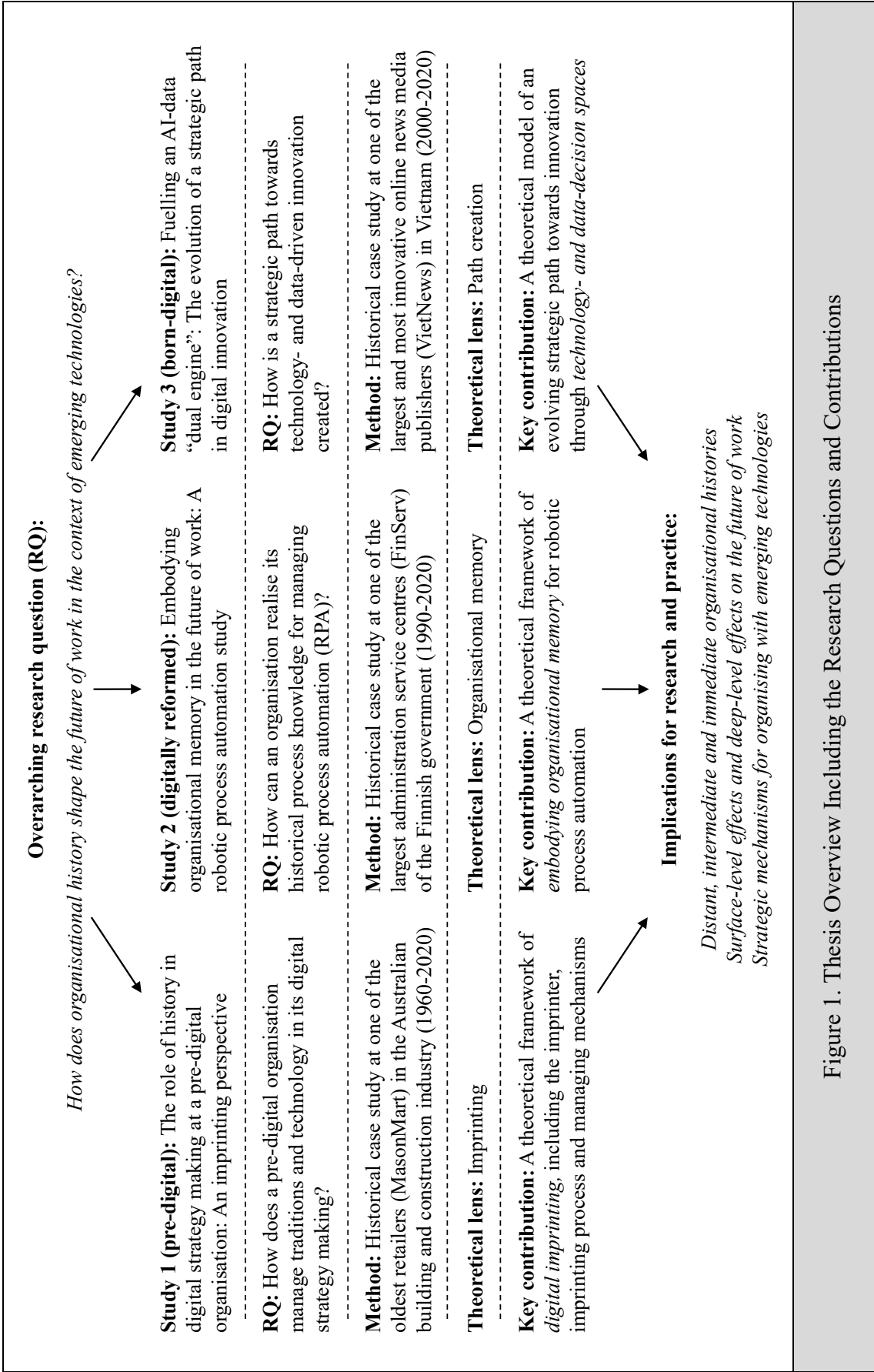


Figure 1. Thesis Overview Including the Research Questions and Contributions

1.4. Thesis Structure

This thesis is structured in a three-study format. It comprises of three free-standing studies of normal journal article structure and length, which are logically organised around a coherent thesis topic, i.e. “the future of work: an organisational history perspective”. In this section, I present the guiding framework (see Figure 1) and illustrate the overarching structure of this thesis. The framework summarises the sub research questions, research methods including the specific case organisations, theoretical lens and the key contributions of the individual studies, in addition to the overarching research question and the overall contributions of the thesis. Based on the three case studies that takes history seriously in organisations, which are currently undergoing technological change and forming new ways of work, this thesis addresses how organisational history shapes the future of work. Before presenting the studies, a broader literature review and the common research methods used across all three studies are presented. And in conclusion, the common implications for research and practice, implications and future research directions are discussed.

The remainder of this thesis is organised as follows. In Chapter 2, a literature review on the future of work and the organisational history perspective is presented in order to identify the predominant research gaps which are common to all three studies. Study specific literature relating to digital strategy, digital innovation, imprinting, organisational memory and path dependence, are reviewed in the corresponding chapters. Chapter 3 explains the historical narrativist approach and the qualitative case study method that has been followed across the studies of this thesis as the fundamental research approach. Again, the case specific details, data collection and the analyses are described in the individual chapters. Thereafter, the three studies are presented in Chapter 4, 5 and 6 respectively. The first study, presented in Chapter 4, develops insights into the interplay between tradition and new technology at a pre-digital organisation. The second study, presented in Chapter 5, develops an understanding of the embodiment of organisational memory in realising process knowledge for RPA at a digitally reformed organisation. The third study, presented in Chapter 6, uncovers the historical formation of decision spaces in creating a path towards digital innovation. In Chapter 7, I look beyond the individual contributions of the studies to elaborate on how the thesis as a whole contributes to the future of work discourse. The discussion entails the surface- and deep-level effects of emerging technologies on the future of work by tracing organisational trajectories that were situated in different times and contexts of technology evolution.

Chapter 2.

Literature Review

To understand the radical change occurring in the context of emerging technologies, this thesis draws from previous literature on the future of work and organisational history. Whereas this chapter synthesises and establishes the foundation for the overall thesis, each of the three studies (in Chapter 4, 5 and 6) presents an individual literature review relating to its particular phenomenon, organisational context and theoretical background.

2.1. Future of Work

Emerging technologies such as AI and robotics are increasingly reshaping the future of work and organisations (Brynjolfsson and McAfee 2014; Forman et al. 2014; Santana and Cobo 2020). These new technologies are adopted by organisations from a wide variety of domains and are changing the work of organisations faster than ever before (Bailey et al. 2019). For example, hospitals use advanced robotic technologies to support surgery, thus changing how nurses and residents coordinate around the operating table (Sergeeva et al. 2020). Government organisations use AI for predictive policing, thus introducing new roles for managing the technology that reshapes police work in unexpected ways (Waardenburg et al. 2018). Financial institutions are increasingly adopting blockchain technologies to enable more transparent and secure transactions (Du et al. 2019; Rossi et al. 2019). The adoption and use of technologies in almost every process and the emerging human-machine interactions in organisations lead to new forms of work practices and organising (Lyytinen et al. Forthcoming; Puranam et al. 2014). Emerging technologies are thereby questioning our fundamental understanding and theories about the future of work and organisations (Agarwal and Dhar 2014; Bailey et al. 2019; Baptista et al. 2020).

The future of work in the context of emerging technologies poses new and distinct challenges and opportunities to research (Baptista et al. 2017; Faraj et al. 2018). Academic and practice discourse has adopted at least three perspectives for studying the future of work phenomena (see Table 1).

Table 1. Existing Studies and Their Perspectives on the Future of Work			
Perspective	Conceptualisation of the Future of Work	Role of Organisational Trajectory	Example References
Socio-economic	The future of work as the societal-level economic revolution and declining labour markets	Focuses on the rapid elimination of jobs because of wide-scale automation in many organisations	Brynjolfsson and Mitchell (2017), Frey and Osborne (2017), Kaplan (2015), Autor (2015), Susskind and Susskind (2015)
Impending work task	The future of work as the individual-level change of work tasks and skill requirements	Focuses on the increasing adoption of emerging technologies, changes in work tasks and new forms of work	Sergeeva et al. (2020), Dunn (2020), Jarrahi et al. (2019), Deng et al. (2016)
Evolutionary	The future of work as already happening and radically changing the organisational processes	Focuses on the ongoing design, implementation and use of emerging technologies and new forms of organising	Baptista et al. (2020), Bailey et al. (2019), Faraj et al. (2018)

The first perspective explores the socio-economic impact of emerging technologies on future labour markets and predicts that emerging technologies are increasingly replacing human employees in organisations (Brynjolfsson and McAfee 2014; Ford 2015; Hupfer 2020; Kaplan 2015; Manyika et al. 2017). This stream of research suggests that many people will lose their jobs, consequently leading to a drastic transformation of work and society, similar to what happened in the era of industrial transformation (Autor 2015; Frey and Osborne 2017; Kaplan 2015). By conducting large-scale surveys and collecting opinions from many organisational participants, these studies predict that professional jobs from disciplines such as accounting and law to mass manufacturing jobs in factories are declining because of the widespread adoption of emerging technologies (Brynjolfsson and McAfee 2014; Kaplan 2015). Although this perspective proposes societal-level general solutions such as advancing the education system to address the problem of mass employment, it overlooks the ongoing change and resultant consequences for work and organising (Bailey et al. 2019).

The second perspective investigates the changes in individual work tasks owing to the emerging technologies in the future of work (Deng et al. 2016; Dunn 2020). These studies emphasise the importance of in-depth exploration at the task level and elaborate on individual problems that need rethinking beyond general effects, such as mass

unemployment. For example, in their case of robotic surgery, Sergeeva et al. (2020) observe that when the work of surgeons changes because of robotic tools, the tasks of nurses and residents also change in various ways. Other studies explore new ways of working introduced by emerging work settings such as gig work (Dunn 2020), crowd work (Alam and Campbell 2017) and digital nomadism (Jarrahi et al. 2019). Zooming in at the micro-level and observing individual workers through in-depth ethnographic studies, this stream of research explains in detail how work tasks are changing and new work roles are emerging in the future of work (Jarrahi et al. 2019; Sergeeva et al. 2020).

The third perspective motivates in-depth studies on the work and organising as an ongoing process that focus on understanding the emerging technologies as they effect almost every aspect of organisations (Bailey et al. 2019; Baptista et al. 2020). Recent discussion from this perspective concerns the evolutionary nature of sociotechnical issues in organisations with the increasing adoption and use of emerging technologies (Davison and Ou 2017; Lyytinen et al. Forthcoming; Sarker et al. 2019). The effects of emerging technologies can be consequences of both intended and unintended initiatives or strategies, and can emerge in the surface- or deep-level of organisations (Baptista et al. 2020; Silva and Hirschheim 2007). While intended consequences are expected and usually arise because of incremental changes of digital technologies, unintended consequences are unexpected and may create new problems even as they solve one (Ransbotham et al. 2016). Surface-level effects are the immediate effects of basic digital workplace technologies, thus can be identified and managed (Baptista et al. 2020). Deep-level effects, however, are more complex because the advanced digital technologies such as AI and RPA can trigger changes that are unseen in the organisational periphery (Besson and Rowe 2012; Tushman and Romanelli 1985). Therefore, deep effects can evolve unnoticed in the embedded structures of organisations and influence the work practices, processes and other established arrangements.

Even though several IS scholars have recently noted the need for more research from an evolutionary perspective on the future of work (Bailey and Barley 2020; Baptista et al. 2020), the current research is almost absent from studies that take a long-term view of technology in organisations. In particular, Baptista et al. (2020) state that the deep effects, and, in particular, their “evolution in scope, complexity and depth of integration into the fabric of organisations is not well understood” (p. 2). The few exceptional studies are focused on understanding a particular new form of organising (Grønsund and Aanestad

2020) or a changing nature of a work practice (Waardenburg et al. 2018). There is, therefore, a need to understand the long-term evolutionary view of the future of work, contributing to and extending the third perspective that has limited existing research among the three research perspectives that are summarised in Table 1.

Despite adopting a future-oriented view on the future of work, the above-discussed perspectives have overlooked the historical trajectories of organisations relating to the evolution of technologies for work and organising over time. Traditional organisations founded before the rise of computers in the 1970s, often referred to as pre-digital organisations, were formed under a different set of conditions in a distant past (Davison and Ou 2014). Whereas some pre-digital organisations have developed new work practices within their established structures (Sebastian et al. 2017), others have gone through significant disruptions and developed new forms of organising and strategising (Chanas et al. 2019; Sambamurthy and Zmud 2000). Organisations founded after the 1990s, such as Google and Amazon, were formed under the conditions of digital technologies from a recent past (Constantinides et al. 2018; Forman et al. 2014). Founders of such organisations have leveraged new technological possibilities such as automation, digital platforms, big data and algorithms for work and innovation (Faraj et al. 2018; Yoo et al. 2010).

Emerging technologies and their deep effects are reshaping the established organisational structures and are setting new conditions for the future (Hinings et al. 2018). As discussed in the evolutionary perspective, it is important to understand the long-term view of the design, implementation and use of emerging technologies and their implications for work, organising and strategy making in organisations (Bailey et al. 2019; Baptista et al. 2020). Rahwan et al. (2019) emphasise the importance of providing a long-term account on the evolution of AI algorithms and the associated big data sets, as they reshape our work and organisational processes. Thus, premier research outlets in multiple disciplines such as science (Allen 2017; Rahwan et al. 2019), organisational studies (Maclean et al. 2018; Suddaby and Foster 2017) and strategy (Argyres et al. 2020; Vaara and Lamberg 2016) have called for and started adopting historical perspectives in understanding the current phenomena and providing implications for the future of work. Drawing from the literature and extending the evolutionary perspective, this thesis set forth to study the future of work from an organisational history perspective.

2.2. Organisational History Perspective

A useful perspective in understanding the future is to investigate the past (Allen 2017; Rahwan et al. 2019; Suddaby et al. 2020), as recognised by scholars in organisational history (Clark and Rowlinson 2004; Decker et al. Forthcoming) and strategy research (Argyres et al. 2020; Iglesias et al. 2020; Vaara and Lamberg 2016). Adopting an organisational history perspective is useful to study the future of work because it can provide us with a long-term view of how historical conditions shape the design, implementation and use of emerging technologies throughout an organisation's evolution (Argyres et al. 2020; Suddaby and Foster 2017; Vaara and Lamberg 2016). As Maclean et al. (2018) puts it, "how organizations are made sense of in historical time helps to determine how they are experienced in everyday life, setting expectations for the present and future" (p. 1734). Clark and Rowlinson (2004) call for a "historical turn" aiming to "entail a turn to historiographical debates and historical theories of interpretation" (p. 331) in organisation studies. An organisational history perspective on the future of work can bring a "historic turn" to IS research by offering an alternative to the current future-oriented perspectives. A historic turn "would entail a turn to historiographical debates and historical theories of interpretation that recognise the inherent ambiguity of the term 'history' itself, which refers to both 'the totality of past human actions, and ... the narrative or account we construct of them'" (Clark and Rowlinson 2004, p. 331). Hence, a historical perspective recognises that the emerging technologies are not just revolutionary inventions but also developments of past trajectories (Garud and Karnøe 2003; Garud and Rappa 1994; Stein and Zwass 1995; Walsh and Ungson 1991).

A historical perspective can help us understand the deep-level effects of emerging technologies on the future of work (Baptista et al. 2020) because we can start from the present status (i.e. immediate history) of an organisation and use the historical perspective to trace back its evolution (i.e. intermediate history) and foundation (i.e. distant history) (Buckley 2016). For example, Johnson's (2007) imprinting study of the Paris Opera explains its formation and structures persisting for centuries and justifies the importance of long-term historical case studies in revealing organisational trajectories that we may not be able to pinpoint using short-term case studies. Unfolding the narrative of Dutch craft beer brewing, Kroezen and Heugens (2019) demonstrate how traditional industrial arrangements can be revived even after organisations have experienced the drastic effects

of industrialisation and abandoned their own prescriptions and technologies during radical time periods. Considering the key role of an organisational founder, Basque and Langley (2018) show how an organisational identity is derived through the stories and memories of its founder. Similarly, an organisational history perspective can help us understand the effects of emerging technologies because their design, implementation and use is conditioned by past organisational trajectories (Rahwan et al. 2019).

Organisational and strategy studies have recently encouraged the use of organisational history as a resource for strategy making (Erçek and Günçavdı 2016; Lippmann and Aldrich 2016; Simsek et al. 2015). These studies identify the important statements made in the history of an organisation as rhetorical history and explore how these statements have been used in future strategy making (Argyres et al. 2020; Cailluet et al. 2018; Denis et al. 2011). For example, Cailluet et al. (2018) show how the founder's legacy is used as a resource in organisational strategy making. Sinha et al. (2020) explain how managers rearrange the guiding statements from an organisation's past to prioritise ongoing strategic decision making. In contrast to the established historical studies that consider inertia and locked-in conditions as difficult to manage (Hannan and Freeman 1989; Kimberly 1975), these studies emphasise the role of managers in reshaping historical conditions and using them as resources when strategising for the future (Basque and Langley 2018; Erdogan et al. 2020).

Historical theories can be used as guiding lens to understand the evolution of organisations in the context of emerging technologies (Rowlinson et al. 2014; Suddaby and Foster 2017). Historical theories allow us to trace organisational trajectories from their foundation to the present state (Johnson 2007; Lippmann and Aldrich 2016). Previous studies have adopted historical theories such as institutional theory (Marquis and Huang 2010), institutional logics (Kroezen and Heugens 2019), path dependence (Gruber 2010), bricolage (Perkmann and Spicer 2014), micro-foundations (Suddaby et al. 2020), organisational memory (Walsh and Ungson 1991) and imprinting (Johnson 2007). These theories allow us to understand the long-term evolutionary view of emerging technologies in organisations that goes beyond the longitudinal explanations of the technologies' adoption and use (Bucheli and Wadhvani 2014). For example, in their study of the Dutch beer brewing industry, Kroezen and Heugens (2019) use institutional logics to explain the re-emergence of small breweries and traditional practices years after their rapid decline owing to industrialisation. In their study of a grassroots media

collective, Perkmann and Spicer (2014) draw from the theories of bricolage to explain how different organisational forms over time came together to create a new organisation. Scholars who have traced back the distant history of organisations by drawing from historical theories provide evidence on the environmental conditions at the time of founding and their long-term consequences on the organisational strategy, structure and survival and the organisations' later adoption of technologies (Erdogan et al. 2020; Hoof and Boell 2019; Suddaby et al. 2020).

In sum, the application of historical theory as the lens can help us better understand and manage the emerging technologies in the future of work. Studies on the future of work often take the long-term evolutionary view of technologies for granted (Rahwan et al. 2019; Rich and Gureckis 2019). However, we cannot ignore the role of history because “to navigate that context wisely, the long view is essential. Why? Because although history might not repeat itself, it often rhymes” (Nature 2019, p. 464). Studying history can help us to develop a better understanding of change and how the world we live in today came to be (Allen 2017). In the context of IS literature, studying history would allow us to understand the changing nature of work enabled by emerging technologies (Baptista et al. 2020; Davison and Ou 2017). Recent literature emphasises the strategic use of organisational history as a resource for future decision making (Argyres et al. 2020; Ingram et al. 2012); this aspect can also shed light on digital strategy making in the future of work. Therefore, an organisational history perspective can help the IS discipline to better understand the long-term consequences of emerging technologies on the future of work. When considering an organisational history perspective, the use of history-informed research methods is inescapable and with many advantages. In the next chapter, I explain the historical narrativist approach and the qualitative case study method as the fundamental research approach of this thesis.

Chapter 3.

Research Approach

This thesis adopts the historical narrativist approach and the qualitative case study method to answer its research question. The future of work in the context of emerging digital technologies is an intricate and evolving phenomenon that unfolds over time. The focal phenomenon has begun to attract the attention of IS scholars, however, has relatively limited prior understanding, especially considering the long-term evolutionary view of technology in organisations. The historical narrativist approach as the philosophical orientation allows us to understand and interpret the long-term evolutionary view, whereas the qualitative case study as the method is useful for in-depth exploration of intricate and evolving phenomena in their real-world contexts. Therefore, the qualitative case study method with an historical narrativist approach allows the in-depth study of organisational trajectories that are not easily separated from the context and unfold over time, providing a research approach to answer the “how” research question of this thesis (Kipping and Lamberg 2017; Klein and Myers 1999; Walsham 1995). The qualitative case study method also provides guidance on the use and development of theory as part of the research process (Gregor 2006; Pan and Tan 2011). While this chapter articulates the fundamental research approach and the role of theory in this thesis, each of the three studies (in Chapter 4, 5 and 6) presents the individual research method relating to its particular organisational context and historical timeframe.

3.1. Historical Narrativist Approach

There are a several approaches to history research that have being used by organisational historians. Based on their review of history research, Kipping and Lamberg (2017) reveal four main approaches: narrativist, structuralist, (con)sequentialist and causalist, based on their fundamental differences between the assumptions and beliefs of scholars. Among them, the narrativist approach is particularly well-suited for interpretive analysis and theory-building through narrative construction because of its onto-epistemological and methodological orientations (Hansen 2012). The narrativist approach to history research follows “a constructivist ontology that sees historical sources as a reality in their own

right with an interpretative, nonformal – often implicit rather than explicit – methodology” (Kipping and Lamberg 2017, p. 306).

The constructivist onto-epistemological orientation sees “narratives and discourses as the only or dominant form of reality” (Kipping and Lamberg 2017, p. 304). Although realist views were dominating in history research for a long time, since the 1970s, social constructivism started taking attention with the “narrative” or “linguistic” turn when scholars started to believe in the narrative nature of history research (Clark 2004). A narrative is defined as “a sequence of logically and chronologically related events organized by a coherent plot” (Rowlinson et al. 2014, p. 254). The plot is the chain of causation linking the chronological sequence of events. A corporate history that encompasses the whole history, or simply the continuity from its founding to the present, is a holistic narrative of a named organisation. However, for a narrative to be interesting it needs both the sequence of events and the plot. As Langley (1999) puts it, the most interesting narratives are not “purely descriptive. They know where they are going” (p. 697), implying the researcher’s role in reconstituting the history.

In terms of methodological orientation, the natural way for constructivists to conduct interpretive research (Kipping and Lamberg 2017). The mainstream historians who used the narrativist view emphasise the researcher’s role in interpreting the historical stories and narratives in reconstituting historical events and re-enacting the inner thoughts of past actors, instead of only treating historical stories and narratives as the focal unit of analysis (Vaara and Lamberg 2016). Despite the advancement of the field in the past two decades, the emerging academic movement of historical organisation studies has recognised the need for more in-depth analyses of the contexts, forces and temporal dynamics bearing upon (Maclean et al. 2021) as well as the evolution of technology in organisations over time (Suddaby et al. 2020).

There is, therefore, a great potential for the historical narrativist approach to IS research. In general, the present focus on the emerging digital technologies in organisations can benefit from an understanding of the past and evolutionary trajectories. In particular, the future of work is an evolving phenomenon that unfolds over time, which is the key focus of historians. Despite the advantages, IS scholars have only rarely used history, in the sense of comprehensively looking at past events and their outcomes to theorise emerging and evolving IS phenomena, such as the future of work. Thus, in-depth analyses of the

evolution of technologies alongside organisational processes are almost absent from the work of organisational historians (Bailey and Barley 2020; Kipping and Lamberg 2017). The few exceptional cases are on the technology evolution (Zhang et al. 2016), historians' use of digital archives (Donaldson and Conway 2015; Sinn and Soares 2014) and the history of the IS field (Hirschheim and Klein 2012). The limited attention to history-informed research has also been recently highlighted in other related disciplines such as organisation studies (Decker et al. Forthcoming) and strategy (Argyres et al. 2020). Thus, this thesis primarily draws from the historical narrativist approach using the qualitative case study method.

3.2. Qualitative Case Study Method

The qualitative case study method allows in-depth exploration of deeply contextualised patterns about a phenomenon in the environment in which it naturally occurs (Pan and Tan 2011; Walsham 1995). The case study method specifically allows us to uncover the organisational processes that emerge over time, their influence on each other and subsequent implications (Walsham 2006). Qualitative research methods allow the researcher to distil nuances and complexities from the phenomenon under study and develop “thick description” of the phenomenon (Weick 2007). In addition, case studies allow for the use of existing theories, yet require “... a considerable degree of openness to the field data, and a willingness to modify initial assumptions and theories” (Walsham 1995, p. 76). Therefore, this method offers an opportunity for deep insights and theories to be built with novelty, testability and empirical validity.

Qualitative case study method aligns well with the constructivist and interpretivist assumptions of the historical narrativist approach (Klein and Myers 1999), even though organisational history is often neglected in case studies (Clark and Rowlinson 2004). Similar to the historical narrativist approach, the interpretive approach to case study research intends to understand a phenomenon through meanings that people assign to it and within its contextual situations. Because of the constructivist onto-epistemological orientation of the narrativist approach (Kipping and Lamberg 2017), it can be used to reconstitute the case details through interpretation using techniques such as narrative construction and visual mapping of organisational processes, in line with the interpretive assumptions of the case study method (Pan and Tan 2011).

The case selection of this thesis considered the times of the organisational formation and their current state of technology adoption. The important prerequisites were to find organisations that had recently started implementing new digital technologies or formulation of a digital strategy but had a rich and interesting organisational history. I also intentionally selected three organisations that belong to different time periods of history to investigate the dynamics of the past and the extent that they influence the present and inform the future. In terms of data collection, this thesis considers both historical sources and onsite visits as equally important. The data collection process was iterative, following the recommendation of Walsham (1995). While individual studies had varied periods of onsite data collection as detailed in the upcoming chapters, I collected data to cover the entirety of organisations from the foundation to the present state. Archival data sources covered most of the organisational histories (Decker 2013), whereas interviews gathered retrospective narratives of the history and in-depth explanations of the ongoing processes (Myers and Newman 2007). The data analysis process was non-linear and emergent (Walsham 2006) and for this reason, comprised a narrative construction and analysis of organisational histories (Rowlinson et al. 2014) that informed the coding of the data and vice versa.

Throughout the thesis, the principles for evaluating validity and trustworthiness in the historical narrativist approach (Kipping et al. 2014) and in the qualitative case study method (Klein and Myers 1999) are followed and applied as outlined in Table 2.

Table 2. Application of the Principles for Evaluating Validity and Trustworthiness		
Principle by Kipping et al. (2014)	Principle by Klein and Myers (1999)	Application of the Principle
Hermeneutics to relate sources to their original contexts and make their interpretation by a researcher today more robust	The fundamental principle of the hermeneutic cycle	This principle is applied in the way I collected the archival data, current documentation and successively requesting interview partners from the organisations. During the data analysis, I continuously iterated between the empirical data, theoretical concepts from history literature and insights from the initially constructed narrative, to reconstitute a corporate history narrative that represent the “whole” of the organisation and highlight the specific events relating to technologies.
	The principle of contextualisation	I collected historical sources and traced the organisational histories from their foundation to the

		present state, before and after conducting onsite field research. I also reflected on the environment conditions at different times of the organisational foundation and evolution, using external archival sources, which represent the social and contextual elements of the organisations and the organisational members from multiple generations. Additionally, the interviewees' shared their own views of the past as shared memories in the form of storytelling, as the questionnaire included retrospective items.
	The principle of abstraction and generalisation	Based on the data analysis processes comprising narrative construction, coding and analysis in parallel, I developed a set of abstractions that are linked to both the underlying theoretical background and the empirical findings.
[No relevant principle]	The principle of interaction between the researchers and the subjects	As I construct the narratives and share them with my supervisors, their interpretations often challenged my reconstitution of history and the roles of past actors. When I presented my findings to the organisational participants, they confronted my theoretical views by bringing up the practical aspects. During such discussions, we together constructed new knowledge that spanned the individualistic boundaries and opened new avenues for this thesis.
Source criticism to identify possible biases and judge the extent to which a source can be trusted to address the research question	The principle of dialogical reasoning	I critically reflected the theoretical backgrounds of the studies building on the IS literature and organisational history theories. The theorising and theoretical frameworks continually evolved and involved several cycles of revision to better align with the empirical story.
	The principle of suspicion	In order to sustain a critical attitude towards the narratives, I continuously crosschecked the interpretations of the narratives constructed through historical sources with the stories from individual interviews. I also crosschecked the narratives with external archival material.
Triangulation with additional sources to confirm or question an interpretation and strengthen the overall findings	The principle of multiple interpretations	I collected internal and external archival data from multiple sources, such as documents, presentations, meeting minutes, annual reports, newspaper articles, social media postings and web archives on the organisations and their contexts. During the onsite data collections, I intentionally interviewed a variety of participants from managers to operational employees in different areas of the organisations. Then, I triangulated the data when constructing narratives and theorising.

3.3. Role of Theory

Embracing the principle of theoretical engagement proposed by Sarker et al. (2013), this thesis explicitly draws from and extend the theories of organisational history. I applied the historical concepts of imprinting, organisational memory and path dependence in the three studies following the guidance provided by Walsham (1995), regarding the uses of theory in interpretive studies.

First, I draw broadly on the organisational history perspective as the “sensitizing device” for the conduct of this thesis’s case studies (Klein and Myers 1999, p. 75). The theoretical perspective takes account of previous knowledge and creates a “sensible theoretical basis to inform the topics and approach of the early empirical work” (Walsham 1995, p. 76). For instance, the awareness of lack of studies that consider history and evolution of technologies in organisations has considerably shaped the concentration of the data collection and the design of my research. The use of the organisational history perspective as the sensitising device has also given a considerable degree of openness to the field data, in line with the recommendation of Glaser and Strauss (1967).

Second, the studies of this thesis integrate three specific theoretical lenses as part of an iterative process of data collection and analysis (Pan and Tan 2011). After gaining an initial understanding of the case context through initial analysis, an inductive theory building process has been followed, using the constructs and propositions from an initial theoretical lens, until the theoretical confidence is reached. Complementing Walsham (1995), “this results in an iterative process of data collection and analysis, with initial theories being expanded, revised, or abandoned altogether” (p. 76).

Third, the theoretical frameworks and the model, that I develop in each of the case studies, present theory as a final product of the research by extending the theories of organisational history (Walsham 1995). The frameworks and the model developed in this thesis can be categorised as theories of explanation, according to the taxonomy of theory types in IS research presented by Gregor (2006). For example, the study of the born-digital organisation draws from the concepts of path dependence and path creation to develop an abstract model of a path in technology- and data-driven innovation. In the next three chapters, I present the three standalone studies that together constitute this thesis in explaining how organisational history shapes the future of work.

Chapter 4.

The Role of History in Digital Strategy Making at a Pre-digital Organisation: An Imprinting Perspective

Abstract

This study explains the dynamic interplay between traditions and technology in digital strategy making at pre-digital organisations. Current research emphasises the need to develop distinct strategies for technology adoption in pre-digital organisations, but seldom accounts for the rich organisational history of them. An organisational history perspective can help us understand how traditions and historical organisational practices evolve and shape new digital work practices. In particular, the imprinting theory, and its processual nature, is useful to trace organisational trajectories from an organisation's foundation to the present. Building on a historical case study and adopting the imprinting lens, I contribute an understanding of how traditions become imprinted following the sudden introduction of a new technology in a pre-digital organisation. I identify the emergence of four imprints as the result of the dynamic interplay between the organisational tradition and the introduction of a new technology. Developing a theoretical framework on digital imprinting, I explain how the process of imprinting unfolds and how the emergent imprints shape future digital strategy making. By emphasising the existence of traditions in pre-digital organisations, this study suggests that an organisational history perspective is important for explaining how digital work practices evolve following the introduction of a new technology.

Keywords: Pre-digital, digital strategy, organisational history, imprinting theory

I have presented an earlier version of this study at the 2020 Pacific Asia Conference on Information Systems (PACIS):

Dias, M., Pan, S. L., Tim, Y., and Land, L. P. W. 2020. "Digital Imprinting: The Role of History in Digital Strategising at a Predigital Organisation," *Proceedings of the 23rd Pacific Asia Conference on Information Systems*, Dubai, UAE, pp. 1-8.

4.1. Introduction

Advances in digital technologies pose challenges to traditional organisations in many industries (Chanas et al. 2019; Sebastian et al. 2017). Traditional organisations in industries such as retail, logistics, construction, agriculture or financial services, which were formed before the rise of computers in the 1970s, are often referred to as pre-digital organisations (Chanas et al. 2019; Ross et al. 2016). Pre-digital organisations have started to experience growing competition from born-digital players such as Amazon and Google and are finding it difficult to respond (Sebastian et al. 2017). The adoption of digital business models and new technologies as a response to the competition would contradict the traditional organisational practices (Remane et al. 2017) that they have mastered for many years. Therefore, managers of pre-digital organisations find it difficult to change the established structures and work practices when adopting new technologies (Sebastian et al. 2017).

Because of its unique challenges, digital strategy making in pre-digital organisations has provided an opportunity for IS research and practice (Chanas et al. 2019; Davison and Ou 2017; Ross et al. 2016). When making strategies, pre-digital organisations must pay attention to digitalising existing business processes in addition to developing new digital processes (Chanas et al. 2019). Tensions arise when traditional and emerging digital practices misalign (Davison and Ou 2017). Some pre-digital organisations are trying to hold on to their traditions, trade knowledge, communities and practices despite the ongoing industrial change (Andal-Ancion et al. 2003; Kroezen and Heugens 2019). This effect is especially prominent, for example, in traditional family-owned businesses (Erdogan et al. 2020). IS literature provides abundant knowledge about digital transformation and strategy making that aim to position pre-digital organisations in an increasingly competitive environment, but it often overlooks the organisations' their rich history, traditions and unsettled past.

Literature on organisational history seriously takes into account traditions and historical strategies (Argyres et al. 2020; Dacin et al. 2019; Erdogan et al. 2020; Johnson 2007). This literature argues that the present state of an organisation reflects its historical conditions that encompass long-established traditions (Dacin et al. 2019; Lippmann and Aldrich 2016). For example, in their study of a cooperative financial institution, Basque and Langley (2018) explain how the statements and stories of its founder have been used

as a strategic resource to manage key stakeholders of the organisation. However, our understanding of the role of organisational history on strategy making in the contexts of new and emerging technologies remains incomplete because previous literature has focused on business strategy and thereby neglected organisations' technological history (Iglesias et al. 2020; Sinha et al. 2020). Studying the role of organisational history in digital strategy making is important as patterns of the past can provide insights into the current organisational structures and future strategies (Allen 2017). Tracing the historical trajectories of a pre-digital organisation can help us understand the reasons for the unique challenges it faces when adopting new technologies and managing digitalisation initiatives (Decker et al. Forthcoming). I, therefore, ask the question: *How does a pre-digital organisation manage traditions and technology in its digital strategy making?*

To explore this research question, I conducted a historical case study at one of the oldest family businesses in the Australian building and construction industry (pseudonym: MasonMart). MasonMart continues to operate as a viable independent retail business, despite the enormous competition retail stores recently face because of large-scale warehouses and online stores. MasonMart was founded as a corner store in 1960 and has grown its business to 25 stores across the state, trading over 140,000 products in 2020. Since 2015, MasonMart has been developing a strategy to better manage digitalisation initiatives in line with its tradition. The rich history of MasonMart and its recent attempt towards digital strategy making provided me with an opportunity to study how a pre-digital organisation navigates through digitalisation while carefully rewriting its tradition.

To construct and analyse MasonMart's history over time, I used historical data analysis techniques grounded in the interpretive principles of conducting qualitative case study research (Kipping et al. 2014; Klein and Myers 1999; Pan and Tan 2011; Rowlinson et al. 2014). I identified three eras of MasonMart's organisational history: pre-digital era (1960-2000), digitally sensitive era (2000-2015) and digital reinvention era (2015-2020)—of MasonMart's organisational history. Drawing from the organisational history and strategy literature, I adopted an imprinting lens to understand the role of history in the pre-digital organisation because its processual nature allowed me to trace organisational trajectories from a distant past to the present (Marquis and Tilcsik 2013; Ni Sullivan et al. 2014). I identified the emergence of four imprints as a result of the dynamic interplay between the organisational tradition and the introduction of a new technology. I also developed a theoretical framework explaining the evolution of a digital

imprint and the strategies for managing its persistence at the pre-digital organisation. In doing so, I extend IS literature on digital strategy making in pre-digital organisations by shifting the focus from a short-term and primarily future-oriented view to a long-term, historical view. Understanding the evolution of practices, processes and strategies can help the managers of pre-digital organisations to understand the challenging aspects of adopting new technologies and carefully manage tradition when strategising for future technology adoption and use.

4.2. Literature Review

4.2.1. Pre-digital Organisations and Tradition

Pre-digital organisations are established businesses in traditional industries that were formed before the rise of computers in the 1970s (Chanias et al. 2019; Davison and Ou 2014; Davison and Ou 2017). They have stable business models developed over many years and are considered as the backbone of conventional economies (Mills 2018). Pre-digital organisations are often owned and run by families and provide for the needs of local communities (Kroezen and Heugens 2019). The founders of these organisations generally were masters of their trade and passed on their knowledge to future generations (Remane et al. 2017). They focused on developing the business based on common traits, values and a preference for local communities (Sminia 2011); for example, community banks (Mills 2018) and smallholder farming families (Slavova and Karanasios 2018) provided goods and services for entire villages. Some pre-digital organisations retaining their founding structures and traditional practices have survived until today (Meyer and Rowan 1977).

Pre-digital organisations have adopted the values, practices and structures of the societal contexts of their founding times (Kimberly 1975; Sasaki et al. 2020). Until the industrial revolution, work mostly was an artistic activity based on individual creativity (Berg 1994). In the late 18th century, mass industrialisation drastically changed how people work and how work was organised (Berg 1994). The development of energy sources and standardised processes moved workers from small workplaces to large scale factories (Lall 1992). However, traditional practices of the pre-industrial era did not entirely disappear; for instance, a culture of craft and community preference remained in certain industries even after the industrial revolution (Kroezen and Heugens 2019; Lippmann and

Aldrich 2016). In the late 20th century, the digital revolution drastically changed the organisation of work and traditional practices (Puranam et al. 2014). Nevertheless, actors in pre-digital organisations still tend to uphold their tradition from the distant and intermediate past when adopting new technologies (Erdogan et al. 2020; Suddaby et al. 2020).

Tradition is defined as the “consciously transmitted beliefs and practices expressing identification with a shared past” (Dacin et al. 2019, p. 356). Traditional practices can persist and evolve for years, passing down from one generation to the next (Soares 1997). For example, in their study of Scottish advocates, Siebert et al. (2017) find that the practices of many advocates were deeply rooted in their tradition and thus did not change for hundreds of years. Founders and the successive generations of pre-digital organisations share their tradition through activities such as storytelling (Kammerlander et al. 2015), apprenticeship training (Ni Sullivan et al. 2014) and constructing resources (Lippmann and Aldrich 2016), narratives (Sinha et al. 2020) and technologies (Abrahamson 2011; Boell and Hoof 2020). Thus, the collective construction of new technologies and the emergence of digital work practices in pre-digital organisations can be seen as a process that evolves over time alongside the organisational tradition (Suddaby et al. 2020).

Digital strategy making in pre-digital organisations is becoming a focal theme in IS research and practice, because of the challenges faced by managers introducing new technologies (Chanias et al. 2019; Davison and Ou 2014; Sebastian et al. 2017). Chanias et al. (2019) highlight the importance of a distinct digital strategy for managing digital transformation in pre-digital organisations, that differs from the strategy used in born-digital organisations. In the IS domain, strategy research is concerned with “how organizations engage in the ongoing processes and practices of strategy making involving IS and IT” (Marabelli and Galliers 2017, p. 347). From a process perspective, managers cannot ignore past organisational trajectories when strategising for the present and potential future competition (Boeker 1989b; Suddaby et al. 2020). IS research, however, has yet to explore the role of organisational history in digital strategy making in pre-digital organisations. Literature on pre-digital organisations is summarised in Table A1, Appendix A.

4.2.2. *Organisational History and Imprinting Theory*

Organisations are increasingly utilising their histories as a resource for strategising (Argyres et al. 2020). In contrast to earlier studies that consider history as completed and static (Hannan 1998; Swaminathan 1996), strategy scholars have recently argued that managers can influence the course of events and consequently rewrite the tradition and organisational practices (Erçek and Günçavdı 2016; Suddaby et al. 2020). For example, in their historical study of the paper and pulp making industry, Lamberg and Peltoniemi (2020) identify that the strategy of maintaining a diversified resource portfolio, compared with focusing on one resource that may become obsolete, helped organisations to remain competitive over time. Accordingly, scholars have adopted historical theories (Kroezen and Heugens 2019; Meyer and Rowan 1977; Stinchcombe 1965) to understand past organisational trajectories.

Scholars have adopted historical theories and concepts such as institutional theory (Marquis and Huang 2010), institutional logics (Kroezen and Heugens 2019), path dependence (Gruber 2010), bricolage (Perkmann and Spicer 2014), micro-foundations (Suddaby et al. 2020) and imprinting (Johnson 2007) to explain organisational phenomena. For example, in their study in the Dutch beer brewing industry, Kroezen and Heugens (2019) adopt the institutional logics lens to explain the re-emergence of small breweries and traditional practices after their rapid decline owing to industrialisation. In their study of a grassroots media collective, Perkmann and Spicer (2014) draw from the theories of bricolage to explain how different organisational forms are brought together in creating a new organisation. In his study of the Paris Opera, Johnson (2007) adopts the imprinting theory to explain the impact of the environmental conditions of different times on forming an organisation's early structures and their later reproduction. Compared with other theories, the processual nature of the imprinting theory and its emphasis on environmental conditions during sensitive periods (Johnson 2007; Marquis and Tilcsik 2013) is particularly useful to understand the role of history during periods of new technology introduction in pre-digital organisations.

Originally developed in biological sciences to explain the evolution of animal behaviours (More 1516), the imprinting theory has been adopted in organisational research to explain organisational evolution (Johnson 2007; Stinchcombe 1965). Introducing the imprinting hypothesis, Stinchcombe (1965) claims that the established structures and practices of

organisations reflect the social and environmental conditions of their founding times. Imprinting is defined as “a process whereby, during a brief period of susceptibility, a focal entity develops characteristics that reflect prominent features of the environment, and these characteristics continue to persist despite significant environmental changes in subsequent periods” (Marquis and Tilcsik 2013, p. 199; Stinchcombe 1965).

Previous studies on imprinting have conceptualised imprinters (Bryant 2014; Burton and Beckman 2007), imprinting processes (Johnson 2007; Powell and Sandholtz 2012), imprinted entities (Boeker 1989a; Marquis 2003) and impact of imprints (Beckman and Burton 2008; Dobrev and Gotsopoulos 2010). Imprinters are the initial influencers or founders that endure environmental conditions and determine the characteristics of an imprint (Simsek et al. 2015). Imprinting processes explain the formation and persistence of imprints (Johnson 2007). Imprinted entities can be various organisational entities such as structures (Meyer and Rowan 1977), strategy (Boeker 1989b) and networks (Ni Sullivan et al. 2014). Among the few studies of imprinting impact, Beckman and Burton (2008), in their study of imprinting impact, show how the initial teams of organisations and their backgrounds shape the later functional expertise of the organisations’ top management. Powell and Sandholtz (2012) elaborate on how new and unstable arrangements lead to imprinting “from the introduction of new practices into old contexts, or the continuance of old practices in new contexts” (p. 199). Therefore, the imprinting theory can help us understand how the tradition and historical practices in pre-digital organisations, following the introduction of a new technology, evolve and shape its digital work practices and strategy.

Pre-digital organisations follow a number of practices that embody their tradition and hand them down to future generations (Dacin et al. 2019; Erdogan et al. 2020). However, to remain competitive and sustain their business across generations, they must revisit and reshape their imprints (Erçek and Günçavdı 2016; Sasaki et al. 2020). Managers of pre-digital organisations are especially interested in developing distinct strategies to adopt digital technologies to advance their traditional business processes and work practices (Chantias et al. 2019; Remane et al. 2017). However, they face enormous challenges in managing traditions and rewriting traditional practices when making strategies in the context of new and emerging technologies (Davison and Ou 2014; Sebastian et al. 2017). An opportunity therefore exists to explore the evolution of digital technologies at a pre-

digital organisation, through the lens of imprinting theory, to understand the role of organisational history in digital strategy making.

4.3. Research Method

Adopting the historical narrativist approach (Kipping and Lamberg 2017, p. 306) to case study research (Pan and Tan 2011), I conducted a historical case study at a pre-digital organisation. A useful way to study the history of an organisation is to narrate its story from its foundation to its present state (Clark 2004; Rowlinson et al. 2014). For narrative construction, historians use verifiable documentary sources such as company statements, archives, newspapers and interviews (Kipping et al. 2014). Drawing from organisational historians, I first collected data from documentary and verbal sources about organisational history to construct narratives (Kipping et al. 2014) related to the case context; then used interpretive qualitative methods to analyse the constructed narratives (Klein and Myers 1999; Pan and Tan 2011).

4.3.1. Research Setting

This study's case organisation is a pre-digital organisation (MasonMart) in the Australian building and construction industry. I conducted a historical case study at MasonMart (all names are pseudonyms), a traditional family-owned retail business. Founded in 1960, MasonMart is one of the oldest independent suppliers of hardware, building, plumbing and renovation products to retail and industrial customers in Australia. It was founded as a corner shop in a suburban industrial area and has since expanded to include 25 stores across the state. By 2019, MasonMart was trading over 140,000 products and was regularly dealing with over 750 local and international suppliers. The years 2000-2015 marked a difficult period for MasonMart, as it was pushed to adopt its first IT system and computerise its point-of-sales process to comply with a new government tax policy for goods and services tax (GST). Since 2015, MasonMart has been developing a digital strategy to better cope with the competition of digital players.

I selected MasonMart as a case for studying the role of history in digital strategy making for several reasons. First, MasonMart provided me with rich historical data for theorising about tradition and technological history, as over the past 60 years (1960-2020), it has evolved from an organisation in the pre-digital era to that in the digital era. Second, MasonMart's story represents a sensitive period, following the introduction of a new

technology, that reshaped its organisational history. Third, MasonMart was actively developing its digital strategy during the time of my on-site data collection (Nov 2018-June 2020). Hence, although not representative of large populations, as a single case, MasonMart offered the depth required to trace and understand the organisational processes that unfold over time.

4.3.2. Data Collection

I collected data covering 60 years of the organisation's history. In particular, I collected (a) data on interviews with the founder, family members, nonfamily managers and employees; (b) internal archival material on the organisation's history and strategies over time; (c) observational data at the organisation's headquarters and at tradeshow; and (d) external archival documents and newspaper articles on the organisation, family, industry, community and IT systems.

I conducted 30 semi structured interviews using an interview protocol (see Table A2, Appendix A) that allowed interviewees to speak about their experiences and views freely without bias. The protocol comprised open-ended questions focusing on the organisational history and evolution of technologies used. I first focused on the founder and four of the organisation's senior managers, including the current managing director (second-generation family), general manager of operations (third-generation family) and two nonfamily managers. I also interviewed family and nonfamily executives who were highly socialised in MasonMart's culture and familiar with its history. The interviews revealed information regarding MasonMart's traditional and current practices and shed light on strategic decisions regarding technology adoption and advancement. Furthermore, I had four discussions with the management team: two at the beginning of the study to understand the overall organisational history and approach to strategising, one in the middle to explain my approach to research and one later, where I presented my findings and sought the team's feedback in an open forum.

To allow for source criticism and to triangulate the insights gained from interviews (Kipping et al. 2014), I collected internal and external archival material and observational data. To understand the influence of historical context across time, I retrieved several documents from the organisation's archives, including a historical timeline, strategy documents, marketing newsletters and brochures. I also searched external local archives

and collected newspaper articles, industry publications and technical documentation of MasonMart's IT system developed by the community. Additionally, I collected observational data on MasonMart's stores and tradeshow. I spent 10 days (during work hours) at MasonMart's headquarters and other stores to observe their routine activities, such as interactions between employees and customers and between managers and employees. I also participated in tradeshow organised by MasonMart, where its customers and suppliers came together. I talked to several internal and external stakeholders and observed MasonMart's relationship with the community. During the visits, I took notes and shared my interpretations with the supervisors. Overall, I collected and coded more than 750 double-spaced pages of archival data in addition to 465 double-spaced pages of interview transcripts (see an overview of data collection in Table 3 and further details in Table A3, Appendix A).

Table 3. Data Collection Sources and Coverage		
Type of Data	Source	Coverage
(a) Interviews about MasonMart's story (30 interviews and 4 discussions)	Founder (1)	1960-2008
	Second-generation family (7)	1984-2020
	Third-generation family (3)	2000-2020
	Nonfamily managers and employees (19)	2001-2020
	Management discussions (4)	2018-2019
(b) Internal archival material (about 100 pages)	Timeline of MasonMart history (1)	1960-2016
	Strategy documents (13)	2016-2020
	Marketing documents (18)	2012-2020
(c) Observations (about 36 pages of notes)	On-site and around the stores (10 days)	2019-2020
	Tradeshow (2 days)	2019-2020
(d) External archival material (about 600 pages)	News articles about MasonMart and family (6)	1960-2020
	Websites and blogs posts (4)	2004-2020
	Industry publications (5)	1960-2020
	IT system documentation (500+ pages)	2000-2020

4.3.3. Data Analysis

Following the historical narrativist approach and the qualitative case study method, the data analysis comprises four main stages: (a) narrative construction (Kipping et al. 2014), (b) open coding (Strauss and Corbin 1998), (c) selective coding (Strauss and Corbin 1998) and (d) theoretical analysis (Pan and Tan 2011).

Table 4. Chronological Summary of MasonMart's Organisational History

Era (year)	Pre-digital Era (1960-2000)	Digitally Sensitive Era (2000-2015)	Digital Reinvention Era (2015-2020)
Practices pertaining to the use of technologies	Archival evidence: <ul style="list-style-type: none"> • Limited use of technologies in organisational processes • Use of invoice books, cash registers, calculators, fax and telephones 	Archival and interview evidence: <ul style="list-style-type: none"> • Introduction of a new IT system to support the point-of-sales process • The local community develops the IT system considering their own requirements 	Observational and interview evidence: <ul style="list-style-type: none"> • Introduction of new and analytical technologies • Some employees use colour-coded paperwork • IT policies are rewritten and published on a central platform
Strategic initiatives and family involvement	Archival evidence: <ul style="list-style-type: none"> • Founder purchases the corner store and starts his own business • Founder purchases more stores and expands the business • Second-generation family joins 	Archival and interview evidence: <ul style="list-style-type: none"> • Founder and family seek help from third-generation family to adopt IT • Third-generation family guides the new IT system implementation 	Archival and interview evidence: <ul style="list-style-type: none"> • Third-generation family leads the digital strategy • New managers and employees are hired to balance the capabilities • Exclusive community networks are established
Traditional practices and changes in work	Archival evidence: <ul style="list-style-type: none"> • Manual interactions and close customer relationships • Long-term customer/supplier accounts and manual book-keeping 	Interview evidence: <ul style="list-style-type: none"> • Traditional employees value their knowledge and physicality of products • Employees come up with workaround practices to bypass the new IT system 	Observational and interview evidence: <ul style="list-style-type: none"> • New and old employees work together and learn from each other • New work practices are a blend of traditional and digital practices
External context	Archival evidence: <ul style="list-style-type: none"> • Exponential growth in the Australian building and construction industry 	Archival evidence: <ul style="list-style-type: none"> • Government introduces a new tax policy that requires computer-assisted processing 	Archival evidence: <ul style="list-style-type: none"> • Increasing adoption of digital technologies in retail businesses across industries

First, I constructed a narrative of MasonMart's story by chronologically arranging the data. To obtain a broad overview of the key events, I read all data, including the archival material on the historical context of the family and the organisation. While reading, I noted the important events in the organisation's history and started constructing a chronology, which I used to discuss in the meetings with my supervisors. Based on those key events and using a visual mapping strategy (Langley 1999), we developed a chronological synopsis of MasonMart's organisational history as illustrated in Figure A1, Appendix A. At the end of this stage, I identified three main eras of MasonMart's evolution and technology adoption. I named those eras as pre-digital era (1960-2000), digitally sensitive era (2000-2015) and digital reinvention era (2015-2020) based on the role of technology in each era.

Second, following the inductive approach to interpretive research, I coded the data and narratives using open coding techniques (Strauss and Corbin 1998). I arranged the data, time-coded the narratives and open codes using the NVivo software and frequently shared the emerging codes with my supervisors. During this phase, I met with the supervisors to discuss the distant sources and cases of dissonant directions that accounted for source criticism and triangulation within and among the different types of data sources (i.e. interviews, documents and observations) following the advice of Kipping et al. (2014). Few examples of open codes include "manual systems did work", "colour-coded paperwork", "community-developed information system" and "family members specialising in IT". Complementing this stage, we formulated Table 4 that presents a chronological summary of the MasonMart's events.

Third, I used selective coding techniques (Strauss and Corbin 1998) to categorise the aspects of MasonMart's story and matched the categories with relevant theoretical concepts from the literature (Pan and Tan 2011). For example, I categorised open codes relevant to family involvement, their values and attachment to the local community as "hereditary history" in the "pre-digital era". All codes were combined and interpreted together with my supervisors, via an interpretive process wherein I noted the iterations between data and the literature, collected and added new data, refined initial codes, filled apparent gaps and reconciled conflicting evidence (Klein and Myers 1999). The detection and unpacking of historical trajectories and digital practices was possible because data were time-coded, enabling a clear understanding of the beginning and end of each process, their sequences and the related environmental conditions (Wadhwani and

Bucheli 2014). I also attended to each historical event and strategic decision from the perspective of organisational actors within their historical context, in line with the suggestion on hermeneutic interpretation by Kipping et al. (2014).

Finally, to ensure “theory-data-model alignment” (Pan and Tan 2011, p. 171), I adopted the imprinting lens for theoretical analysis. Drawing from the imprinting theory, I developed a theoretical framework to explain the role of organisational history in digital strategy making. The identified imprinting process explains the interplay between organisational tradition and new technology introduction, I explored at MasonMart. I ended the data collection process in June 2020 (20 months after I started) when a point of saturation had been reached (Glaser and Strauss 1967) and that the new data was unlikely to affect the findings of this study. A detailed data structure is presented in Table A4, Appendix A.

4.4. Findings

The findings of this case study is structured based on the three eras of MasonMart’s organisational history: pre-digital era (1960-2000), digitally sensitive era (2000-2015) and digital reinvention era (2015-2020).

4.4.1. *Pre-digital Era (1960-2000)*

As a pre-digital organisation, during the founding and expansion periods, MasonMart’s practices included a few basic technologies, and it received considerable help from its founder’s family and the community. I derived two main aspects of MasonMart’s history regarding its use of technologies and stories of the founder and family in the pre-digital era.

First, MasonMart used a limited number of rudimentary technologies in its business processes. At the beginning, all business processes were manual and accounting books were the only tool. A family member used to walk to each store every morning and hand over a new book for the day and later used to collect it and calculate the closing balance. The founder and his son (the current managing director) shared their memories on how the process and technology evolved in the 1980s:

Managing director (founder’s son): So, we had these invoice books and there’s still some up in the office. They had a carbon paper between them. So, there were three

copies. The yellow copy went with the goods with the customer. The pink copy was in the book and it was costed after the customer had left and the white copy stayed in the book. And the book would come up at the end of each day to a clerical person who would ensure the things were extended properly. And then they'd pull out all the day's transactions for that store out of the book. There could have been two books for a store. They had even three on the big stores and they would batch control. They'd use that batch control to go into the ledger room where they had these old fashioned... this is early '80s, what do you call them, dad?

Founder (dad): Counting machines. You've probably never heard of them.

(The founder and managing director, 2019, discussion)

Until 2000, counting machines, cash registers, accounting books, calculators, fax machines and telephones were the only technologies MasonMart used to manage its daily business processes. During the interviews, the founder and second-generation family members emphasised that those systems and processes worked flawlessly, and they had time to focus on developing the business in the community.

Second, from 1960 to 2000, MasonMart's business grew exponentially business because of the involvement of family, community support and booming construction industry in the state. A daughter of the founder, who is the accounting manager, explained her attachment to the family business:

“Well, I am a family member, so my dad started the business many years ago. I've sort of grown up with [MasonMart]. It has always been a part of our lives”.

(Accounting manager/second-generation family, 2019, interview)

The founder of the established business was proud of its legacy and acknowledged the support from family. The following is an excerpt from a newspaper article quoting the founder on MasonMart's 50th birthday:

Since then he has employed, literally, thousands of people in a successful and expanding business. The 88-year-old admits he's proud of this but, for him, gratitude is the most important message on the celebration of [MasonMart]'s 50th birthday. “I thrived on the challenge of running the business”, [the founder] said,

“and I’d like to thank my children for going into the business and for all the support they give me”. (Local newspaper, 2011, quoting the founder)

The local community was also very important to MasonMart’s business, and the firm is still regarded as the preferred channel to the Australian market of building and construction supplies. As a member of the community, MasonMart was closely associated with many trade merchants and benefitted from the best supplier deals in the industry. Trading suppliers and customers praised MasonMart’s communal and ethical values built around the family and passed on to the younger generations:

“[MasonMart] has a great history. Suppliers value their loyalty, exclusivity and fairness. They don’t mark-up the prices unscrupulously. They are ethical and sincere in the way they conduct their business”. (Supplier, 2019, informal talk at a tradeshow)

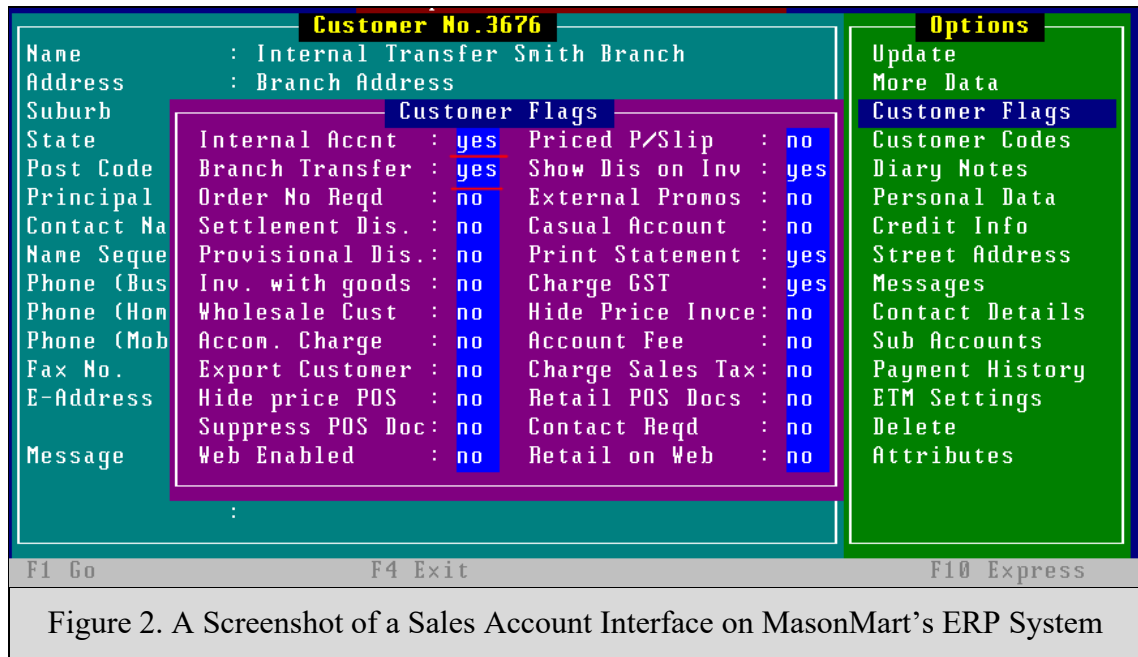
The founder and family have been handing down the values and business practices from one generation to the next. In particular, I found the evolution of two types of histories, technological history and hereditary history, comprising the organisational tradition, because of the generational transmission of practices.

4.4.2. *Digitally Sensitive Era (2000-2015)*

The organisational history narrative revealed the period between 2000 and 2015 as a sensitive period for MasonMart because of the sudden computerisation of the point-of-sales process to comply with the GST tax policy. In this era, I found four history-reshaping effects and emerging digital work practices following the introduction of the new IT system.

First, MasonMart partnered with a vendor from the local community to develop and deploy its first IT system. It was a character-based enterprise resource planning (ERP) system specifically designed to meet the needs of the retail stores in the local building and construction industry. Figure 2 presents a screenshot of the sales account setup interface of the ERP system. Members from the local industry collaboratively developed the IT system by testing it and suggesting updates. Digging through the system’s archives, I revealed more than 600 records of release and upgrade notes that were suggested by the community members including MasonMart. The partnership between MasonMart and the system vendor was mentioned by the system developers in a local newspaper:

In 2000, just prior to the introduction of the GST, [MasonMart] struck up a business partnership with us when they installed their software - a package designed specifically to meet the needs of the building supplies industry. [The developers] are currently working on reviewing their usage of [the system] to ensure they maximise the functionality and efficiencies that [the system] provides. (Local newspaper, 2007, mentioning MasonMart's IT system)



Although the initial aim of implementing the IT system was to comply with the GST tax policy, MasonMart later considered fully adopting the system for its business processes with support from the vendor. MasonMart built a physically wired local area network (LAN) connecting all the nearby stores it acquired over time. At the time, a son of the founder submitted a request and received special permission from the city council to lay underground cables along the street where the stores were located.

In this sense, the organisation was preserving its tradition by partnering with the local community and, at the same time, was developing its technology by collaboratively creating an IT system and infrastructure with them. Hence, I identified the emerging practice of localised IT co-creation as a result of the interplay between preserving tradition and augmenting technology.

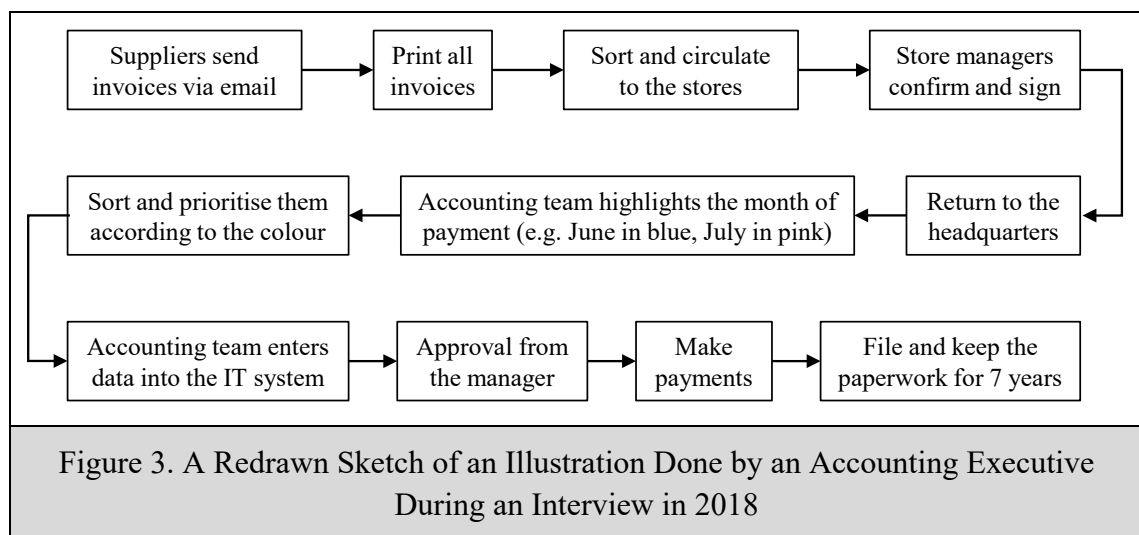
Second, MasonMart's employees were initially questioning the ability of the technology to represent the sometimes complex technical products that they sold. For example, a hot water system had some functions that a person would not understand just by reading a

text specification. As the managing director explained, “many employees didn’t like computers and the constraints they put on them”. The employees gathered product knowledge over the years and became experts in their trade, but they were not interested in learning the digital skills necessary to use the system. This trend escalated as MasonMart acquired other small stores, whose existing staff was threatened by computerisation. MasonMart managers had to push these employees to use the IT system, and it was not easy to change their way of working, as the managing director said:

“We would pick some really experienced people and those who knew their products so well, but they didn’t like computers. So, we had accumulated a lot of these staff that didn’t want to be with computers and then we had thrust it on them. So, we struggled with it”. (Managing director/second-generation family, 2019, interview)

In this sense, the organisation was preserving its tradition by allowing manual work practices and hiring more conservative employees; the employees’ digital illiteracy, in turn, was constraining the potential of new technology. Hence, I identified the emerging practice of disregarding digital literacy as a result of the interplay between preserving tradition and constraining the potential of technology.

Third, MasonMart’s work practices were closely aligned with those of the traditional construction industry. The managers and workers were very efficient with manually coordinating the workflows. The new IT system interrupted those processes. Thus, they came up with new ways to bypass the IT system and continue with the existing workflows. One of the accounting executives illustrated how her team revised the accounts payable workflow to manage digital and physical copies of invoices, as redrawn in Figure 3:



MasonMart also maintained separate business processes, which were isolated in several IT systems, to maintain customer expectations, as stated by the managing director in an interview with an industry journal:

“We never considered consolidation because we were dealing with mainly manual systems, with handwritten price lists for each store and each one managed differently”, says [the managing director]. “While a new centralised computer system has streamlined these processes in recent years, the client preference for individual treatment still dictates the separateness of stores”. (Industry journal, 2015, quoting the managing director)

In this sense, the organisation was reshaping its tradition by inventing workarounds to bypass the new technology and, thereby, was constraining the full potential of the technology. Hence, I identified the emerging practice of coordinating workarounds as a result of the interplay between reshaping tradition and constraining the potential of technology.

Finally, after running the family business using accounting books and counting machines for almost 40 years, the founder struggled to adopt technology in envisioning the organisation’s future. Seeking help within the family, he turned to his granddaughter to implement the new IT system in MasonMart stores, as she explained:

“My grandfather came to me and said we need someone who we can trust in the family who is technical-minded and who knows technology as it is back then. And he asked would I apply for the help desk job. And I said, “Yeah, I can”. And so, we did. And a couple of other people were interviewed and hired, so they ended up building this small team for IT”. (IT manager/third-generation family, 2019, interview)

With the support from a small IT team, the granddaughter implemented the system, extending the extremely localised LAN, and trained the employees by focusing on one store at a time. In this sense, the organisation was starting to reshape its tradition by inviting the younger generation to support the transition and, thereby, was augmenting the IT system of the organisation. Hence, I identified the emerging practice of invoking future generations as a result of the interplay between reshaping tradition and augmenting technology.

4.4.3. *Digital Reinvention Era (2015-2020)*

Since 2015, MasonMart's managers have been trying to develop a digital strategy to adopt emerging, more advanced technologies, such as business analytics for sales forecasting and digital platforms for community interactions. When reviewing the existing digital practices of the organisation to make strategies, the managers noticed remnants of the organisational tradition within them. Therefore, they developed four strategic mechanisms to reshape the digital work practice of MasonMart when adopting more advanced technologies.

First, MasonMart supported the local community in developing an online trade network. As I noted, one of the key events of the community in 2015 was the launch of this network, integrating and extending standalone web portals and systems as one platform exclusively for the members, as mentioned on the community website:

Following a busy past 4 months, [the community] proudly launched [Trade Network] to members on 2nd July. Introduced at the May conference, [Trade Network] consolidates a number of old web portals and systems to create a centralised, modular and mobile-ready online portal designed for both members and suppliers. (Community website, 2015, article on the launch of Trade Network)

With the online trade network, MasonMart and other retailers of the community extended the exclusivity and convenience to collaborate with each other and interact with their suppliers all around the world.

Second, the managers realised the presence of digital illiteracy among employees over the years. As a solution to this issue, they encouraged collaboration between old and new employees to share their knowledge. One of the store managers explained:

“We work very closely together. We are constantly mentoring each other. It's something that many of us believe is the right way to go. Without that mentoring, without being able to rely upon somebody else to help you, it won't work. So, we do that together a lot”. (Store manager, 2018, interview)

When visiting the stores, I observed the employees' interactions and collaborative work practices around complex machinery and computer terminals. While gaining product knowledge from experienced employees, new employees were able to share their digital

skills. Over time, all employees learnt new skills, and MasonMart gradually improved their digital literacy.

Third, the managers realised the existence of inefficient workarounds. As a solution to this issue, they identified one of the stores that had developed efficient processes using the IT system. The manager of this store was promoted to the role of policy and process manager for the entire organisation. She was constantly rethinking the business processes and rewriting the IT policies, as she explained:

“As we spoke before, in June, July, I was offered a position as the policy and process manager. So, I do that for all of the company - writing policies, processes and fixing up procedures. [...] And [operations manager] is now working on a new one. It’s called the knowledge management tool - it is a library of frequently asked questions about policies, processes and procedures. There’s a link that I can go in and put in a workflow process or a chart or best practices. It will go up on that dashboard where everyone can read and understand it. So that was another thing we just created - the knowledge management dashboard”. (Policy and process manager, 2019, interview)

At the time of the interview in late 2019, she was working with the operations manager (third-generation family) to develop an online knowledge management dashboard to share all the policies, processes and procedures.

Fourth, the family developed IT capabilities and took over the key roles in IT management. The founder’s granddaughter, who developed her IT expertise by being involved in the family business early on, later became the IT manager. She inherited the leadership position in the IT team after the founder promoted her upon his retirement:

“And then my grandfather had that conversation again with me. I was interviewed amongst all these other people as well. And they hired me as the IT manager because of my level of education. I’m a certified Linux system administrator. We moved to the cloud two years ago for Office 365. I presented the proposal. It was probably about six or seven pages. I sat the senior management team around a meeting table and walked them through what it was in very layman’s terms because it was quite challenging to get it approved”. (IT manager/third-generation family, 2019, interview)

An extended family member, who held a strategic position in the manufacturing industry, was also brought in as the operations manager to guide the digital strategy. Both of them experienced many challenges in managing the organisation's tradition and technology.

In sum, on the one hand, the managers further strengthened the practice of localised co-creation by creating local networks and prepared the future family generation to take over the digital leadership positions. On the other hand, the managers strategically motivated the traditional employees to learn digital skills by collaborating with new employees, while reorganising the IT policies to eliminate the discrepancies of workarounds. The key findings in the three eras of MasonMart's organisational history are presented in Table 5.

Table 5. Key Findings in the Three Eras of MasonMart's Organisational History			
Pre-digital Era: Historical Conditions	Digitally Sensitive Era:		Digital Reinvention Era: Managing Mechanisms
	The Interplay Between Tradition and Technology	Emergent Digital Work Practice	
Technological and hereditary history of the founder and family generations	Preserving tradition and augmenting technology	Localised IT co- creating	Expanding local networks
	Preserving tradition and constraining technology	Disregarding digital literacy	Co-developing IT capabilities
	Reshaping tradition and constraining technology	Coordinating workarounds	Reorganising IT policies
	Reshaping tradition and augmenting technology	Invoking future generations	Inheriting digital leadership

4.5. Theoretical Analysis and Discussion

This study examined how work practices at a pre-digital organisation changed following the sudden introduction of a new technology and how managers reinvented those practices in the subsequent organisational history. Now I analyse the findings of this study, through the lens of the imprinting theory.

4.5.1. *Towards a Theoretical Framework of Digital Imprinting*

Looking through the lens of the imprinting theory (Johnson 2007; Stinchcombe 1965), I conceptualise the founder and family generations as the imprinters who were carrying the organisational tradition (Dacin et al. 2019). The imprinters reproduced the tradition, which contained the characteristics of the technological and hereditary history of the organisation, during the sensitive period (Simsek et al. 2015), followed by the

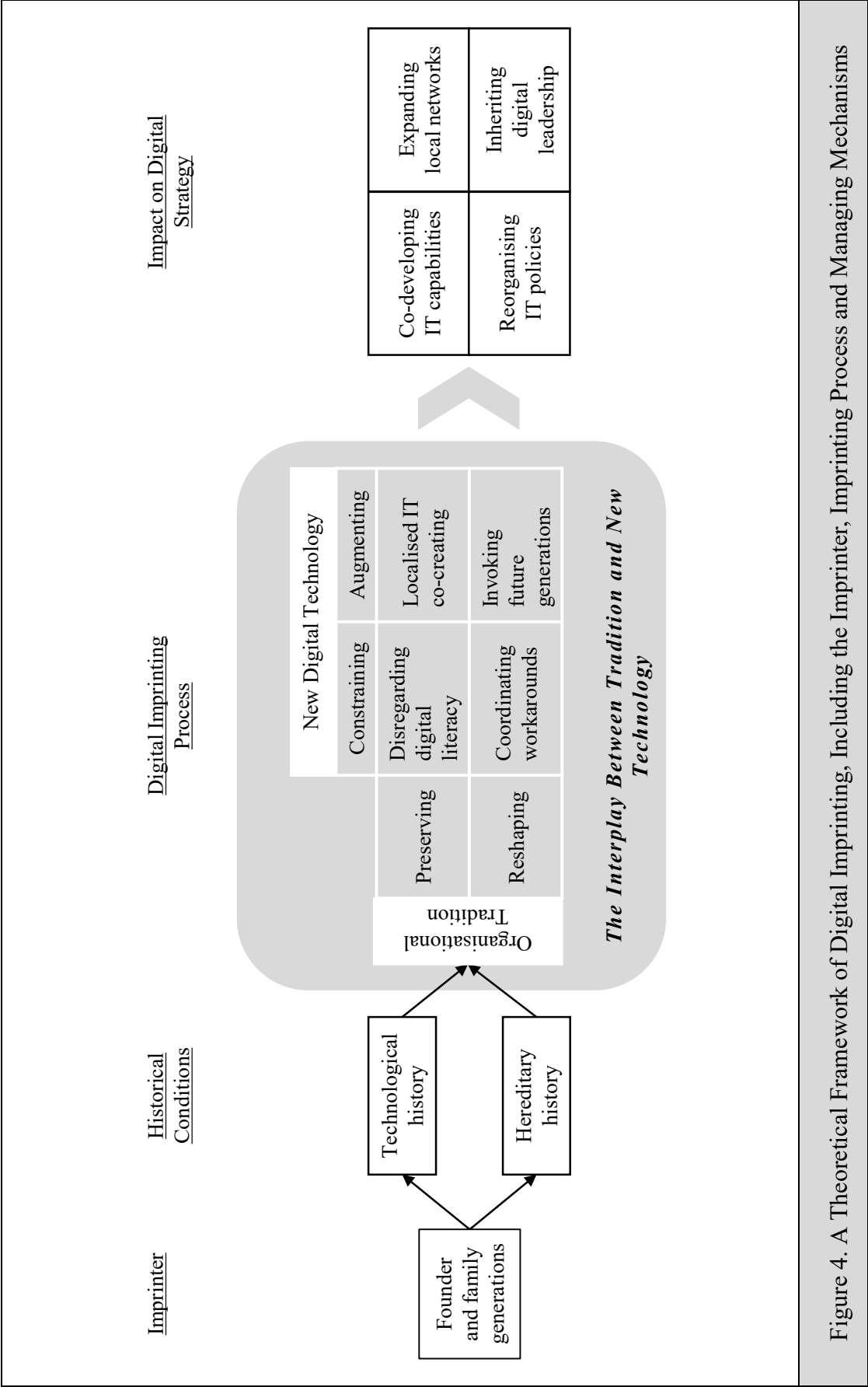
introduction of a new technology. The technological history of the organisation was important in understanding its use of technologies because existing practices were shaped by those historical conditions (Stinchcombe 1965). Similarly, the hereditary history (Ellis et al. 2017) helped me understand the evolution of the values, interests and expertise of the imprinters, including the founder and family generations, throughout the organisational history (Marquis and Tilcsik 2013). The technological history of the pre-digital family business was not superior to its hereditary history involving the family and community and their trading practices. Therefore, drawing from the family imprinting perspective of tradition and innovation (Erdogan et al. 2020), I argue that an imprinting process emerged as the interplay between the organisational tradition and the new digital technology. Based on this, I developed a theoretical framework elaborating the trajectories of four digital imprints, including the imprinting processes, imprinted work practices and managing mechanisms.

First, the attempts of organisational members to preserve their local community and, at the same time, to co-create technologies with the community developed into an imprinting process. This case study revealed that MasonMart has been operating in the local building and construction industry for decades; thus, partnering with the community for co-creating technologies (Alam Sultana 2020) became a practice in the digitally sensitive era following the GST tax policy and remained far into the future. The imprinting theory suggests that community-based organisational practices emerge after a sensitive period and persist later on as imprints (Marquis 2003). Thus, I argue that the digital work practice was imprinted upon because of the processual interplay between preserving the tradition and augmenting the technology. I conceptualise the practice of *localised IT co-creating* as an imprint. Later, the managers strategically reinforced this imprint, as also indicated by Sinha et al. (2020), because of its aspect of augmenting technology, and more actively collaborated with the local community to develop exclusive online networks. Hence, they used *expanding local networks* as a strategic mechanism for digitalisation.

Second, the physicality of the products and manual practices in the industry, which the organisation was using, and the lack of those aspects in digital representation, emerged as another imprinting process. This case study revealed that MasonMart was reluctant to streamline its business processes using digital technologies because of its attempt to maintain “the client preference for individual treatment” in the building and construction industry. The employees were also reluctant to use the IT system and were questioning

the ability of technology in representing the complex nature of their products. Powell and Sandholtz (2012) explain how imprinting shapes work practices when recombining past practices with new science. From a similar stance, I argue that the practice of *disregarding digital literacy* became an imprint based on the technological and hereditary history of the organisation. The interplay between preserving the tradition and constraining the technology triggered this imprint. Later, on recognising the limitations of this imprint, the managers encouraged the employees to work together with new employees to share knowledge and capabilities as also suggested by Hsu and Lim (2014), in their study of imprinting effects in knowledge brokering. Hence, in line with the organisational strategy literature (Argyres et al. 2020), I argue that the managers reshaped the imprint by introducing the practice of *co-developing IT capabilities* as a strategic mechanism for improving digital literacy.

Third, the employees' attempts to come up with workarounds for bypassing the technology and not adequately using it triggered a third imprinting process. MasonMart's case study revealed that the employees used the IT system only for the essential process (i.e. point of sales) and always reverted back to the traditional work practice for the rest. Coming up with workarounds to incorporate or bypass the IT system within the established business processes thus became a practice when working with digital technologies. Workarounds have recently been discussed as a concept relating to pre-digital organisations (Davison and Ou 2014; Davison and Ou 2017). Integrating the imprinting theory with the existing IS literature, I conceptualise *coordinating workarounds* as an imprinted work practice in pre-digital organisations. It emerged through the intertwined processes of reshaping the tradition and constraining the technology. Later, on recognising the discrepancies in the workflows preserved by workarounds, a management role was established to revise and rewrite all the IT policies of the organisation, similar to the IT policy change in the study of institutionalisation by Baptista (2009). Hence, I claim that the managers were *reorganising IT policies* as a strategic mechanism to reinvent the imprinted digital work practice of the pre-digital organisation.



Fourth, based on the extended family involvement in the organisation to support the IT system another imprinting process emerged. MasonMart's case study revealed that the family of the pre-digital organisation's founder was actively participating in developing the business. The founder and his son (the current managing director) laid their trust unto the next-generation family members to obtain expertise in managing the IT system. Hence, the interplay between reshaping the tradition and augmenting the new technology was the underlying process of the imprint, *invoking future generations*. This imprint and the process was in line with Lippmann and Aldrich's (2016) findings on how individuals from one generation hold shared memories and pass them on to the next. Similar to the first imprint of this study, the family centric managers reinforced this practice by learning digital skills and growing into the leadership roles related to digital technologies. Hence, *inheriting digital leadership* became a strategic mechanism of moving forward and adopting digital technologies in the family organisation.

In sum, I argue that organisational history provides the basis for the emergent digital work practice and strategising in pre-digital organisations. Building on the findings of the case study and the imprinting theory, I offer an explanation of how the organisational tradition is imprinted and co-evolves with the digital work practice of a pre-digital organisation. Figure 4 shows the theoretical framework of digital imprinting. This framework foregrounds the importance of organisational history in managing the interplay between tradition and technology in a pre-digital family-operated business. I suggest that understanding and managing the trajectories of digital imprinting is vital in digital strategy making in pre-digital organisations. This study contributes to IS research and practice by providing an organisational history perspective on the emerging digital work practice and strategy making in pre-digital organisations.

4.5.2. *Implications for Research and Practice*

In this study, I uncovered how the technological and hereditary histories of pre-digital organisations are imprinted in their digital work practice and how managers strategically reshape those imprints. The organisational history perspective shifts the futuristic focus of IS research to look back and reflect on organisational history. In doing so, I make several contributions to IS research and practice.

First, this study highlights the importance of broadening the current focus in IS research on digital strategy making in pre-digital organisations (Chantias et al. 2019; Sebastian et

al. 2017) to further our understanding of their technological history and the evolution of the organisational tradition. I argue that digital strategy making in pre-digital organisations is challenging because of their organisational tradition; for example, some members of such organisations are still attached to physical objects and manual processes because of their historical practices. Much of IS research accounts for new technologies and emerging forms of organising (Vial 2019) but seldom accounts for the past. Present study addresses this gap in literature by providing an organisational history perspective on digital strategy making in a pre-digital organisation. I further extend IS literature by incorporating historical methods and theories to conduct qualitative interpretive case study research.

Second, the imprinting perspective developed in this study offers a novel way to trace the effects and long-term consequences of suddenly introducing new technologies for traditional work in pre-digital organisations. By introducing the concept of digital imprinting, I highlight the assumption of the imprinting theory that explains the reproduction of imprints during a sensitive period in the intermediate organisational history (Johnson 2007). Thus, in contrast to the well-established literature on foundational imprinting (Leung et al. 2013; Marquis 2003), This study provides empirical evidence for an imprint that occurs long after an organisation's formation. In doing so, I support and extend the literature on reproducing traditions in the intermediate organisational history (Dacin et al. 2019; Maclean et al. 2018). I also indicate specific implications for how imprinting occurs when historical practices meet a new digital technology that reshapes them in multiple and unexpected ways and leaves a footprint that persists far into the future.

Third, I integrate organisational strategy literature that considers organisational history as a resource or a constraint that can be managed (Basque and Langley 2018; Sinha et al. 2020), with IS literature that discusses the transformation of historical practices through digitalisation (Baiyere et al. 2020; Baptista et al. 2020). I suggest that examining the similarities, differences and tensions at play between historical practices and new technologies at pre-digital organisations can offer insights into the opportunities and challenges they encounter. Recent studies on strategy that considered the imprinting perspective indicate that managers can modify and reshape imprints to serve new purposes (Erçek and Günçavdı 2016; Ni Sullivan et al. 2014; Sinha et al. 2020). Similarly, while acknowledging the role of founders in creating the original imprints, this study

offers a new avenue to reimagine the tradition within the digital strategies of organisations.

Last, I provide guidance for practitioners by not only suggesting strategic mechanisms for managing the role of history to relate with digitalisation but also uncovering ways to identify imprinted digital practices in pre-digital organisations. For example, I identify the statements and short stories from or related to the founder that have been reused by succeeding family generations during and after the digitally sensitive period. In doing so, I offer insights into the digital imprints that can be used as resources or should be managed as constraints in strategy making. I also emphasise the importance of identifying the imprints and imprinted entities before strategising for future digitalisation initiatives. Oertel et al. (2016) discuss the impacts of founding conditions, imprinting and later institutional change on organisational success or failure in the long-term. I extend their work by showing how managers can identify and reshape imprints to better cope with institutional change, in particular, through digital transformation.

Chanas et al. (2019) and Davison and Ou (2017) help practitioners by presenting real-world cases on how managers developed strategies at pre-digital organisations. I add to this literature by explaining the long-term view of technological evolution and digital strategy making with my tracing of real-world historical trajectories and how managers reshaped them in practice. In this case study, I point to the specific aspects of technological and hereditary history of the studied organisation; thus, managers can find similar occurrences in their organisations. Furthermore, Baptista (2009) explains the interplay between a technology and its organisational context of use by empirically investigating the micro-level processes of how an intranet is changing an organisation and vice versa. This study further abstracts the interplay between technology and tradition when a new digital technology is introduced, thus presenting a big picture on the inertial and adaptive nature of the organisation.

4.6. Conclusion

I acknowledge that this paper only discusses one case study of a pre-digital organisation; hence, my findings may not be applicable to other organisations. However, the study findings and the framework developed is useful for pre-digital organisations to identify and manage their digital imprints when making a digital strategy. In this study, I only

considered how a pre-digital organisation imprinted on its digital work practice during a sensitive period long after its formation. IS research is yet to explore how contemporary organisations create and reshape their organisational history when they dynamically navigate through the fast-paced future. Therefore, as a concluding remark, I call for future IS scholars to “turn towards history—as past, process, context” (Clark and Rowlinson 2004, p. 331) and incorporate the historical theories of interpretation in exploring the future.

Chapter 5.

Embodying Organisational Memory in the Future of Work: A Robotic Process Automation Study

Abstract

This study investigates how a centralised government organisation managed its process knowledge towards an automation strategy. Studies of knowledge management have indicated the existence of historical knowledge in organisations, which they referred to as organisational memory. It is not clear, however, how organisational memory can be interpreted and used in the context of emerging digital technologies such as RPA. I propose an embodiment view on organisational memory as a useful perspective in understanding how an organisation realises its process knowledge when adopting a RPA technology. Building on a historical case study at the largest government services centre in Finland, I found that a centralised government organisation achieved automation by recollecting organisational memory and then embodying and codifying the knowledge through new forms of human-machine organising. Drawing from the literature on organisational memory and knowledge embodiment, I developed a framework articulating the strategies for managing organisational memory and the practices of embodying process knowledge with emerging technologies. I contribute to literature by providing a historical and an ongoing view of embodying process knowledge through the integration of organisational memory and human-machine organising practices. This study suggests that embodying organisational memory is essential in realising process knowledge for automation.

Keywords: Process automation, human-machine organising, digital work, organisational memory, knowledge embodiment

I have presented an earlier version of this study at the 2019 European Conference on Information Systems (ECIS):

Dias, M., Pan, S., and Tim, Y. 2019. “Knowledge Embodiment of Human and Machine Interactions: Robotic-Process-Automation at the Finland Government,” *Proceedings of the 27th European Conference on Information Systems*, Stockholm, Sweden, pp. 1-11.

5.1. Introduction

Automation is gradually permeating every aspect of our lives (Susskind and Susskind 2015; Willcocks and Lacity 2016). Emerging technologies such as AI, digital platforms and RPA are changing work practices and how organisations are managing knowledge work (Newell 2015; Willcocks 2020). Automation technologies are faster and more than humans in performing certain tasks (Davenport and Kirby 2015). For example, in their study of RPA at an insurance company, Lacity and Willcocks (2017) state that the task of processing 500 records of insurance premiums, which required several days for a human administration team to complete, required only 30 min after automation. Based on a global survey of 400 organisations, Deloitte reports that 53% of the respondents have already adopted RPA technology and 19% of the respondents plan to in the next two years (Wright et al. 2018). Although the economic value of automation is high, organisations face difficulties in identifying specific processes that can be automated (Faraj et al. 2018; Pettersen 2019) and improving them by automation (Davenport and Brain 2018; Nonaka 1994). Automating processes is particularly challenging in organisations where knowledge work has been done by human employees for many years in the organisational history (Decker et al. Forthcoming; Polanyi 1966; Tsoukas and Vladimirov 2001).

Realising process knowledge is not an easy task for many organisations (Davenport and Brain 2018; Gupta et al. 2000). Nevertheless, some approaches for successfully realising process knowledge using automation technologies are better than others (Willcocks and Lacity 2016). One such approach is to involve process administration employees, who manually performed the tasks for many years, in automating the processes (Hallikainen et al. 2018). In particular, the visual and easy-to-program interfaces of RPA technology provide a low barrier of entry and allow operational employees with little technical skills to automate their work tasks (Syed et al. 2020), thus offering them an opportunity to externalise their own experience (Nonaka 1994). Existing studies provide best practices and guidelines to develop business processes and overcome challenges in organisations when implementing RPA (Lacity and Willcocks 2016; Osmundsen et al. 2019; Syed et al. 2020; van der Aalst et al. 2018). However, the specific ways of realising the process knowledge that has been historically developed in organisations, resides in the minds of human employees and is embodied in their interactions, for the purpose of automation are

not clear. Therefore, I ask the following question: *How can an organisation realise its historical process knowledge for managing RPA?*

Research on knowledge embodiment (Blackler 1995; Clark 2006) and organisational memory (Stein and Zwass 1995; Walsh and Ungson 1991) has considered the knowledge of the past when adopting technologies. The theory of knowledge embodiment views cognition, the act of knowing, as embodied interactions that are distributed across humans and machines rather than internalised within humans or machines (Clark and Chalmers 1998; Polanyi 1966). Organisational actors from intermediate generations, who carry and share memories, embody the meanings of the past in organisational processes (Walsham 2006) and technologies (Lippmann and Aldrich 2016). In their review of organisational memory, Walsh and Ungson (1991) state, “interpretations of the past can be embedded in systems and artifacts as well as within individuals” (p. 61). Memories of individual employees, their group activities and the collective mastering of daily routines can constitute organisational memory (Cook and Brown 1999). Organisational memory is “temporally prolonged into the present” (Decker et al. Forthcoming, p. 8) and allows an organisation “to store and retrieve knowledge of facts, processes, or experiences” (Yates 1990, p. 172) of the past. Organisational memory can be embodied in the form of paper or computer systems of individuals and organisations (Yates 1990). In this sense, an embodiment perspective on organisational memory is useful in understanding how an organisation realises its process knowledge for automation.

To investigate the organisational strategies and practices of managing process knowledge, I conducted a historical case study at the largest government services centre in Finland (pseudonym: ‘FinServ’). FinServ was officially formed in 2010 as part of a large-scale project of the government administration services (since 1990) and brought together the finance and HR processes that were previously handled by individual government institutions across the country at one location. With the implementation of a central IT solution (since 2011) and RPA technology (since 2014), the relocated administration employees actively engaged in process development and automation activities, thus, the organising of work and work practices drastically changed. The story of FinServ’s formation and its recent RPA adoption provided me with an opportunity to study how an organisation realised its past process knowledge for automation.

Based on this case study covering 30 years of FinServ's organisational trajectory, I found that the realisation of process knowledge for RPA is a long-term effort of human work teams and continuing human-machine collaborations. Drawing from the literature on organisational memory (Walsh and Ungson 1991) and knowledge embodiment (Blackler 1995), I developed a framework to explain the trajectory of realising process knowledge through recollecting (using human teamwork), embedding (using human-machine knowledge codification) and rewriting (using human-machine organising) organisational memory. In doing so, I contribute to IS literature on strategy (Bharadwaj et al. 2013), managing knowledge (Newell 2015) and digital work (Baptista et al. 2017) by providing a historical and an ongoing view of embodying process knowledge through the integration of organisational memory and new forms of human-machine organising. The strategies and practices of realising process knowledge revealed in this study can help managers of centralisation initiatives to understand the long-term view of embodying process knowledge and carefully manage the knowledge of the past when strategising for automation.

5.2. Literature Review

5.2.1. *Robotic Process Automation and Process Knowledge*

The automation of processes using robotic technologies is becoming increasingly popular in organisations (Aguirre and Rodriguez 2017; Zhang and Liu 2019). RPA is a software-based technology that involves configuring robotic assistants to perform work (Hallikainen et al. 2018; Lacity and Willcocks 2016; Lacity and Willcocks 2017). The RPA software is referred to as “a software robot that mimics human activity by performing processes characterised by structured data and clear action rules, leading to unambiguous outcomes” (Osmundsen et al. 2019, p. 6919). Once configured, the RPA software can perform routine tasks that are based on pre-defined rules (Mendling et al. 2018). For example, the RPA software can retrieve data from spreadsheets, perform calculations, update different IT systems and communicate decisions to stakeholders via email (Osmundsen et al. 2019). The goal of RPA is to automate routine work processes in organisations so that they can provide more efficient, high-quality services at reduced costs while also freeing knowledge workers from mundane tasks (Lacity and Willcocks 2017; Papageorgiou 2018).

Literature suggests that some organisations are better at managing their processes and thus achieve better productivity than others after implementing RPA (Davenport and Brain 2018; Hallikainen et al. 2018; Plattfaut 2019). One of the action principles suggested by Lacity and Willcocks (2016) is to identify and prioritise the processes that can be automated before implementing RPA. Hallikainen et al. (2018) recommend collaborations between administration employees and RPA experts for sharing process knowledge for automation. According to Davenport and Brain (2018), the reason for poor RPA adoption is that many organisations lack an understanding of process knowledge because of poor documentation and historically developed routine practices. They reveal that team collaboration is a better way of improving processes for automation than individual attempts. Therefore, the collective improvement of processes is becoming a practice in many organisations when considering RPA adoption (Mendling et al. 2018).

Process knowledge in organisations has long been discussed in IS research (Bharadwaj et al. 2010; Iivari et al. 2004; Prieto and Easterby-Smith 2006). In their study of business process outsourcing, Bharadwaj et al. (2010) identify the discovery of process knowledge as a complicated task if the process is “embedded in the minds of a large number of process actors” (p. 173). According to van der Aalst and Kumar (2003) process knowledge can exist in the process models of workflow management systems in addition to the minds of human agents who coordinate complex processes. Process knowledge that has been historically developed and coordinated by human workers using enterprise IT systems is increasingly being transformed into more advanced “human-in-the-loop” (Grønsund and Aanestad 2020) forms of work with emerging technologies such as RPA (Aguirre and Rodriguez 2017). Our understanding of realising process knowledge and related human-machine organising thus remains incomplete (Baptista et al. 2020; Grønsund and Aanestad 2020; Lyytinen et al. Forthcoming) because previous literature is limited in exploring the historical development of organisational processes. A summary of RPA studies is presented in Table B1, Appendix B.

5.2.2. Organisational Memory and Knowledge Embodiment

Literature on organisational memory considers the historically developed, embodied knowledge in organisations (Stein and Zwass 1995; Walsh and Ungson 1991). Organisational memory is a core concept in information processing literature and is referred to as “stored information from an organization’s history that can be brought to

bear on present decisions” (Walsh and Ungson 1991, p. 61). This information is stored through sharing and creating collective interpretations of the past by the individuals from a particular time in the organisational history (Lippmann and Aldrich 2016). Walsh and Ungson (1991) suggest that “interpretations of the past can be embedded in systems and artifacts (e.g. structures, transformations, ecology), as well as within individuals”. For example, in their review of entrepreneurial groups at Silicon Valley, Lippmann and Aldrich (2016) show how the collective construction of technologies by individuals from a certain generation who share, provide meaning to and combine their interpretations from the past makes them successful entrepreneurs. Tuomi (1999) has proposed a reversed hierarchy of how data, information and knowledge are being developed, and the use of organisational memory systems as “the social process that makes it possible for the users of the system to make sense of each other’s worlds” (p. 115). Organisational memory is becoming increasingly important for organisations (Decker et al. Forthcoming; Gasparin and Neyland 2018), especially because their processes are being automated and knowledge workers are being replaced by machines.

The concept of organisational memory is useful in understanding the evolution of process knowledge in the context of RPA for multiple reasons (Decker et al. Forthcoming; Lippmann and Aldrich 2016). When processes are automated, human work practices become organisational memory (Stein and Zwass 1995). Experienced human workers often use their memories and historical practices to solve problems in unconventional circumstances (Lippmann and Aldrich 2016). Established organisations value the contribution of their experienced employees and work teams in knowledge creation (Madsen and Desai 2010). However, in the age of automation, an increasing number of organisations are moving their process knowledge into sophisticated machines (Aguirre and Rodriguez 2017; Lacity and Willcocks 2016). In doing so, they lose or alter the embodied knowledge and experience of human workers and their collective actions in reproducing knowledge (Nunes et al. 2006). For example, in their study of healthcare robots, Pee et al. (2019) find that robotic automation can alter the connections among people by recognising, visualising and interpreting the information of work processes. Organisational managers need to recognise the value of the organisational memory that resides in the minds of human workers, their interactions with others and IT systems to carefully manage RPA initiatives. Jackson (2012) suggests that the knowledge resides in the memory traces of individuals can be, to a certain extent, stored in organisational

memory systems as collective interpretations of the explicit knowledge and from which it emerges. Therefore, an embodiment view of organisational memory can help us understand how historical process knowledge is realised using human and machine collectives in automation (Chughtai 2021; Pee et al. 2019; Sergeeva et al. 2020).

An explanation of how process knowledge is realised through the embodiment of organisational memory (Yates 1990) is useful for IS research. Organisational actors from intermediate organisational generations, who carry and share memories of the past, embody the meanings of the past in standard operating procedures (Walsham 2006) and technological mechanisms (Lippmann and Aldrich 2016). In an early attempt to explain the preservation of organisational memory in systems, Stein and Zwass (1995) argue that such memory preserving activities can lead to knowledge embodiment. The theory of knowledge embodiment views cognition, the act of knowing, as embodied interactions (Blackler 1995; Nonaka 1994). When working together, humans and machines embody knowledge in their interactions (Vertesi 2012). Clark (2001, p. 154) claims, “much of what matters about human intelligence is hidden not in the brain, nor in the technology, but in the complex and iterated interactions and collaborations between the two”. These embodied interactions among human workers and between humans and machines can become organisational memory and persist over time (Sutton 2006). Organising via emerging technologies provides “a different mode of perception and action, which can both enhance and limit work performance” (Sergeeva et al. 2020, p. 3). Stein and Zwass (1995) also stress that “IS can only realize a portion of organizational memory” (p. 91). Therefore, understanding the strategies and human-machine organising practices that help organisations realise their historical process knowledge is necessary.

5.3. Research Method

I conducted a historical case study (Clark 2004; Rowlinson et al. 2014) using a qualitative interpretive approach (Klein and Myers 1999; Pan and Tan 2011) to develop an understanding of managing process knowledge in the future of work context. Tracing organisational trajectories through narrative construction is an established way of conducting historical research (Kipping et al. 2014; Walsh and Ungson 1991). Adopting the historical narrativist approach (Kipping and Lamberg 2017, p. 306) to qualitative case study research, I first collected data from historical sources and interviews about

organisational trajectories to construct narratives and then followed an interpretive qualitative approach to analyse the chronologically arranged narratives.

5.3.1. *Research Setting*

This study's case organisation is a service centre (pseudonym: FinServ) of the Finnish government. Founded in 2010, FinServ is the government's largest service centre and provides finance and HR administration support services for all the government institutions. Since 1990, before founding FinServ, the Finnish government envisioned a service centre model aiming to centralise and streamline the common processes of all government institutions. When FinServ was founded, approximately 600 finance and HR administration employees were relocated from state agencies across the country to FinServ to centralise the services and implement a government-wide IT solution. With an initial budget of EUR 120 million, this was one of the largest public-sector IT projects of its kind in Finland. However, FinServ could not achieve the expected productivity because of the process discrepancies that remained after the IT-solution implementation. To further increase productivity and reduce costs, in 2014, FinServ started developing an automation strategy, considering an RPA software application. After a pre-study, the managers decided to involve their own employees in learning and implementing processes with the RPA software. By 2017, some operational employees managed to become RPA experts through self-learning. Since then, FinServ has been radically by developing new forms of organising and working with RPA.

I selected FinServ as a case for studying the evolution of process knowledge when implementing an automation strategy for several reasons. First, FinServ provided me with rich data on its organisational history (1990-2020), from the inception of a service centre model to the automation of services. Second, I recognised the importance of FinServ's history in uncovering new ways of creating and preserving organisational memory through the design, implementation and use of emerging technologies. Finally, FinServ was executing its automation strategy by actively implementing and using RPA for providing finance and HR services for government-wide institutions. Hence, although not representative of a large population, as a single case, FinServ offered the depth required to trace and understand the organisational trajectories related to its strategy, work practice and technology use over time.

5.3.2. *Data Collection*

I collected data covering 30 years of FinServ's history from the preliminary stages of introducing a service centre model to the automation of services using an RPA technology. In particular, I collected (a) interviews with the founding directors and transferred administration employees who later became RPA experts; (b) observations of the RPA software in use; (c) internal archival material on the organisation's history and strategic initiatives over time; and (d) external archival material including news articles, government publications and case studies on FinServ, its context and IT projects.

I conducted 20 semi-structured interviews with participants ranging from the founding directors to service employees. I visited FinServ twice – once when they began the RPA initiative (June 2017) and again in the middle of its implementation (April 2018). My interview protocol included open ended questions (see Table B2, Appendix B) that allowed interviewees to freely share their stories and experiences. The questions focused on both the organisational history and its ongoing events, including strategies, adoption of technologies and changes in work practices. In the first round of interviews, I focused on the organisational strategies and therefore interviewed senior management, including the chief technology officer and director of ICT projects. The interviews revealed information about how the Finnish government services were handled before founding FinServ and the evolution of the service centre model. In the second round, I interviewed administration employees who were working with RPA followed by their relocation to FinServ from individual government institutions. The employees explained their journey as administration employees who recently advanced their work roles and skills by developing and working with RPA. Some of the employees became RPA experts, whereas others used RPA to perform their work. They also did a demonstration of the RPA technology. Finally, I interviewed middle-level managers and team leaders to understand their view of changes in the organisation and work practices.

To explore the organisational history in more detail, I collected internal and external archival material about FinServ. I read through corporate documents covering FinServ's strategic initiatives from 1990 to 2019. I also retrieved publications and reports from the Finnish government about the service centre model, to understand the influence of the socio-political content at the time. Consultation reports and reports on IT projects allowed me to trace the evolution of technologies over the organisation's lifespan. I also searched

other archives and collected newspaper articles about FinServ and its IT projects. Overall, I collected and coded about 800 double-spaced pages of data, sources and notes in addition to the 392 double-spaced pages of interview transcripts (see an overview of data collection in Table 6 and the list of interviewees in Table B3, Appendix B). These additional data allowed me to account for source criticism, triangulation and hermeneutic interpretations as suggested by Kipping et al. (2014).

Table 6. Data Collection Sources and Coverage		
Type of Data	Source	Coverage
(a) Interviews about FinServ's formation and automation projects (20 interviews)	Founding directors (3)	2010-2018
	Capability development manager (1)	2015-2019
	Project managers and team leaders (5)	2010-2018
	Relocated HR/finance administration employees who work with automated processes (6)	2010-2018
	Relocated HR/finance administration employees who became RPA experts (5)	2010-2018
(c) RPA observations (90+ min of video recordings)	Observations of the team developing and working with the RPA software	April 2018
(b) Internal archival material (about 400 pages)	Strategy documents (5)	1990-2019
	Consultation reports (2)	2008-2016
	Reports on FinServ's IT projects (6)	2015-2019
(d) External archival material (about 300 pages)	News articles about FinServ (6)	2011-2020
	Relevant government publications (4)	2000-2020
	Other related webpages and blogs (11)	2000-2020
	Case studies on FinServ's IT projects (3)	2011-2019

5.3.3. *Data Analysis*

I followed the historical narrativist approach (Kipping and Lamberg 2017, p. 306) and qualitative interpretive case study (Klein and Myers 1999; Pan and Tan 2011) method for analysing the data. I followed four steps, including (1) narrative construction (Kipping et al. 2014), (2) open coding (Strauss and Corbin 1998), (3) selective coding (Strauss and Corbin 1998) and (4) "theory-data-model alignment" (Pan and Tan 2011, p. 171).

First, I constructed a narrative of FinServ's history. I read through the data and arranged them chronologically, while taking notes on the important and specific events of the organisational history. When unpacking and arranging the events and related

organisational processes, the data were time stamped, enabling a clear understanding of the start and end of each process, their sequences and the related environmental conditions. NVivo software was used to organise the data. Then, using a visual mapping technique (Langley 1999), I discussed the data with my supervisors, revised the narrative together and developed a chronological synopsis of FinServ's organisational history, as illustrated in Figure B1, Appendix B. At the end of this stage, I identified three distinct eras of FinServ's organisational history: centralisation era (1990-2011), reformation era (2011-2017) and automation era (2017-2020). To complement the narrative, I formulated a summary of FinServ's history, as presented in Table 7.

Second, following the inductive approach to interpretive research, I used open coding techniques to interpret the chronologically arranged data and the narrative. Again, I initiated the open coding phase on the NVivo software and shared the emerging codes with my supervisors. Next, I discussed, interpreted and refined the codes with them in iterations to ensure the interpretive principles are met (Klein and Myers 1999). I also collected and added new data to fill apparent gaps and detect conflicting evidence to account for source criticism and triangulation following the advice of Kipping et al. (2014). For example, the open codes included "service reformation", "learning by doing", "work role changes" and "automation of work". The derived open codes were related to both strategies and work practices across the organisational eras.

Third, I categorised the open codes into groups and incorporated selective coding techniques to account for the related theoretical concepts from literature (Pan and Tan 2011; Strauss and Corbin 1998). For example, I categorised the open codes related to the introduction of the shared service model and the relocation of employees as relating to the theoretical concept of "recollecting memory" from the study by Lippmann and Aldrich (2016). The concept of "collaborative re-standardising" was derived from the open codes related to work practices such as sharing in teams and lean standardisation. As focused upon in the interviews and later discussed with my supervisors, I attended to each event, strategy and changing work practice from the perspective of organisational actors, within their historical contexts, following the advice by Kipping et al. (2014) on hermeneutic interpretation between historical data and their contexts in time. Towards the maturation of selective coding, I identified memory (Stein and Zwass 1995) and embodiment (Sutton 2006) as relevant theoretical concepts to this study's data about realising process knowledge at FinServ.

Table 7. Chronological Summary of FinServ's Organisational History			
Era (Year)	Centralisation Era (1990-2011)	Reformation Era (2011-2017)	Automation Era (2017-2020)
Events pertaining to technologies	Archival evidence: <ul style="list-style-type: none"> • A central IT solution begins to be designed and implemented in the government in 1990 	Archival and interview (June 2017) evidence: <ul style="list-style-type: none"> • IT solution is deployed, but productivity improvement is limited • RPA is considered as the new solution 	Observational (April 2018) evidence: <ul style="list-style-type: none"> • RPA software visualises entire processes • RPA software formulates reports • RPA software generates complex errors
Strategic initiatives	Archival evidence: <ul style="list-style-type: none"> • A service centre model is proposed for reforming government services using IT • Administration employees are relocated to one location, forming FinServ 	Archival and interview (June 2017) evidence: <ul style="list-style-type: none"> • RPA is introduced to reduce process discrepancies • Administration employees are involved in developing RPA 	Archival and interview (April 2018) evidence: <ul style="list-style-type: none"> • New teams and work roles are created • RPA team is given more responsibility • Managers plan to utilise own employees for future digitalisations
Changes in work	Interview (June 2017) evidence: <ul style="list-style-type: none"> • Administration employees collaboratively streamline the processes • Administration teams are formulated to provide common services 	Interview (June 2017) evidence: <ul style="list-style-type: none"> • Administration employees realise the need for and start learning new skills • Several enthusiastic employees volunteer to develop the processes in the RPA software 	Observational and interview (April 2018) evidence: <ul style="list-style-type: none"> • Administration employees develop and work with the RPA software • RPA software provides feedback
Government context in time	Archival evidence: <ul style="list-style-type: none"> • Government encourages the centralisation of common services across institutions 	Archival evidence: <ul style="list-style-type: none"> • Government wants to reduce administration support costs 	Archival evidence: <ul style="list-style-type: none"> • Government encourages and supports hi-tech automation projects

Finally, I adopted the concepts of organisational memory (Walsh and Ungson 1991) and knowledge embodiment (Demarest 1997) as my lenses to conceptualise the phenomenon. These two concepts together helped to interpret the data structure and theoretical codes that explain how historically developed knowledge in organisations can be realised for automation. The automation strategy focuses on recollecting, embedding and rewriting organisational memory, whereas work practices are related to embodiment in work teams and human-machine interactions. Integrating the two theoretical concepts, I developed a framework to explain how the centralised government organisation managed process knowledge in its automation strategy. I collected and analysed data until theoretical saturation had been reached (Glaser and Strauss 1967). A detailed data structure is presented in Table B4, Appendix B.

5.4. Findings

I structure the findings of this case study based on the three eras of FinServ's organisational history: centralisation era (1990-2011), reformation era (2011-2017) and automation era (2017-2020).

5.4.1. *Centralisation Era (1990-2011)*

In the centralisation era, administration employees from different government institutions were brought together and formed teams to streamline the common processes. When working in teams, the employees had the opportunity to discuss and learn each other's ways of working. I explore the practices that employees used for realising process knowledge collectively in teams.

The first practice is related to how individual employees thought about their own work after the introduction of the service centre model to provide administration services. One of the administration employees who later became an RPA expert explained in an interview:

“I've always been interested in developing things. Over several years ago, when I came here in the beginning, I started to think why certain things are done this way. And I used a lot of Excel, when other people just printed it out and cut the stuff. So, I never liked manual stuff. I don't like to do one thing many times. I want to do

things fast and efficient”. (Relocated finance administration employee who became an RPA expert, 2017)

The strategic initiative to centralise the services motivated employees to think about their own work and how processes can be better streamlined to simultaneously provide administration services for several government institutions. For example, some employees used Excel sheets to record and macros to process transactions across institutions instead of several paper forms. In the sense, they started thinking ahead and improving their own processes to be automated using IT applications. They not only kept digital records of the work but also ensured that the processes are digitally preserved. Therefore, I identify *perceptive reasoning* as a practice of realising process knowledge for automation.

The second practice came about as administration employees from several government institutions were brought together and requested to discuss the possibilities for integrating the processes to provide services to all institutions. One of the relocated employees shared with us:

“It’s changing all the time, when five people get together and start to talk about something, we can actually realise during the conversation that there’s an even better way to do it. Even when the best practice is all we had to share, if you combine them in some way, it can evolve in the next phase”. (Relocated finance administration employee who works with automated processes, 2017)

The relocated employees went through cycles of knowledge sharing and improving the processes for centralising common finance and HR services. They held discussions among themselves to identify the most effective practice and, sometimes, integrated the process knowledge to determine the most appropriate practice for centralisation. For example, payroll secretaries were brought together as one team to provide payroll services to government institutions. While sharing their past knowledge and experience, they agreed on a common ground to streamline the processes. Therefore, I identify *experience sharing* among administration employees from different government institutions as a practice of realising process knowledge for automation.

The third practice came about as the permanently relocated employees continued to share their experience and collectively re-standardise the processes in teams. One of the team leaders explained:

“I realised that when people perform routines everybody was doing the same thing a little bit differently. There might be somebody doing it really efficiently. When you find that way, you can... ‘standardise’ is not the right word, because it can still improve”. (Team leader, 2017)

The teams of relocated employees added the re-standardised steps into their previous process manuals or collaboratively created new manuals to collect and maintain their collective knowledge. Thus, the administration employees continuously improved the processes through the practice of *collaborative re-standardising* in teams of relocated employees who worked on the same process earlier in separate government institutions.

5.4.2. Reformation Era (2011-2017)

My historical analysis revealed that after the centralisation of services, FinServ led the government-wide adoption of the IT solution and reformed administration services, during the period between 2011 and 2017. Following the introduction of the new IT solution, FinServ managers saw a need for developing new capabilities in their relocated workforce to successfully integrate the process knowledge with IT. In the reformation era, thus, I investigate the interactive practices between the employees and RPA software application that integrate the process knowledge.

The first practice was established when the managers created awareness about the forthcoming work-life changes that are about to come and encouraged employees to learn new digital skills. Some employees realised the importance of specialising in emerging technologies for the future of work. One of the finance administration employees who drastically changed her job role after relocating to FinServ explained:

“In that sense it’s different from the industrial revolution because now you have to learn so fast and become different so fast. Because earlier, you went to work in a factory; and it wasn’t so difficult. But now it’s like ... mind challenging. It is more like a cognitive challenge that you really have to change your mindset, plus learning to learn is the thing”. (Relocated finance administration employee who became an RPA expert, 2017)

She explained that she always liked when “the things are changing” because then she would not have to do the same things every day. However, learning new things was challenging to her, as she had developed her career so far as a finance professional. She accepted the challenge and started self-learning new technologies and coming up with new ideas for improving processes; thus, she reformed her work life to better adopt IT. Here I identify *digital self-reforming* as a practice of realising process knowledge.

The second practice was motivated by the managers when they involved the administration employees to learn and experiment with the RPA software since the beginning of pre-studies. Certain employees were very eager to experiment with the new software, irrespective of their daily workload in regular tasks. When I visited FinServ in early 2017, one of the HR administration employees who later became an automation expert explained that he did not have any technical skills until he started experimenting with the RPA software:

“I didn’t have any previous experience in programming, so I started from zero. I knew the substance, but it was so hard to get into the robot. It was hard for me to say to myself that you cannot know everything, and you need time to learn. You have to experiment and learn new things. Learning by doing is the approach we used for RPA”. (Relocated HR administration employee who became an RPA expert, 2017)

RPA technology had a low barrier of entry and provided an opportunity for administration employees to automate their own work. They used experimental learning while working to automate the processes. Therefore, I identify *experimental working* with the RPA software as a practice of realising process knowledge.

The third work practice was employed when FinServ formed a new team to implement the RPA software. The managers requested volunteers among the administration employees to join the team. These employees changed their work roles and became RPA experts. The RPA experts showed me how they assemble the processes using the visual navigation features of the RPA software. For example, I observed how the RPA team members program the recruitment process using the manuals prepared by the administration teams. A screenshot of an RPA programming interface is presented in Figure 5. One of the RPA experts explained how he interacts with the software:

“This is the manual for the recruitment process on the [HR management] system and job posting webpage. So, every click has been set. Based on this, I have to know every click, just from these markings, where the robot should click. Then I click it with the robot and show it this is the task you have to do; for example, you have to type the applicant name into this element. Then it records the process itself. That’s the easiest part as we just showed, but then we have to put error handling, delays and elements exist which are harder”. (Relocated finance administration employee who became an RPA expert, 2018)

The experts also explained how they were testing the automated processes using the visual interfaces of the RPA software. The visual interfaces of the RPA software helped the non-technical administration employees to realise their process knowledge on their own by *interactively assembling* the software.

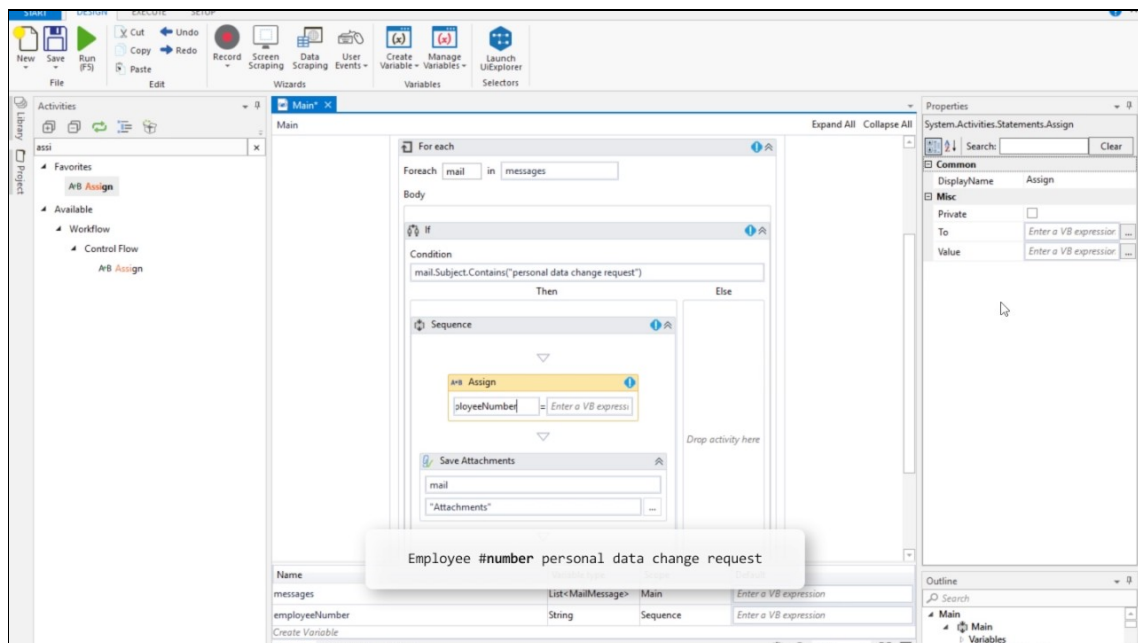


Figure 5. A Screenshot of a Programming Interface of the RPA Software

5.4.3. Automation Era (2017-2020)

Since 2017, FinServ employees have been working with automated processes to provide administration services. During my second visit to FinServ, in April 2018, 13 of their 28 business processes were fully automated. FinServ employees were providing services using 10 fully assembled RPA software robots (a “robot” is equivalent to a software license), as mentioned in an RPA project progress report in 2018. In the automation era,

I found practices of realising process knowledge for the continuous improvement of automated processes.

The first practice is facilitated by the software robots. The robotic applications have been scheduled to execute certain processes and send reports to administration employees. The schedules are set such that the automated processes run overnight or on the weekends, when employees are usually not at work, and generate reports for them to further process during regular work hours. As I observed, and as one of the employees explained:

“It’s a new thing that the robot does better. It does that regularly every week. Before the robot there was this person who took these reports and sent them to everyone. In all our officers, there were 200 people checking the report and they had to work on the things concerning their own department. Now the robot generates all the reports every Tuesday. Then there’s about four people who process and finalise the things that the robot couldn’t do. Then the quality is better because they are on time every week and accurate”. (Relocated HR administration employee who works with automated processes, 2018)

I name this scheduled RPA practice as *automated reporting*. As a result of automated reporting, the work of administration employees changed.

The second practice is centred around investigating the errors that appear on automatically generated reports. In addition to manually fixing the errors and further processing the reports, the employees analyse the errors, determine the underlying causes of the errors and work together with the RPA experts to investigate discrepancies in the automated processes. An employee explained:

“Oh! The robot organises lines, the easy ones. For example, in the payroll job I had at least 4,000 lines, and now the robot gives me 80 lines. And when I come to work, all those 80 lines need processing. They all need some kind of effort from me. I think every morning why do these faults come to my list? Is there something customers give us, the wrong information, or is there some point in our processes where we could correct this? I think about it, ask others, and we analyse how to correct the robot”. (Relocated finance administration employee who works with automated processes, 2018)

The work of administration employees became more complicated as the automated processes generated some errors that required more thinking and analytical skills to be resolved. In this sense, I observed the practice of *dynamic investigating* enabled by the visual interfaces of the RPA software that allowed the RPA team to work together with the administration teams to resolve the errors.

The third practice is considered essential in this era because the automated processes started to become obsolete very fast. To keep advancing the business, the processes needed to be constantly revisited and revised. The RPA experts became responsible for updating the automated processes whenever someone determines a new way to solve a recurring error. This practice is evident in the below quotation by the capability development manager explaining her view on the future of work and continuous automation:

“The robot can’t do my job. Well, it can do most of it. Oh okay, it can do almost everything, but it needs me every time it is broken. Okay it works well with the routine tasks, but it needs me to do the new things. It’s good that it took my old boring job because humans are not supposed to do that. And then the next phase is, it is nice when robots are doing my old job. My new job is much more interesting and I am so happy that the robot can’t do what I do now. But then we repeat the story from the beginning”. (Capability development manager, 2018)

Receiving reports from the RPA software, investigating the errors and reconstructing the processes became an ongoing practice at FinServ. As accurately said by the capability development manager, they were “giving more intelligence to the processes”. The employees also became more innovative in their jobs and advanced their job roles with a futuristic mindset. Thus, *ongoing reconstruction* of processes became a new practice of realising process knowledge.

5.5. Theoretical Analysis and Discussion

The historical analysis revealed the practices used by the employees for realising process knowledge for the automation of administration services across three eras: centralisation, reformation and automation. I also found that all the practices of realising process knowledge were managed by the organisational strategy. Next, I discuss how managers can carefully modify historical knowledge in organisations for RPA.

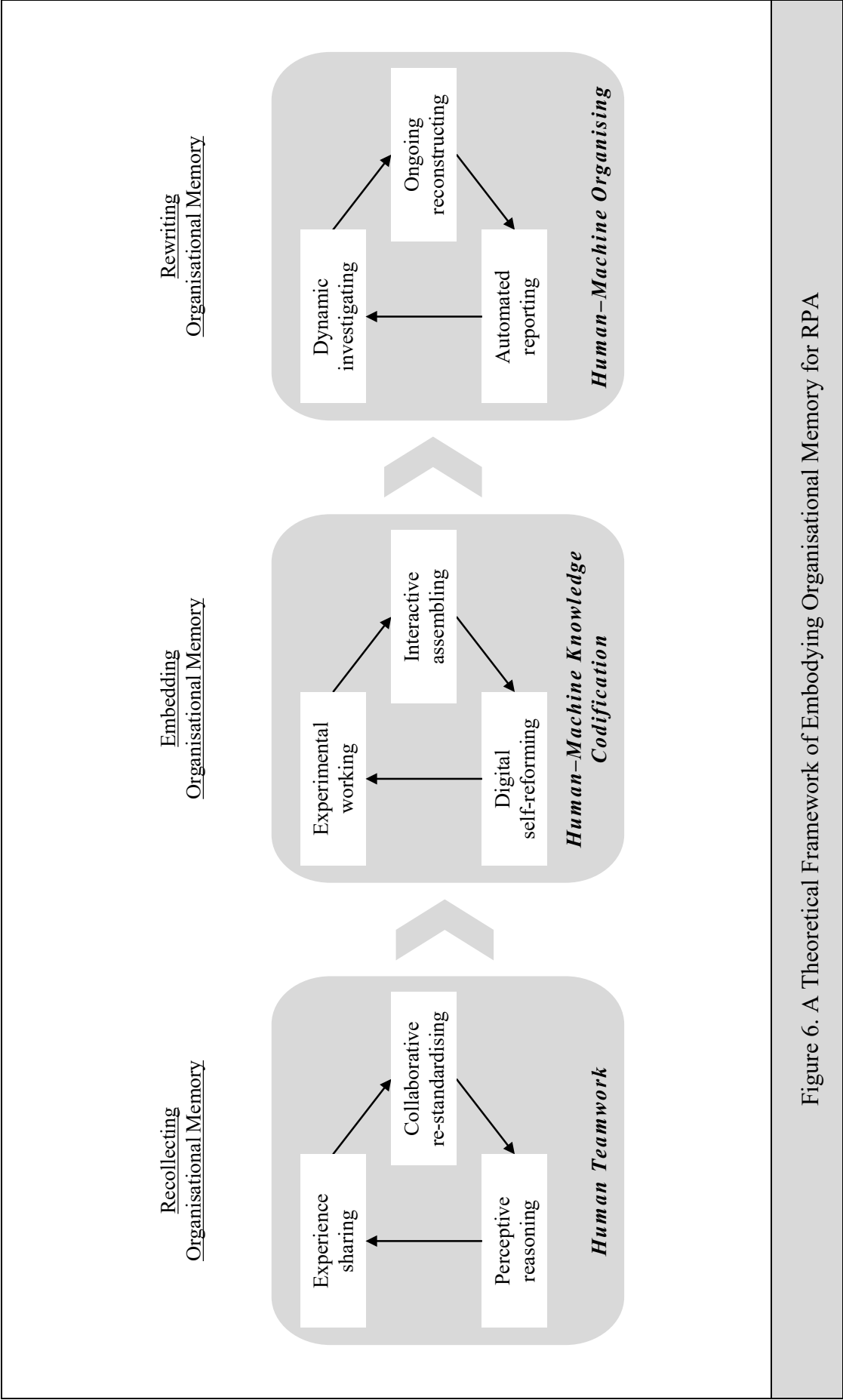


Figure 6. A Theoretical Framework of Embodying Organisational Memory for RPA

5.5.1. Towards a Theoretical Framework of Embodying Organisational Memory

Generalising the insights, I develop a framework that articulates the strategies and practices of realising historically developed process knowledge in organisations (see Figure 6). Organisational memory is recognised as the accumulated body of knowledge in an organisation over time (Decker et al. Forthcoming; Walsh and Ungson 1991), whereas the knowledge embodiment theory explains how people embody knowledge in teams, processes and technologies in organisations (Demarest 1997; Nonaka 1994). Drawing from these two streams of literature, I propose that an organisation can realise process knowledge through embodying organisational memory. In particular, I discuss three strategies and interrelated practices of embodying organisational memory for RPA.

First, organisations can strategically bring together employees who have worked with the same administration process and have similar experience to share their knowledge. The strategy of teamwork between employees who share a similar past is relevant with the concept of collective memory in organisational history literature (Decker et al. Forthcoming; Lippmann and Aldrich 2016). Drawing from the literature on collective memory, I conceptualise recollecting historically embodied organisational memory as a strategy for realising process knowledge for RPA. In this study, when centralising the administration services, employees from multiple government institutions, who had experience with the same administration work were relocated to FinServ. According to previous literature, traditional ways of collecting organisational memory include storytelling and documenting past knowledge by employees who have shared experiences from the past (Suddaby and Foster 2017). Extending the literature, I found three specific practices – experience sharing, perceptive reasoning and collaborative re-standardising – of recollecting organisational memory when the teams were arranging process knowledge for automation. Perceptive reasoning helped them to improve their own work of integrating the past memories and emerging technologies. Experience sharing allowed employees to share their memories and documentations among team members. Collaborative re-standardising helped them to improve the processes for automation. These practices resulted in new collective understandings that embodied process knowledge in human work teams (Williamson and Sutton 2014).

Second, with the increasing use of digital technologies, knowledge codification through human-machine interactions has become a way of realising past knowledge in

organisations (Stein and Zwass 1995; Sutton 2006). In this case study, I found that the managers used embedding organisational memory as a strategy for RPA involving the past knowledge of administration employees. Previous literature suggests that knowledge is embodied in the interactions between humans and machines (Clark 2008). Drawing from this literature, I identify codification of historically developed process knowledge as a useful way of embedding organisational memory in technologies. In particular, the visual and easy-to-use interfaces of the RPA software allow ongoing codification (Newell 2015; Prieto and Easterby-Smith 2006) of process knowledge using several practices. I found three practices that the human-machine teams used for codifying knowledge: digital self-reforming, experimental working and interactive assembling. In line with the organisational strategy to involve them, the administration employees reformed themselves by extending their cognitive abilities to work with technologies (Smart et al. 2017). They learnt the new technologies through experimenting while working with the systems. Moreover, the administration employees assembled the RPA software by themselves using its interactive, easy-to-learn interfaces (Hallikainen et al. 2018). Therefore, I propose embedding organisational memory through knowledge codification in human-machine teams, also indicated in recent literature (Daugherty and Wilson 2018; Lyytinen et al. Forthcoming), as another strategy for realising process knowledge.

Third, automation of work to require minimal human intervention is becoming widespread in modern organisations (Manyika et al. 2017; Mendling et al. 2018; Willcocks and Lacity 2016). In this study, I observed how an RPA software performs work such as executing end-to-end processes, generating reports and updating enterprise IT systems. These software-based robotic applications that mimic human routine work (Lacity and Willcocks 2017) can be used to continuously update and rewrite organisational memory, thus contributing to organisational knowledge creation (Nonaka 1994). In particular, I found three practices that were used to continuously refine process knowledge: automated reporting, dynamic investigating and knowledge reconstructing. Automated reporting is a new practice in organisations that use advanced technologies to perform work tasks (Mendling et al. 2018). However, complementing Grønsund and Aanestad (2020), I also found that human employees must be “in-the-loop” to solve the issues arising with fully automated work and to reconstruct processes for the ever-changing requirements. Therefore, I propose rewriting organisational memory (Snyder

and Judt 2013) in the forms of human-machine organising as an ongoing method of realising valuable knowledge in organisations.

In sum, the framework developed in this study provides an explanation of how an organisation realises process knowledge through recollecting, embedding and rewriting organisational memory (see Figure 6). Building on the findings of this case study and integrating the theoretical concepts of organisational memory and knowledge embodiment, I discuss the strategies and practices used to realise historically developed process knowledge for RPA. I suggest that the successful adoption of RPA requires both teamwork and human-machine interactions to improve and redevelop processes for automation. This study contributes to IS research and practice by offering a human-machine embodiment perspective on organisational memory for realising process knowledge.

5.5.2. *Implications for Research and Practice*

In this study, I investigated how an organisation can realise its historical process knowledge for managing RPA. Drawing from the concepts of organisational memory and knowledge embodiment, I uncovered specific strategies and practices that managers and employees used to realise historically developed process knowledge for managing RPA. This study makes several contributions to IS research and practice.

First, this study highlights the importance of organisational memory (Walsh and Ungson 1991) in IS strategy literature on managing knowledge (Bharadwaj et al. 2013; Newell 2015; Yeow et al. 2018). Because organisational administration processes have been developed over many years within the structures of established institutions, I cannot ignore the role of historical conditions (Stinchcombe 1965) when transforming the process knowledge using new digital technologies (Kettl 2000). A long view of IS strategy is useful in understanding how organisations transform historically developed business processes using digital business models and automation technologies (Ranerup and Henriksen 2019; Willcocks and Lacity 2016). A new stream of research on managing process knowledge is also appearing, especially with regard to the increasing adoption of RPA technologies for knowledge work (Hallikainen et al. 2018; Lacity and Willcocks 2015; Lacity and Willcocks 2017). I extend this literature by providing a long-term perspective on how organisations can strategically embody organisational memory through practices of sharing in teams and human-machine interactions. Future studies

should explore how organisations use or do not use organisational memory related to digital technologies when upgrading their systems or adopting completely new systems.

Second, the knowledge embodiment perspective developed in this study offers insights into the emerging human-machine organising practices. Recent literature introduces concepts such as “human-in-the-loop” (Grønsund and Aanestad 2020) and “metahuman systems” (Lyytinen et al. Forthcoming) with regard to emerging work teams in organisations. I add to this literature by identifying specific work practices that embody knowledge within human work teams and in the interactions between humans and machines. Cross and Baird (2000) identify the ways that organisations can use technology tools to build personal relationships among employees and turn shared experience into working knowledge, I extend their findings in the context of RPA by explaining how not only humans but also machines use and share the automated knowledge. I further theorise these practices through the lens of knowledge embodiment, thus contributing to the literature on knowledge creation (Blackler 1995; Nonaka 1994) in organisations. I conceptualise the automation of process knowledge as an ongoing process of knowledge embodiment and codification within the work practices between human employees and robotic technologies. Codification is an established concept in IS literature on outsourcing (Bharadwaj et al. 2010; Kotlarsky et al. 2014; Oshri et al. 2005); however, it can be further studied because it is increasingly being applied in the areas of automation and intelligent technologies (Sanzogni et al. 2017).

Third, this study contributes to the IS literature on the future of work and digital work in organisations (Baptista et al. 2020; Davison and Ou 2017; Willcocks and Lacity 2016) by empirically investigating the strategies and work practices of a digitally reformed organisation. I discuss how human knowledge workers, despite being freed from their routine tasks, are frequently adapting their ways of knowing, embodying and organising using novel technologies in the future of work. The framework offers a long-term view on the evolution of work practices when centralising, reforming and automating process knowledge using emerging technologies at an organisation, thus answering the calls for research on new forms of human-machine organising (Bailey et al. 2019; Baptista et al. 2017). However, the historical evolution of technologies and increasingly complex machine behaviour remains to be studied, as also emphasised by Rahwan et al. (2019).

Last, this study provides empirical evidence and suggestions for practitioners by uncovering the strategies and work practices that can be used for RPA, especially in organisations providing finance and HR services. In general, the key strategies included relocating employees from prior administration units, forming teams of relocated employees for process improvement, involving these employees to develop processes by experimenting with technologies and changing their work roles to continuously observe and refine the automated processes. The most important implication for administration employees is that because the work is constantly changing (Manyika et al. 2017), they must be proactive in learning new skills to remain competitive in the future job market (Wilson and Bataller 2015). Employees may resist changing their work practices owing to the fear of losing their current job. However, this study shows that the administration employees who took the risk of changing their work eventually became highly skilled experts. Recent studies such as Baptista et al. (2020), Grønsund and Aanestad (2020) and Lyytinen et al. (Forthcoming) help practitioners by conceptualising the emerging human-machine forms of organising. I complement their effort by explaining the specific strategies for realising and human-machine organising practices that embody historically developed knowledge in organisations.

5.6. Conclusion

Organisations face challenges when preparing their processes for automation. Nevertheless, some approaches for successfully realising process knowledge for RPA are better than others. This study aimed to investigate the transformation of process knowledge from residing in the minds of individual human employees to being automated forms in machines that are continuously reconstructed by humans. I portray this process in three stages: recollecting shared memories of employees, embedding processes in technologies and rewriting process knowledge in human-machine interactions. This study details a theoretical framework on the strategies and practices used by the organisational actors in realising process knowledge for managing automation. I hope that my framework can serve as a foundation for informing our understanding, and future studies, on using the organisational memory and embodiment aspects of historically developed process knowledge in organisations for automation.

Chapter 6.

Fuelling an AI-Data “Dual Engine”: The Evolution of a Strategic Path in Digital Innovation

Abstract

Innovation enabled by digital technologies is commonly portrayed as a sudden breakthrough with a transformative impact; thus, I often overlook the historical decision making processes and the evolution of strategic choices that lead to digital innovation. To address this gap in literature, I explore how a strategic path is created towards technology- and data-driven innovation. I report on a historical case study of the largest online news media company in Vietnam that is currently adopting AI technologies to provide personalised news for its readers. By tracing the company’s organisational history using historical research methods and qualitative interpretive analysis, I find three distinct innovation trajectories emerging across two decision making contexts. I refer to these contexts as *decision spaces*. I identify three strategic mechanisms – technology pivoting, content diversification and technology-data convergence – that were reshaping the innovation trajectories that emerged from the decision spaces. Drawing from the theories of path dependence and path creation, I theorise the formation of a technology-data “dual engine” by tracing the innovation trajectories that emerged from the technology- and data-decision spaces. Contributing to the literature, I develop a model to demonstrate the evolution of a strategic path through the decision spaces. I also indicate the specific implications for how the three strategic mechanisms shape the innovation trajectory by diversifying or converging the range of options in the decision spaces. I provide insights for prospective entrepreneurs and practitioners who consider innovating with digital technologies and data.

Keywords: Digital innovation, AI-driven innovation, innovation trajectory, strategic decision making, decision spaces, path dependence, path creation

6.1. Introduction

Digital technologies are fundamentally changing the way companies innovate (Karimi and Walter 2015; Nambisan et al. 2017; Yoo et al. 2010). Traditionally, innovation has been conceptualised as a one-off process by emphasising its outcome and breakthrough aspects (Kimberly 1979; Nayak and Kettingham 1986). More recently, however, scholars focusing on innovation in digital ventures have started theorising innovation as an ongoing process (Garud et al. 2013; Henfridsson and Yoo 2014). For example, in their study of a mobile money service, Oborn et al. (2019) explain the unexpected tensions experienced by the innovative service when it was moving from the geographical location of its initial development (i.e. United Kingdom) to the location where it was being used (i.e. Kenya). Hackathons and makeathons compress the innovation journey of new product development, which conventionally spans months in traditional organisations, into a sprint of only a couple of days (Lifshitz-Assaf et al. Forthcoming). This complex and dynamic view of digital innovation is particularly important in the context of emerging technologies such as AI and big data analytics (Raisch and Krakowski 2021). The increases in computing power and the availability of big data have fuelled an increasing number of ever more AI- and data-driven innovations; they have also, which is the focus of this paper, reconfigured innovation processes across industries (Brynjolfsson and McAfee 2012; Dougherty and Dunne 2012; Fichman et al. 2014).

Digital ventures establish new innovation trajectories as they develop a vision, make decisions and mobilise people to achieve and sustain innovation (Nambisan et al. 2017). The range of opportunities in the context of emerging technologies has created a need for organisations to continuously innovate and, therefore, constantly adjust their innovation trajectories: that is, “the path that an innovation typically follows on its journey” (Oborn et al. 2019, p. 1100). Organisational managers also constantly adjust their strategies to make re-innovation possible (Kirtley and O'Mahony Forthcoming; Lamberg and Peltoniemi 2020). The need for constant re-innovation and strategy making is especially motivated by emerging technologies such as AI and big data (Fountain et al. 2019; Hinings et al. 2018). Although digital innovation trajectories (Henfridsson and Yoo 2014; Oborn et al. 2019) and strategy making processes (Chanas et al. 2019; Grover and Kohli 2013) have been discussed in IS literature, how strategic decision making can guide digital innovation in an organisation is unclear.

Scholars have used the theory of path dependence to explore organisational trajectories and the historical decision making processes that they represent (Arthur et al. 1987; Vergne and Durand 2010). The evolution of organisational trajectories into an organisational path is defined as a process of tracing several decisions or types of actions that follow a sequential order (Schreyögg and Sydow 2011). Over time, the range of possible decisions narrows down as an organisation develops a history of decision making: that is, an organisational path emerges (Sydow et al. 2009). For example, at the foundation of a new organisation, the range of possible decisions is broad, but over time this range is increasingly conditioned by prior events and past decisions (Beckman and Burton 2008). An organisational process becomes path dependent when it converges on a fixed trajectory and alternate patterns of decision making are constrained (Arthur 1989). Although, path dependence has been proven to be a rich concept to explain organisational processes, it focuses on the immobile nature of paths and emphasises the passivity of managers and decision makers. Thus, the theory of path dependence is limited in exploring dynamic innovation trajectories and “how embedded actors attempt to shape and navigate their ways through (or out of) such processes” (Garud et al. 2010, p. 762). Consequently, path creation has been proposed as a complementary perspective to explore the ongoing activities involved in innovation processes and how managers can actively shape an organisational path (Garud and Karnøe 2001; Garud et al. 2013). In adopting a path creation lens, I ask the following research question: *How is a strategic path towards technology- and data-driven innovation created?*

To answer this question, I conducted a historical case study at the largest online news media company in Vietnam (pseudonym: VietNews). After experimenting with several digitally enabled business models since 2000, VietNews was formally founded in 2006 as an online news publishing company. Since its formation, VietNews has a history of innovating with emerging technologies and novel content creation methods to produce high-quality news content. To remain competitive, VietNews went through several organisational restructuring and strategising efforts. Owing to its continuing innovation efforts with emerging technologies and content creation methods, VietNews became one of the leading innovators with AI and big data technologies in Vietnam. VietNews’ ongoing innovation journey offered me with a unique opportunity to explore digital innovation as an ongoing process throughout the company’s organisational history.

To trace VietNews' innovation trajectories over time, I grounded this case study in a qualitative interpretive analysis (Klein and Myers 1999; Pan and Tan 2011) informed by historical data analysis techniques (Kipping et al. 2014; Rowlinson et al. 2014). Tracing VietNews' history, I found three distinct innovation trajectories emerging across two decision making contexts. I refer to these contexts as *decision spaces*. I identified three strategic mechanisms – technology pivoting, content diversification and technology-data convergence – that were reshaping the innovation trajectories that emerged from the decision spaces. In other words, the managers were forming a strategic path from the decision spaces towards innovation using these mechanisms. Drawing from the theories of path dependence (Sydow et al. 2009) and path creation (Garud et al. 2010), I developed a model of an evolving strategic path from technology- and data-decision spaces towards AI-driven digital innovation. Contributing to literature on digital innovation strategy making, I theorise innovation as an ongoing process rather than a one-off activity that is conditioned by an organisation's history and shaped by managerial decision making. Further, I contribute to the literature on organisational path dependence (Schreyögg and Sydow 2011) by extending its current focus on one range of options towards heterogeneous decision spaces (i.e. more than one range of options) and the complementarities between them. I also provide insights for decision makers and entrepreneurs looking to manage technology- and data-driven innovation. In particular, I provide time sequences of strategic decision making and show how managers can identify decision spaces and employ strategies to shape their innovation trajectories.

6.2. Literature Review

6.2.1. *Digital Innovation and Innovation Trajectories*

Literature has highlighted the need for studying innovation as an evolving process that unfolds over time (Hinings et al. 2018; Nambisan et al. 2017). Overcoming the traditional view of innovation as a one-off process that focuses on the breakthrough aspect of a product or service (Kimberly 1979; Nayak and Ketteringham 1986), scholars have recently studied innovation as an ongoing process (Oborn et al. 2019; Yoo et al. 2012). For example, in their study of an Italian newspaper, Raviola and Norbäck (2013) explain how old practices of news making gave meaning to new practices when the newspaper was transforming from print to online publishing. In their study of digital innovation, Oborn et al. (2019) explain the unexpected tensions experienced by a mobile money

service when it was moving from the geographical location of its initial development (i.e. United Kingdom) to the location where it was being used (i.e. Kenya).

Digital innovation has become an even more complex and dynamic process owing to emerging technologies, large volumes of data and complex algorithms (Barrett et al. 2012; Raisch and Krakowski 2021; Yoo et al. 2010). Emerging technologies and organising principles have transformed the speed, scale and scope of innovation trajectories (Hinings et al. 2018; Nambisan et al. 2017). Born-digital organisations, such as Amazon, Google and Facebook, have leveraged digital technologies for innovation and have managed to rapidly expand their businesses during the past few years (Huang et al. 2017). The chief executive officer of NewVantage Partners, writing about a survey based on managers' input from 60 Fortune 500 companies, states, "the main finding of the 2018 survey is that an overwhelming 97.2% of executives report that their companies are investing in building or launching big data and AI initiatives" (Bean 2018, p. 1). Thus, AI technologies and data are accelerating digital innovation and creating a need for many organisations to keep re-innovating.

Some studies have traced innovation trajectories, including their shifts and distinct patterns, to understand the transformative impacts of innovation (Henfridsson and Yoo 2014; Lifshitz-Assaf et al. Forthcoming; Oborn et al. 2019). An innovation trajectory is defined as "the direction and future path of human activity intended to develop new products and services" (Henfridsson and Yoo 2014, p. 932). Organisational managers have shown the ability to strategically change the direction of an innovation trajectory by recognising limits from the known past and seeking to embrace opportunities for an unknown future (Svahn et al. 2017). Understanding the evolution of innovations over time and across contexts allows managers to identify new opportunities while strategising to smoothly manage organisational disruption (Suddaby et al. 2020). In their study on hearing aid technology, Garud and Rappa (1994) show how the organisation allowed its users to enjoy immediate benefits while taking advantage of potential future innovations of the hearing devices by considering the history of the technology development. Therefore, when envisioning a new innovation trajectory, organisational managers must simultaneously consider the past decisions and imagine the potential outcomes for the future (Garud and Rappa 1994; Henfridsson et al. 2014).

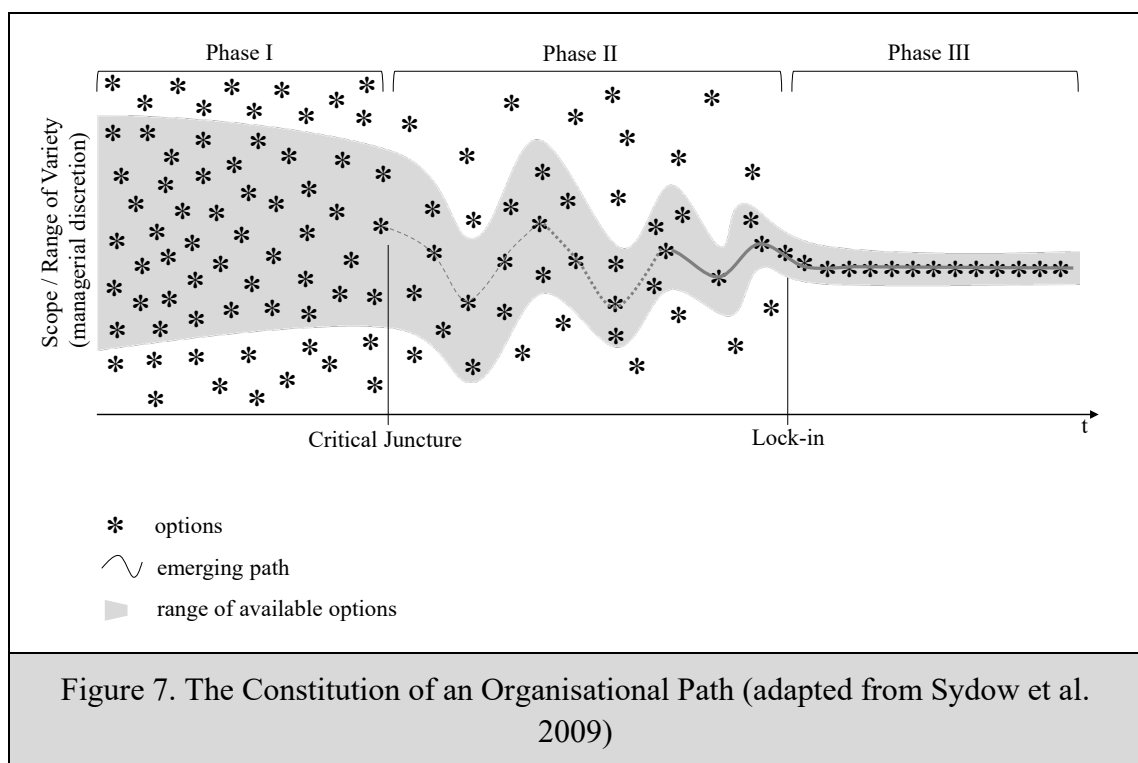
When innovating with AI technologies and data, organisational managers need to constantly adjust their innovation trajectory (Duan et al. 2019; Grønsund and Aanestad 2020; Holtel 2016). Rapid innovation with AI and data is especially visible in the industries where content creation and data have always been the key product, such as news publishing (Kunert 2020). Digital innovation in such companies together with their in-house digital datasets collected over the past decade gives them a direct competitive advantage over others in AI revolution (Johnson et al. 2019). Rich and Gureckis (2019) further explain how AI technologies enable or constrain future decisions because of the historical development of the data being used for machine learning. Similarly, Elish and boyd (2018) argue, “in order to fully understand the innovations and imaginaries that underpin big data and AI, it is necessary to situate the relevant technical orientations and practices historically and socially” (p. 59). However, the evolution of digital innovations that combine AI technologies and big data sets and how their trajectories are shaped through strategic decision making throughout the organisational history is unclear. A summary of literature on AI is presented in Table C1, Appendix C.

6.2.2. *Strategic Decision Making as Path Creation*

Strategy literature has recently indicated the use of organisational histories to reshape innovation processes (Pillai et al. 2020; Suddaby et al. 2020). These studies indicate that managers use interpretations of the past and strategic decisions made by founding entrepreneurs to interpret the present situation and shape future decision making (Basque and Langley 2018; Sinha et al. 2020). For example, in their study on organisational transition at Proctor & Gamble (P&G), Maclean et al. (2018) show how P&G used its past experience and historical accounts for strategic decision making when transforming from a multinational to a global enterprise. Early studies on technological product innovations also claim that the strategic decisions made at their formation and stages of evolution can condition the decisions regarding opportunities for the future (Beckman and Burton 2008; Garud and Rappa 1994). Therefore, reflecting on the strategic decisions made in the past is an effective way to innovate for the future (Argyres et al. 2020; Garud et al. 2014).

Scholars have adopted the theory of path dependence to trace organisational trajectories and historical decision making (Schreyögg and Sydow 2011; Sydow et al. 2009). The theory of path dependence emphasises “the importance of past events for future action or,

in a more focused way, of foregoing decisions for current and future decision making. Hence, decisions are conceived of as historically conditioned” (Sydow et al. 2009, p. 690). Sydow et al. (2009) have developed a general model to illustrate path dependence as a process (see Figure 7). As seen in the illustration, the available options for managerial decision making become limiting and narrow over time as the path arrives at a lock-in phase. Mainstream studies on organisational path dependence investigate historically embedded, contingent processes in organisations that develop knowledge and capability boundaries for future decision making (Carlile 2004; Ghemawat and Levinthal 2008; Nerkar 2003). Some studies on organisational paths highlight the ability of strategically managing a path towards innovation (Garud et al. 2010; Thrane et al. 2010).



Some organisational managers are successful in creating paths (Garud and Karnøe 2001) to their advantage, whereas others may arrive at lock-in phases, where future decision making becomes challenging (Arthur et al. 1987). For example, in their study on the evolution of top management teams, Beckman and Burton (2008) show how the initial team formation is conditioned by founding members’ prior experiences and how the founding structure shapes the subsequent functional structure of the team. They find that the organisations initiated with more comprehensive functional expertise manage to achieve competitive advantage. Early studies have conceptualised technological path dependence: for example, the standard of the QWERTY keyboard that has been handed

down to us from the age of typewriters and is in use even today after more than 100 years (David 1985). Whereas recent IS literature has mainly considered technological capabilities (Lim et al. 2011) and knowledge sharing (Yoo et al. 2007) in organisations from a path dependence perspective, few studies have emphasised managers' role in creating paths towards innovation (Singh et al. 2015). However, these studies more closely investigate the technology development path rather than the path created through careful decision making by organisational managers. There is, therefore, an opportunity to trace innovation trajectories in terms of decision making to understand how a path is strategically created towards technology- and data-driven digital innovation.

6.3. Research Method

Adopting a historical narrativist approach (Kipping and Lamberg 2017, p. 306) to interpretive case study research (Pan and Tan 2011), I traced and analysed innovation trajectories at an online news media organisation. Narrating an organisation's story from its foundation to the current state is a useful way to understand its trajectory (Clark 2004). Following the suggestions from organisational history research, I used archival sources such as corporate documents, newspapers and other relevant publicly available documents as well as interviews, to construct narratives of the case study (Kipping et al. 2014). Then, I followed interpretive qualitative methods to interpret the narratives and analyse the historical case study (Klein and Myers 1999).

6.3.1. Research Setting

The case organisation, VietNews, is one of the largest online news media companies in Vietnam founded in 2006. VietNews is known for its innovative digital products in the news media industry. Although the official date of founding was in 2006, VietNews' story began in 2000, when the founder started an online news blog and a forum as a hobby, which he later developed into an online newspaper. With the newspaper, the founder started experimenting on the Internet and became a pioneer of online news publishing in Vietnam. With an initial staff of 20 employees, VietNews has expanded immensely in less than 20 years, with about 2000 employees and 40 million diverse readers by 2020. Since 2014, VietNews has been experimenting with AI technologies to develop personalised news stories for its readers.

I selected VietNews as the case study to understand historical decision making in digital innovation for several reasons. First, VietNews has been innovating with news content and emerging technologies throughout its history; a number of innovative digital products by VietNews were leading on the Internet in Vietnam. Second, the founder and managers decided to strategically develop these products after experimenting with many ideas in the technology and media contexts. Third, VietNews provided rich stories on the founder's experience and on the organisational inheritance of his legacy starting from the online newspaper to later innovations in the contexts of emerging technologies and media content. Therefore, this case offered the depth needed to trace and understand digital innovation trajectories that unfold over time (Sinha et al. 2020).

6.3.2. Data Collection

I collected data comprising archival material and interviews covering the stories of VietNews' history from 2000 to 2020. In particular, I collected (a) data on the organisation's history and strategies over time, including a corporate chronology published on its 10th anniversary, from internal corporate archives; (b) external archival material on the organisation, founder, their innovations and the growth of Internet in Vietnam; and (c) interviews with the founder, other founding members, team leaders and employees from technical and content development teams.

The historical sources comprising internal and external archival material helped me to develop a case narrative of VietNews' story from 2000 to 2020. The main source of this data collection is the corporate chronology tracing VietNews' history that was published on its 10th anniversary. Following Kipping et al.'s (2014) suggestions on triangulation and source criticism, I collected other corporate strategy documents and technical and sales presentations to further investigate the historical events mentioned in the chronology. The dates of publication of the documentary sources vary from year 2004 to 2020; some of the organisational strategy documents contained details about the founder's initial ideas since 2000. To study the influence of environmental contexts over time through hermeneutic interpretations (Kipping et al. 2014), I retrieved archival documents and newspaper articles on the Internet in Vietnam and its growth in the 21st century.

After obtaining an initial idea about VietNews' history, I conducted on-site interviews with the organisational participants. I conducted 38 semi-structured interviews using an interview protocol (see Table C2, Appendix C) that allowed participants to freely share

their stories about and journey with VietNews. The interview questions focused on the organisational foundation and on gaining insights about VietNews' historical decision making over the years related to the development of innovative online news media products. First, I focused on the founder and the founding team to understand the founding strategies and decisions made at the time. Then, I interviewed others focusing on the subsequent strategising and decision making towards innovation, in particular about AI- and data-driven innovation.

Table 8. Data Collection Sources and Coverage		
Type of Data	Source	Coverage
(a) Internal archival material (300+ pages)	VietNews' corporate chronology (161 pages)	2006-2017
	Strategy documents (67 slides)	2000-2019
	Technical documents (106 slides)	2012-2019
	Sales documents (144 slides)	2012-2020
	Corporate web portals (16)	2006-2020
(b) External archival material (about 50 web pages)	Blog posts (15)	2004-2020
	Local newspaper interview with the founder (1)	2005
	Newspaper articles (8)	2004-2020
	Other online posts and comments (13)	2004-2020
(c) Interviews about VietNews' story (38 interviews)	Founder (1)	2000-2019
	Co-founder and other founding members (9)	2006-2019
	Head of technology infrastructure, Technology bloc (1)	2006-2019
	Managers of media teams, Content bloc (6)	2008-2019
	AI team, including the lead and engineers, Content Technology bloc (8)	2014-2019
	Data scientists and big data analytics team, Content Technology bloc (6)	2014-2019
	Other employees including software engineers, content developers, sales personnel and interns (7)	2010-2019

Collectively, the interviews and documentary sources helped me to construct VietNews' narrative by allowing for triangulation, source criticism and hermeneutic interpretation of data, in line with Kipping et al. (2014). During data collection and interviews, I wrote multiple memos to capture reflections, impressions and common themes and shared them with my supervisors. Overall, I collected and coded more than 500 double-spaced pages of data, sources and memos in addition to 478 double-spaced pages of interview

transcripts (see an overview of data collection in Table 8 and the list of interviewees in Table C3, Appendix C).

6.3.3. *Data Analysis*

I adopted an interpretive approach with a focus on the historical practices and strategies that occurred in the narratives (Walsham 1995). I used qualitative data analysis methods, including open coding, temporal bracketing and abstracting from the data (Langley 1999; Pan and Tan 2011; Strauss and Corbin 1998), throughout the different stages of the analysis. I analysed the data in parallel with data collection to benefit from the understanding emerging from recurrent iterations between the empirical material and theoretical concepts (Klein and Myers 1999). While analysing data, I switched between the documentary sources and interviews to narrate the story of VietNews from 2000 to 2020. In particular, I marked the evidence, using time stamps to categorise the events that were unfolding in each era. During data analysis, I met with my supervisors regularly to share new insights and discuss the interpretations of the emerging corporate narrative.

First, I used an open coding technique to discover concepts and their historical meanings related to the contexts (Strauss and Corbin 1998). I coded all the interview transcripts with the aim of identifying organisational events pertaining to innovation, strategy and decision making. I also coded the internal and external archival material, both before and after on-site interviews at VietNews, to account for source criticism, triangulation and hermeneutic interpretation as suggested by Kipping et al. (2014). Through the analysis, I identified three distinct eras of VietNews and its innovation trajectory, as its strategic focus was noticeably shifting. I label the eras as foundation era, expansion era and integration era, reflecting the dominant strategic initiatives in each era. Using a visual mapping technique, as suggested by Langley (1999), I discuss the data with the supervisors, outlined the narrative, and developed a chronological synopsis of VietNews' organisational history, as illustrated in Figure C1, Appendix C.

Second, I used a temporal bracketing technique (Langley 1999) to conceptually distinguish between the innovation trajectories in each of the various eras of VietNews' organisational history. I began by temporally bracketing technology-related decisions and data-related decisions in each of the three eras. I dug deeper into the archival sources to glean a large number of strategic decisions made throughout VietNews' history. This generated multiple lists of codes; for example, in the foundation era, the codes included

“it is just like a circle of experimenting and researching” and “Technology bloc”; in the expansion era, the codes included “content network strategy” and “Content bloc”; in the integration era, the codes included “[VietNews] does not have a long-term strategy – or we do, but it’s not really clear” and “Content Technology bloc”. Through the temporal bracketing of eras, I found two types of contexts, “Technology bloc” and “Content bloc”, across the eras in which the innovation trajectories unfolded. Technology bloc decisions were related to experimenting with novel technologies, whereas Content bloc decisions were related to creative content development and innovating with data. Similarly, the head of technology infrastructure worked in the Technology bloc and the managers of media teams worked in the Content bloc, whereas when they were integrated, AI team and data scientists worked together in the Content Technology bloc. I also revealed that the organisational strategic decisions were driven by these two contexts. For example, I categorised “I started an online forum” as a decision made in the technology context and “I started an electronic newspaper” as a decision made in the data context.

Third, I reiterated between theoretical abstraction (Pan and Tan 2011) of path dependence and path creation literature and the analytical concepts generated in this study to develop a theoretical model of strategic path creation. Early in the analysis, I thought that VietNews’ strategy was driven by its vision of “innovation non-stop”. However, further analysis and discussions with the supervisors revealed that the strategic decisions were, forming a path based on VietNews’ fundamental and constant focus on the complementary nature of news content and digital technologies. For example, I interpreted and categorised codes such as “the infrastructures include storage solutions, websites and internet applications, of which data is the root” and “Content Technology bloc” as belonging to both technology and data contexts, which merged decisions towards a path. These interpretations formed the basis of the conceptual focus on how VietNews’ strategic path is formed through the dual contexts of decision making. I complemented the analysis by constructing Table 9, presenting VietNews’ main events in the eras that I identified and organised using the narratives and open codes related to the innovation, strategy, technology decisions and data decisions in each of the temporal eras.

Table 9. Chronological Summary of VietNews' Organisational History			
Era (Year)	Foundation Era (2000-2008)	Expansion Era (2008-2014)	Integration Era (2014-2020)
Events pertaining to innovation	Archival and interview evidence: <ul style="list-style-type: none"> • Founder experiments with an online forum and local news content • Founding team experiments with a variety of technologies 	Archival and interview evidence: <ul style="list-style-type: none"> • Co-founder comes up with an idea to create specialised news portals • Journalists find new ways of digital content creation 	Archival and interview evidence: <ul style="list-style-type: none"> • Technology bloc employees experiment with AI and first-party data • Content bloc employees evaluate AI outcomes
Strategic initiatives	Archival evidence: <ul style="list-style-type: none"> • Founding team aims to develop the first online newspaper in Vietnam • They try emerging technologies with the vision of “innovation non-stop” • Introduction of “Technology bloc” 	Archival evidence: <ul style="list-style-type: none"> • Co-founder proposes a content network strategy • Managers decide to provide specialised news content to diversified user groups • Introduction of “Content bloc” 	Archival and interview evidence: <ul style="list-style-type: none"> • AI-driven value creation • Introduction of “Content Technology bloc” • Invest on building AI and data analytics capabilities
Decisions about technology	Archival and interview evidence: <ul style="list-style-type: none"> • Develop in-house infrastructure • Develop a platform as a service • Develop an internal cloud system and storage • Develop a content distribution network (CDN) 	Archival and interview evidence: <ul style="list-style-type: none"> • Extend the technology infrastructure to clone new content portals • Develop a unique advertising technology • Introduce a video streaming technology 	Archival and interview evidence: <ul style="list-style-type: none"> • Experiment with AI technologies and big data analytics • Develop news recommendation and distribution engines • Develop an integrated social news platform
Decisions about data and content	Archival evidence: <ul style="list-style-type: none"> • Initiate an online newspaper • Publish local news content • Hire traditional journalists • Review news articles by experienced editors 	Archival and interview evidence: <ul style="list-style-type: none"> • Establish a number of specialised news portals • Launch financial news, a children's portal and a fashion portal • And many more... 	Archival and interview evidence: <ul style="list-style-type: none"> • Generate personalised news profiles for individual users • Create personalised news stories using AI • Editorial work with AI-assisted content creation

6.4. Findings

I structure the findings of this case study based on the three eras of VietNews' organisational history: foundational era (2000-2008), expansion era (2008-2014) and integration era (2014-2020). Across the analyses of the three eras, one overarching trend appears: the shifting nature of innovation trajectories between the Technology bloc decisions (i.e. tech) and Content bloc decisions (i.e. data). In addition to the findings of each organisational era, I provide data structures and exemplary quotations to explain the technology and data contexts of strategic decision making. The findings are tabulated in three columns to show the time sequence and my interpretation of the context (i.e. technology and/or data) in which the exemplary quotes are situated. I coded the context as tech when the ideas or decisions of the quotations are directly related to infrastructure, networks, devices and other technological systems. I coded the context as data when the quotations explicitly mention information that existed or could exist without technology but has recently become digital, in particular, news content and user data.

6.4.1. *Foundation Era (2000-2008)*

In the foundation era, the innovations focused on pivoting with modern technologies to position the local news platform. The founder and the founding members were focusing on developing technology capabilities and infrastructure to achieve their vision of “innovation non-stop” and become “the first mover” in the online news media industry in Vietnam.

[Founder]'s success in developing [VietNews] to be the leading news media company in Vietnam began when he founded his first online community from a garage start-up in 2000. After founding this network, he founded the first online media and news portal [Vietnam News] in 2002. In 2005, he founded the first private company in mobile value-added services and internet content, which formed the initial foundation of the current day [VietNews]. (Corporate chronology, 2016, archival)

The above excerpt from a corporate strategy presentation explains VietNews' founding story in brief. The foundation of VietNews dates back to when the founder started his first technology start-up in 2000. At the same time, he started a forum and an online blog,

using free and open source technologies, as a hobby when he was a university student. As the founder shared in his story, he had many followers on his forum:

“The forum had about 20,000 members by that time. And that’s when Internet was rising in Vietnam. So, I hit the rocks and a lot of attention. I started my first online news website in 2002. But I started with an online forum. It is a rare case of someone building a company based on a hobby”. (Founder, 2019, interview)

As stated in the archival sources, the founder’s first innovative idea was to extend the forum to an online newspaper. In late 2003, operationalising this idea and making a strategic transformation in his technology start-up, he launched an online newspaper. Extending this company, in 2006, he founded VietNews with the aim of developing an online news platform using open source technologies.

VietNews had an initial staff of 20 employees, including traditional journalists to write news articles and editors to publish on the “quite primitive” platform. Soon after the launch, the userbase exponentially grew and the platform was not able to handle the incoming traffic. Then, researching and experimenting with new technologies in the open source domain became a practice at VietNews to advance its rudimentary infrastructure. The present head of technology infrastructure, who was a programmer in the founding team, elaborated on how his team researched and gradually developed the technology infrastructure over time:

“I joined [VietNews] in 2006 as a programmer. A year later, in 2007, I was assigned to be in charge of building infrastructures for all applications and websites of [VietNews]. [...] Our approach was to build platform as a service for common use of all platforms. Also, we needed to come up with solutions to optimise the use of servers and infrastructure cost. For that, our job was to first research and deploy a cloud system for [VietNews]. Second, to research and deploy shared storage for all projects. Third, to deploy CDN solutions, meaning a content distribution network (CDN) for data distribution on the Internet. The infrastructures include storage solutions, websites and Internet applications, of which data is the root”. (Head of technology infrastructure, 2019, interview)

From the above quotation, it is evident that VietNews’ vision of “non-stop innovation” focused not only on business innovation leveraging news media opportunities but also on

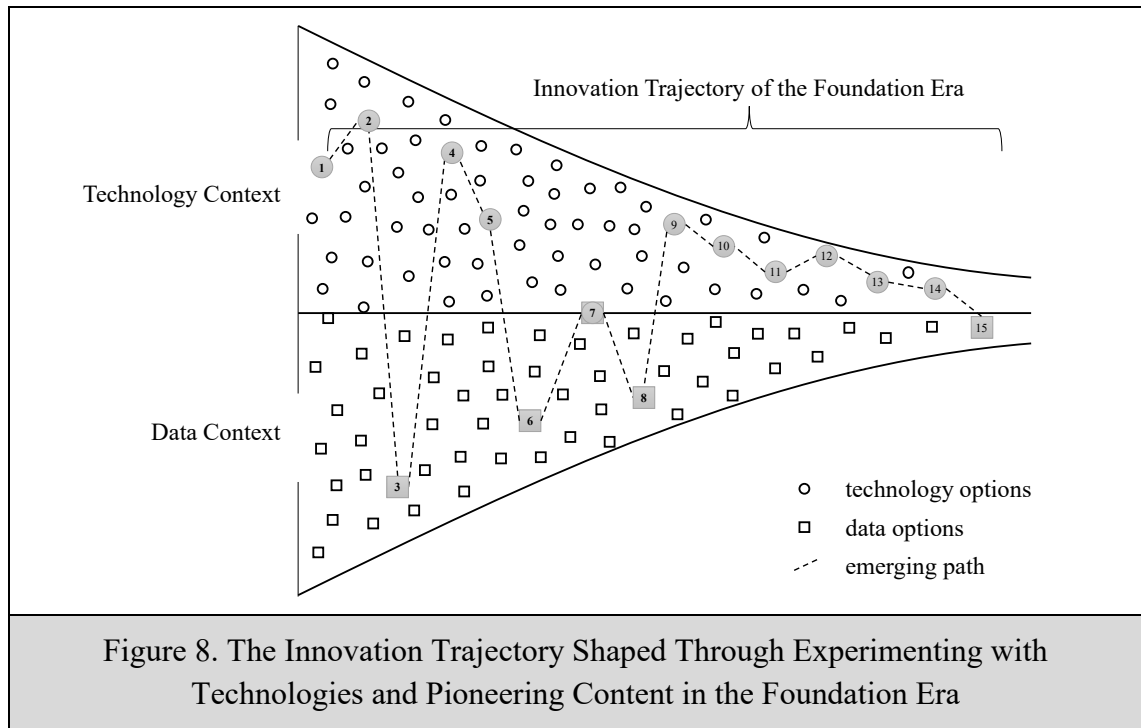
digital innovation leveraging disruptive technologies. In the foundation era, VietNews had a primitive infrastructure; over time, they developed technologies to advance it. The technology team was researching and experimenting with many technologies to find innovative ways to build infrastructure related to content management solutions (CMS), networking and cloud services while considering “data is the root” to become the pioneer in the online news industry. Therefore, pivoting with different technologies to publish and distribute content in creative ways became a way of decision making for innovation at VietNews.

The dual contexts of innovation activities and decision making were noticeable in the chronological narratives I constructed by tracing the founder’s experience and founding team’s activities. I present evidence in Table 10, including time, context (i.e. tech or/and data), decision (with a decision number (#)) and exemplary quotations. Accordingly, I have visualised the trajectory shaped by key decisions made (referring to the decision number (#) in Table 10) in the Foundation Era in Figure 8.

Table 10. Data Structure of the Foundation Era			
Time	Context	Decision (#)	Exemplary Quotes
2000	Tech	Online forum as the publishing medium (1)	“In 2000, I was still a student at the University of Technology in Hanoi. And Internet came to Vietnam and it was brand new to young people like me. And I started to try to do something online. As at that time everything was new, I started an online forum called [Vietnam Network]” (Founder, 2019, interview)
2001	Tech	Technology start-up as the business model (2)	In 2001, from the thought of having to have money to maintain the servers of the growing network, [the founder] with his friends opened a technology start-up with only a small capital of VND 50 million. (Local newspaper, May 2004, archival)
2002	Data	News articles as the content (3)	“In 2002, I started a newspaper, just news, but online. At that time people were still reading paper and ink-based newspapers”. (Founder, 2019, interview)
2003	Tech	Technology and communications as the business model (4)	At the end of 2003, we changed the model from Software Solutions to Technology and Communications. This is a strategic transformation (VietNews’ first online newspaper, 2005, archival)
2004	Tech	CMS as the backend platform (5)	Development of the CMS has a different starting point, because of low cost open source IT and [founder’s] passion. (Local newspaper, May 2004, archival)

May 2005	Data	Online newspaper as the frontend content (6)	Recently, we launched an electronic newspaper - [vietnews.vn] and, within a month, it reached the top 5000 most visited websites in the world. (VietNews' first online newspaper, June 2005, archival)
July 2006	Tech and data	Digital content and technology as the field (7)	Established in 2006, [VietNews] is a pioneer in the field of digital content and technology. (VietNews' corporate website, 2020, archival)
Aug 2006	Data	Editorial board as the staff (8)	There were 20 staff as well as main departments including mobile, advertising, newspaper's editorial board and administration. (Corporate chronology, 2016, archival)
Late 2006	Tech	Open source software as the experimentation technology (9)	"At first, since we didn't have money to invest in commercial solutions, we build the system mostly on open source software. We selected the solution that best suited the company in terms of scale and demand at that time". (Chief technology officer, 2019, interview)
Early 2007	Tech	Experimental development of a cloud using open source software as the technology (10)	In 2007, I was assigned to be in charge of building infrastructures for all applications and websites of [VietNews]. [...] For example, at first, we didn't have cloud technology. We had to spend several hundred thousand dollars to buy the cloud system from the U.S. Simultaneously, we experimented with some open source platforms then customised them into a form of a cloud that is 10 times cheaper". (Head of technology infrastructure, 2019, interview)
Early 2007	Tech	In-house design of a private cloud as the technology (11)	"But in the long run, we wanted to develop and replace it entirely with a private cloud solution". (Head of technology infrastructure, 2019, interview)
Mid 2007	Tech	CDN as a technology (12)	"First, to build a distributed system, we built server load balancing mechanisms based on geographical locations. Second, we built an algorithm using a database of user IPs. It helped to organise the distributed system and identify the geographical location of users. Third, also based on that IP system, we built an algorithm to assess the quality of network from users to server systems. From that, we came up with plans to distribute data based on geographical location or network quality. We deployed server systems for CDN using open source software on the cloud". (Lead software engineer, 2019, interview)
July 2007	Tech	Technology bloc as the technology division (13)	The first-year anniversary was the first big event of [VietNews] since it was founded. The event marked a dramatic increase in staff from 20 to 143. The company started to expand its scale as Technology bloc affirmed its position. (Corporate chronology, 2016, archival)

Late 2007	Tech	Search engine system as a technology (14)	“I joined [VietNews] in 2007 and started with the search engine project. Building a search engine system for [VietNews] was a very complex task that involved a lot of work, from collecting data to storing and processing them, etc”. (AI team lead, 2019, interview)
Aug 2007	Data	Strategy as new content (15)	Co-founder proposed a unique content network strategy. (Corporate chronology, 2016, archival)



6.4.2. Expansion Era (2008-2014)

In the expansion era, content diversification became the driver for innovation with a new content strategy. The founding focus on local news publishing was not innovative anymore in the established online news industry. Therefore, as suggested by the co-founder, VietNews focused on creating new and targeted news content to attract readers from multiple, demographically diverse, user groups. According to the narratives in corporate history documents, the co-founder proposed the “content network strategy” in late 2017. Because the technology infrastructure was adequate to handle the expanding user base, he led the organisation towards innovating with digital content. Disrupting the organisation by forming small teams to create “a range of content sites” was the main strategy for innovation in the expansion era. With the theme of “Content is King”, VietNews developed a range of platforms providing specialised information to Vietnamese readers.

VietNews developed a content-based “divide and conquer strategy” to restructure the company into small teams, each focused on launching one product at a time:

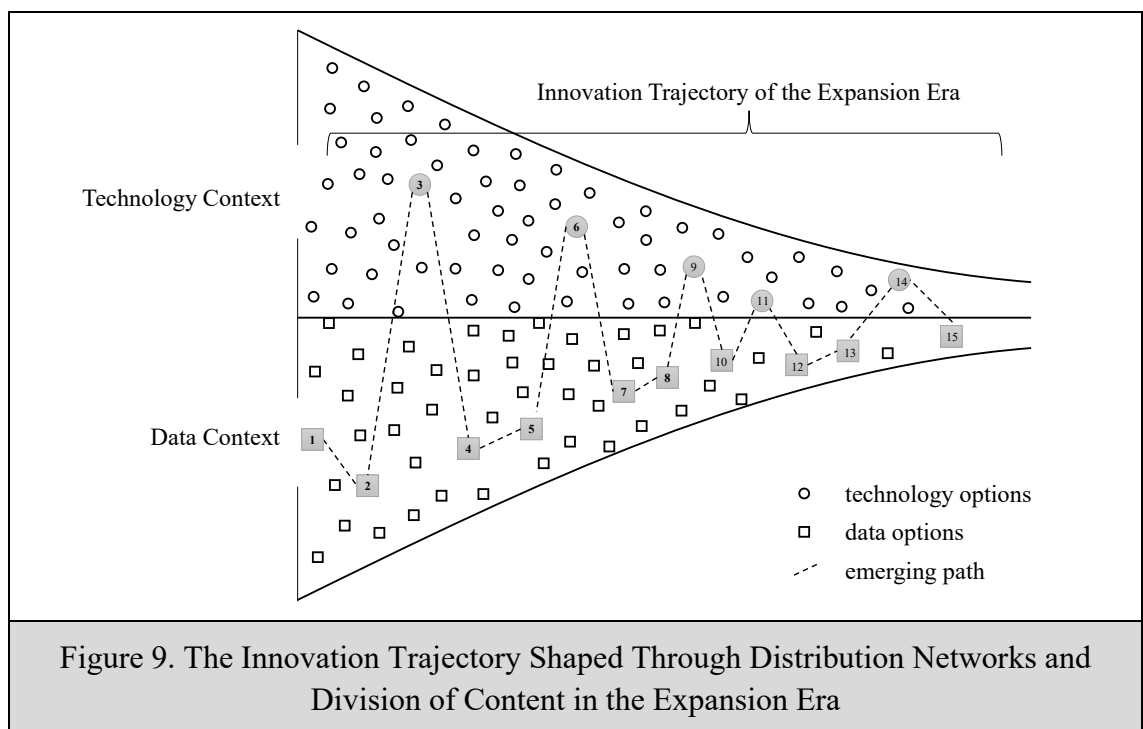
With a unique content network strategy unprecedented in the market proposed by [the co-founder], a range of content projects were launched during this time, followed by the formation of the Content bloc on 6 August 2007. All of them quickly gained the No.1 position in the specialised content networks in Vietnam until this day. (Corporate chronology, 2016, archival)

VietNews created many teams to work on new products based on innovative ideas. Every launch of a specialised news site was a result of a prior decision of creating a new team to come up with a new product idea. Some ideas were developed as innovative projects, whereas others were only experimented and presented at internal contests. For example, the decision to develop the financial news site was discussed at a meeting in Feb 2008 considering the economic growth in the country. As stated in a corporate strategy presentation, “at [VietNews], best people are all moving from project to project”.

Although the strategy for content creation for a range of audiences was the main driver of innovation in this era, the content products and data could not exist without technological foundation. The establishment of the cloud-based storage solution in 2019, introduction of advertising technology in 2011, emphasis on advanced mobile technologies in 2012 and deployment of a private cloud in 2013 showed the trajectory of VietNews’ decisions in the technology space, although the main focus in the expansion era was on content diversification. VietNews’ founding members and managers, often highlighted their dual capabilities by stating, “developing technology-based innovative products, [...] simultaneously with content development”, when referring to the organisational vision. I provide evidence related to the innovation trajectory in the expansion era in Table 11. I have coded and numbered the quotes related to the main activities leading to innovation with mostly content and sometimes technology. Accordingly, I have visualised the trajectory shaped by the key decisions taken in the expansion era in Figure 9.

Table 11. Data Structure of the Expansion Era			
Time	Context	Decision (#)	Exemplary Quotes
Aug 2007	Data	Media channels as the content (1)	“We started researching many different products with the focus on investing in and developing technology-based media channels”. (Co-founder, 2019, interview)
Feb 2008	Data	Financial information as a media channel (2)	“We saw that the market was lacking a website that provides financial information to satisfy the needs of investors and users. Economic growth was trending. The market needed a good product for this area”. (Head of financial news content, 2019, interview)
July 2008	Tech	Advertising backend as the technology (3)	“We proposed the strategy that [VietNews] will invest resources and technology in building an advertising technology infrastructure. I was assigned to build it. In mid-2008, we established the [advertising technology] division to bring technicians in the company together.” (Head of advertising technology, 2019, interview)
Aug 2008	Data	Specialised news as the content (4)	A range of content projects were launched during this time, namely, content technology room, virtual game room, automobile content and general news. (Corporate chronology, 2016, archival)
Early 2009	Data	Specialised platforms as the media channels (5)	“[VietNews] invested a lot of resources to develop content channels, such as [social.vn], [finance.vn], [family.vn], [youth.vn], [kids.vn] and [tech.vn]”. (Co-founder, 2019, interview)
Late 2009	Tech	In-house development of a cloud as the storage technology (6)	“The amount of data transmitted between users and internet applications was extremely huge, and so was the demand for data storage. By 2009, we had our first storage solution based on cloud. Since then, we have been continually developing and upgrading those systems”. (Head of technology infrastructure, 2019, interview)
April 2010	Data	Digital media as the content innovation (7)	The board of directors set new directions for content innovation, expansion, immediacy, investment in 5 key sectors, namely, media, social network, mobile, advertising and e-commerce, with the aim of leading the Vietnam Internet in 2015. (Corporate chronology, 2016, archival)
Nov 2010	Data	Internal contest as the content innovation (8)	[VietNews] contest! The prize was up to VNĐ 131 million with over 43 entries from 14 divisions. A number of jury members with a record of 20 people selected creative and highly applicable topics expressing the spirit of innovation non-stop. (Corporate chronology, 2016, archival)
Jun 2011	Tech	Advertising as a technology platform (9)	[VietNews] introduced an online marketplace for advertising including a platform for real-time bidding and marketing content. (Corporate presentation, 2012, archival)

Aug-Oct 2011	Data	Specialised platforms as the media channels (10)	Launch of family entertainment [family.vn] and business information [business.vn] sites and a platform for hi-tech users, programmers and software developers. (Corporate presentation, 2012, archival)
May 2012	Tech	News reader app as the mobile technology (11)	[VietNews] developed more than 20 specialised streams of news on mobile. One of the biggest successes was the launch of [VietNews] news reader app. In a short time, [the app] became one of the most downloaded applications on mobile app stores. (Corporate chronology, 2016, archival)
Aug 2012	Data	Information for foreigners as the content (12)	[VietNews] acquired a restaurant information site from a Swedish company to strengthen the content ecosystem and reinforce resources for expanding information for foreigners in Vietnam. (Local website, 2012, archival)
Oct 2012	Data	Online gaming platform as the content (13)	[VietNews] started creating an online gaming and virtual content platform becoming the fastest growing web game publisher in Vietnam, which made an impression about [VietNews] brand among the gaming community and local publishers. (Corporate presentation, 2012, archival)
Oct 2013	Tech	CMS platform as a service (14)	Extended CMS infrastructure and advertising technology as a service for other news providers and websites in Vietnam (Local blog, 2014, archival)
Jan 2014	Data	Content bloc as the content division (15)	The year of 2013 marked a strong development period of Content bloc's projects, affirming its strong position in the market providing news about life, economy, community and entertainment. (Corporate chronology, 2016, archival)



6.4.3. *Integration Era (2014-2020)*

After the technology infrastructure and content products were established, in the integration era (2014-2020), VietNews' strategy was to leverage its own data to realise the value through AI-enabled augmentation and automation. To implement achieve this strategy, Technology bloc and Content bloc were converged to form the Content Technology bloc, thus bringing together news content and user data using AI technologies and big data analytics.

On 6 March 2014, an extremely important meeting took place between the Board of directors and the leaders of [VietNews]. This sudden and secret meeting was a milestone marking that [VietNews] moved to a new chapter after 7 years of establishment and development. (Corporate chronology, 2016, archival)

VietNews moved to a new era of development in 2014. In the integration era, VietNews managers realised its strength as a company that was innovating with technology and data for more than 10 years. Established technological capabilities and first-party data provided VietNews with an affluent testbed to extensively experiment and innovate with AI and analytical technologies. The path for integration was clear and well-aligned between the technology and data contexts.

VietNews referred to their main innovation contexts as "Technology bloc" and "Content bloc" to mainly address the work teams in the two contexts. The integration of the two contexts was a prominent event in 2015, with "Content Technology bloc" emerging as a new strategic initiative:

Ending the 9-year operation cycle of content management system, Content Technology bloc transformed the application of integrated editorial solutions with brand new features. (Corporate chronology, 2016, archival)

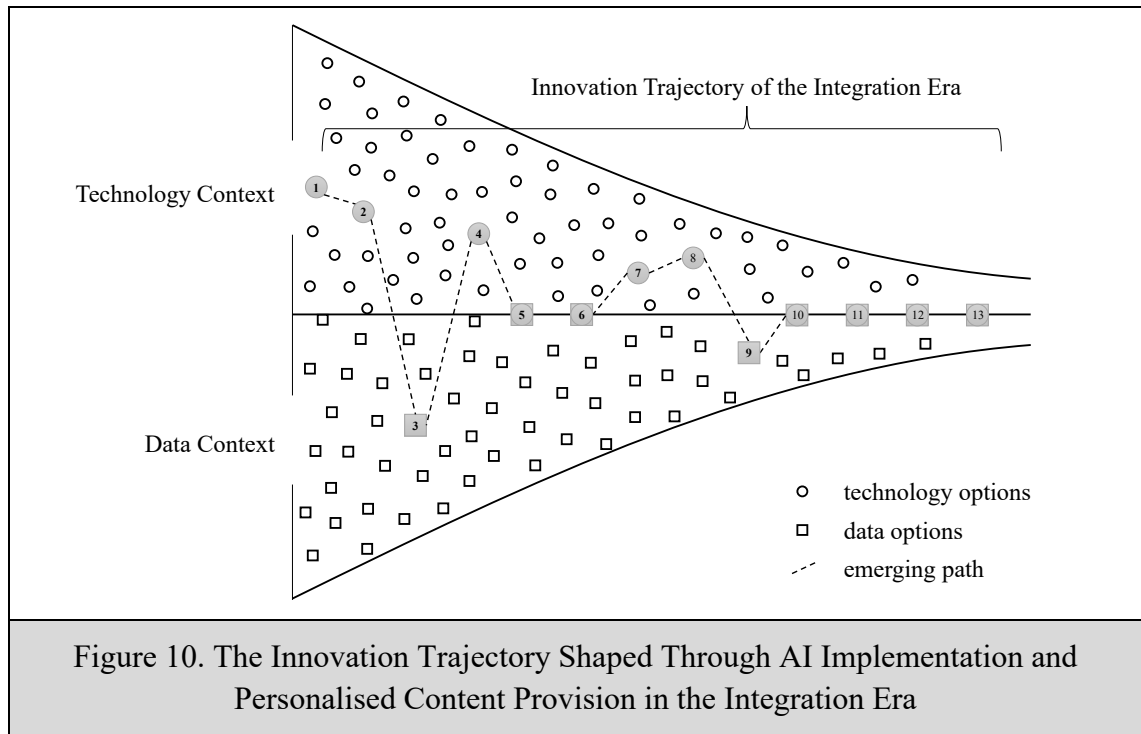
The Content Technology bloc solved a key challenge VietNews was facing owing to its exponentially growing content. Using big data and AI technologies, VietNews upgraded its news distribution engine and developed a news recommendation engine to provide personalised news to its readers:

It was a key challenge for users of news websites to find interesting articles to read. Now we are proud of becoming the first company in Vietnam having an automatic method for publishing news. (Corporate presentation, 2018, archival)

AI algorithms enabled the convergence of diversified content and data across VietNews platforms, reducing editorial workload and providing personalised news content to the readers. I provide evidence related to the innovation trajectory in the integration era in Table 12 and visualise the trajectory in Figure 10.

Table 12. Data Structure of the Integration Era			
Time	Context	Decision (#)	Exemplary Quotes
Nov 2013	Tech	Private cloud as the integration technology (1)	A private cloud solution was researched and deployed, taking full advantage of existing infrastructure (network systems, servers and other hardware devices). (Corporate chronology, 2016, archival)
Jul 2015	Tech	Live video streaming as the technology (2)	Technology teams researched and developed a livestream video streaming technology. The new technology supports both HTML5 and Flash, high scalability, easy integration and automatic encoding of real-time video in the storage layer. (Corporate chronology, 2016, archival)
Aug 2015	Data	Understanding and filtering users as data analysis (3)	“At first, it was only about data analysis. We analysed all the data and filtered them to understand more about users”. (Data engineer, 2019, interview)
Nov 2015	Tech	Big data and AI as new technology (4)	“Our upgrade of the cloud system, in 2015, helps with new technologies such as big data and AI. Because of new programming methods, APIs [application protocol interfaces] help algorithms to easily access data”. (Head of technology infrastructure, 2019, interview)
Dec 2015	Data and tech	Content Technology bloc as the integrated solution (5)	Ending the 9-year operation cycle of content management system, Content Technology bloc transformed the application of integrated editorial solutions with brand new features. (Corporate chronology, 2016, archival)
Oct 2016	Tech and data	AI techniques as new ways of content distribution (6)	A key challenge of news websites is to help users find articles that are interesting to read. We came up with an innovative way for news distribution, applying techniques such as real-time engagement statistics, personalisation, NLP [natural language processing], event detection, trending detection and breaking news detection. (Corporate presentation, 2016, archival)

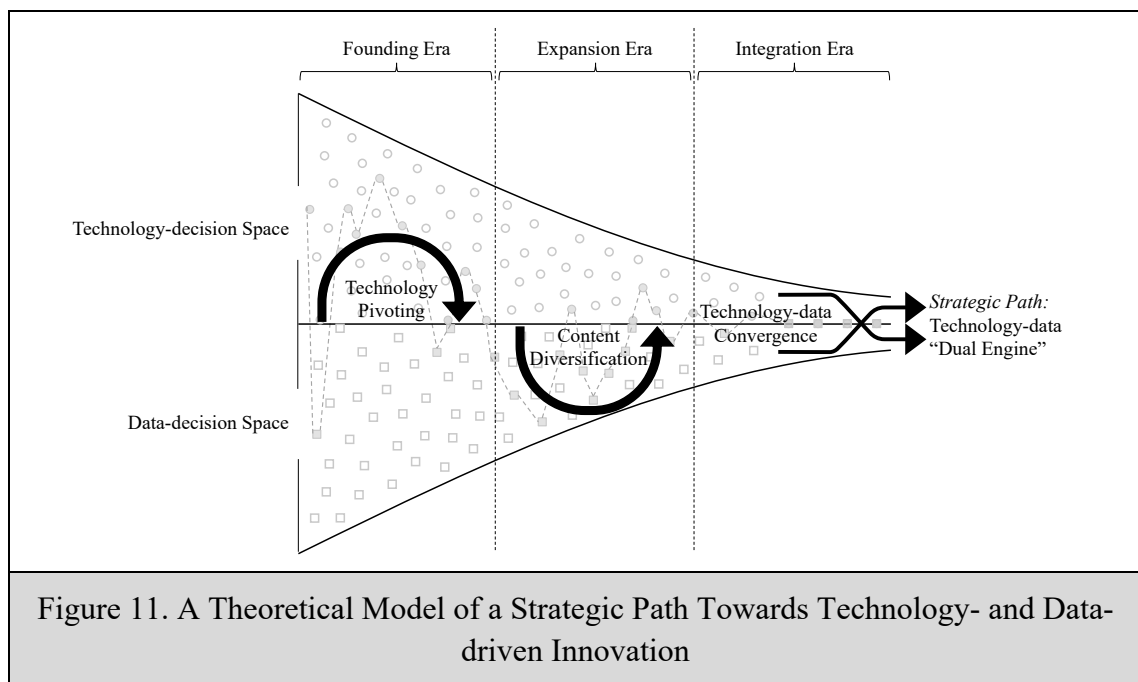
Nov 2016	Tech	News recommendation engine as an AI application (7)	The knowledge network for news recommendation is built using core NLP including deep learning and sentiment analysis techniques. This is the foundation of the news recommendation engine (NRE), which provides suggestions for users based on their reading history. (Corporate presentation, 2016, archival)
Early 2017	Tech	Computer vision and natural language processing (NLP) as the main AI technologies (8)	At [VietNews], the two main areas of AI are computer vision and NLP. NLP technologies include sentiment analysis, text mining and deep learning. Computer vision includes pattern recognition, voice recognition, object detection and image processing (VietNews, 2017, a corporate technical presentation)
Late 2017	Data	A/B testing as evaluation (9)	“We conducted A/B testing for evaluating the output produced by the news recommendation and distribution engines”. (Data scientist, 2019, interview)
Mar 2018	Tech and data	AI application as news distribution (10)	The rising editorial challenges such as: what kinds of news stories are attractive to the readers? Was my decision good? What are the personal biases of manual selection and editing? Solution was the news distribution engine (NDE) - AI infrastructure to distribute and publish news. (Corporate presentation, 2018, archival)
Apr 2018	Tech and data	AI-assisted decision making as the new editorial job (11)	The editor with AI-assistance generated hundreds of higher quality, highly curated and semantically inter-lined articles, in the time (about 1 hour) it took her/him to decide on just one article manually. (Corporate presentation, 2018, archival)
Oct 2018	Tech and data	News distribution as the automation technology (12)	“Currently, it seems [VietNews] is the only Internet company in Vietnam where news articles are written by journalists and editors, but what articles to be published and where to publish them are decided by the machine. News writers only need to focus on writing articles, and effective content distribution is left for the system”. (Data scientist, 2019, interview)
2019	Tech and data	Social news platform as the integration technology (13)	With the theme ‘Content is King’, [VietNews co-founder] said [the social news platform] is following a different path, providing a platform supporting content contributors and individuals to access creative and quality content. (Asian newspaper, 2019, archival)



6.5. Theoretical Analysis and Discussion

This study traced the historical trajectories and examined the strategic decision making processes of an organisation that innovated in the contexts of technology and data. I found that the innovation trajectories traversed through two contexts of strategic decision making throughout the organisational history. I refer to these contexts as *decision spaces*. Drawing from the theories of path dependence (Schreyögg and Sydow 2011; Sydow et al. 2009) and path creation (Garud et al. 2010; Singh et al. 2015), I developed a model to explain the presence of decision spaces and three strategic mechanisms – technology pivoting, content diversification and technology-data convergence – that shaped the digital innovation trajectories (see Table 13 and Figure 11) emerged from the decision spaces. In other words, the managers were forming a strategic path towards innovation through the decision spaces using these mechanisms.

Table 13. Technology- and Data-driven Innovation Trajectories				
Organisational Eras	Decision Spaces		Strategic Mechanisms	Strategic Path (2000-2020)
	Technology	Data		
Foundation Era (2000-2009)	Experimentation with technology infrastructure	Pioneering of online news content	Technology pivoting	Evolution of technology-data “dual engine”
Expansion Era (2010-2015)	Extension of CDN	Division of content into specialised sites and user groups	Content diversification	
Integration Era (2016-2020)	Training and optimisation of AI algorithms using first-party data	Creation and provision of content based on individual user preference using AI technologies	Technology-data convergence	



6.5.1. A Strategic Path Towards Technology- and Data-driven Innovation

Based on the analysis, I propose that a strategic path towards technology- and data-driven innovation is created through the complementary nature of decision making between the decision spaces. I define the *decision space* as an idea domain where alternative options emerge over time and managers constantly research the emerging range of options for decision making to guide their organisation towards re-innovation. From the path creation perspective (Garud et al. 2010), the decision spaces enable multiple potential outcomes rather than reinforcing the previous decisions. For example, in this case study, VietNews was creating news media content for specialised reader networks and pivoting with disruptive technologies to meet the needs of their intended market. From the path

dependence perspective (Schreyögg and Sydow 2011), complementarities between the decisions made in the two decision spaces can lead to the formation of an organisational path. For example, VietNews managers were continuously shifting between the *technology-decision space* and *data-decision space* in their strategic decision making for innovation, which created the technology-data “dual engine”, following the AI-data integration. I visualise the creation of the technology-data “dual engine” in Figure 11, which also presents the three mechanisms that managers used to reshape the innovation trajectories in the different eras of the organisational history. I have summarised these mechanisms in Table 13 and explain them below.

Technology pivoting refers to the strategic mechanism that managers used for decision making in the technology space (emphasised in Figure 8). This mechanism evolved, mainly in the founding era, as the founding members decided to experiment with many different technologies to develop stable and cost-effective infrastructure for the growing online content and user base. According to literature, a pivot is a strategic reorientation that can only be achieved by incrementally adding strategy elements over time (Kirtley and O'Mahony Forthcoming). Likewise, technology pivoting is a way of reorienting the development of technology infrastructure by incrementally adding or changing technology elements over time. Another aspect of technology pivoting is user reorientation by constantly creating new ways of accessing the technologies and improving the user experience, as explained in the study on digital ventures by Huang et al. (2017). Pivoting in the technology-decision space thus repeatedly generated innovative outcomes that sometimes aligned with the range of options in the data-decision space.

Content diversification refers to the strategic mechanism that managers used for decision making in the data space (emphasised in Figure 9). This mechanism evolved, mainly in the expansion era, as the co-founder proposed a strategy to develop targeted user networks based on specialised content. Diversification is an established concept in innovation literature because it stimulates innovation (Oborn et al. 2019; Yoo et al. 2012). In the literature on AI-and data-driven platforms and based on this study, the diversification of application areas based on data network effects is emerging as a new way of stakeholder value creation (Gregory et al. Forthcoming). The diversification of content and building networks of users for each content category thus generated innovations in the data-decision space that complemented the underlying technologies.

Technology-data convergence refers to the mechanism that managers used for decision making based on the complementarities between the two decision spaces (emphasised in Figure 10). This mechanism evolved, mainly in the integration era, when the value of digital content and user data was realised with AI technologies. News content was always the most valuable resource in the news publishing industry. With the advent of the Internet, the industry became widespread, allowing anyone to publish newsworthy content. However, providing relevant and interesting content to the readers became increasingly challenging. AI algorithms were particularly useful for addressing this challenge. Managerial decisions with regard to AI technologies and data complemented each other at many instances throughout the integration era. Thus, I revealed an evolving strategic path based on the complementarities between technology- and data-decision spaces.

By tracing back in time, a strategic path emerging from the organisational foundation is revealed. Figure 11 visualises how the strategic path evolved through the decision spaces over time when managers were pivoting, diversifying and converging the complementarities of technology and data. In the foundation era, although the strategy for innovation was focused on experimenting with technologies, the founder's dual interests in technology and data provided the foundation for the two prominent decision spaces. These imprinted decision spaces persisted over time, leading to the expansion of technology infrastructure and the diversification of media content, in the expansion era. In the integration era, AI technologies became the driver for technology- and data-driven innovation, which brought together the complementarities of the decision spaces. VietNews' innovation trajectory gradually evolved as a strategic path when the decisions in the technology- and data-decision spaces converged resulting in a technology-data "dual engine".

6.5.2. *Implications for Research and Practice*

This work draws from and extends the literature on digital innovation trajectories (Garud et al. 2013; Oborn et al. 2019), organisational path (Garud et al. 2010; Sydow et al. 2009) and digital strategy (Bharadwaj et al. 2013; Vial 2019). Garud et al. (2013) suggest that "innovation processes are characterised by repeated cycles of divergent and convergent phases" (p. 775). Bharadwaj et al. (2013) as well as other scholars (Henfridsson and Yoo 2014; Reynolds and Yetton 2015) emphasise the strategic influence in managing

innovation trajectories and provide ways to understand the evolution of innovation processes by recognising limitations in the present and seeking opportunities in an uncertain future. This study supports and extends this literature by developing a model of a strategic path in technology- and data-driven innovation that takes into account how an innovation trajectory emerges through historically established contexts of decision making. I present specific implications for how the three identified strategic mechanisms shape the innovation trajectory by diversifying or converging the range of options in the decision spaces. By doing so, this study makes several theoretical and practical contributions.

First, this study highlights the importance of broadening the current focus in digital innovation research to further our understanding of innovation with technology and data, in particular, AI- and data-driven innovation. Findings of this study suggests the existence of decision spaces in organisations and, more specifically, the complementarities between the spaces when incrementally adding or changing digital technologies and domain-specific content for innovation. In doing so, I advance the existing understanding of how innovations are managed using technologies to support both diversification and integration. For example, the current literature on innovation in developing complex science-based products focuses on building an open problem space and productively searching it to anticipate multiple futures (Dougherty and Dunne 2012). Garud et al. (2014) discuss the importance of contexts in entrepreneurial innovation. Extending this literature, this study highlights the existence of two decision spaces – technology- and data-decision spaces – and the opportunities of potential complementarities between them for strategic decision making for digital innovation. Further research is needed to assess whether and how the distinct decision spaces and their complementarities may be relevant in managing other innovation domains and their trajectories. I also suggest that tracing the similarities and differences of innovating in multiple domains over time can offer insights into the possible complementarities and incompatibilities in the constituting practices that may lead to unexpected and unexplainable outcomes (Thrane et al. 2010).

Second, I draw attention to the role of organisational history in shaping the innovation trajectory towards a strategic path. Stinchcombe (1965) suggests that organisations are shaped by the historically specific resources that their founders draw from. In this case study, the organisational strategy was established on the basis of the founder's dual interests, which were imprinted during the founding period and persisted over time as

decision spaces. These decision spaces provided the ground for path creation. Prior literature on path dependence (Schreyögg and Sydow 2011) and path creation (Garud and Karnøe 2001) explains how an organisational path emerges through the range of available options within the scope of managerial discretion. The current study extends this understanding by suggesting more than one range of options – that is, decision spaces and the movement of the innovation trajectory between two decision spaces. In addition, by adopting and extending the path creation perspective (Garud et al. 2010), I argue that emerging options and their complementarities between decision spaces provide further opportunities for innovation through strategic decision making by broadening the scope of discretion. This research thus sheds light on the process of path creation that emerges through two innovation contexts that were once diversified and then converged with the use of emerging technologies. Future research can study the effect of disruption through punctuated equilibrium on the constitution of an organisational path (Connie 1991; Sabherwal et al. 2001).

Third, this research contributes to the digital strategy literature by identifying new mechanisms for reshaping an organisational path over time and through the decision spaces. I suggest that the identification of the strategic path and the decision spaces and mechanisms that reshaped it towards innovation throughout the organisational history helps to reconceptualise our understanding of short-term and long-term strategic decision making in organisations. I conceptualise how short-term strategic decision making based on pivoting and diversification mechanisms led to a long-term strategic path after converging the complementarities between the decision spaces. Hence, by explaining how short-and long-term strategies are better operationalised using digital technologies, this study contributes to the digital strategy literature (Grover and Kohli 2013). I reveal three mechanisms that managers used for decision making – technology pivoting, content diversification and technology-data convergence – which reshaped the innovation trajectory over time.

These strategic mechanisms extend existing literature in numerous ways. The concept of pivoting has recently gained attention in entrepreneurship and strategy research (Grimes 2018; Kirtley and O'Mahony Forthcoming; Pillai et al. 2020). However, most of these studies focus on the founders and their creative work in determining the early strategies and the use of technology in pivoting has not been extensively studied considering its widespread use by technological start-ups to make decisions for shifting their strategic

orientations (Terho et al. 2015). Therefore, I call for future research on conceptualising the strategic pivoting in digital innovation. The diversification is an established way of strategy making (Ansoff 1965). By discussing diversification in the news publishing industry, I reiterate the potential for the rapid scaling of user base on the Internet (Huang et al. 2017). Diversification of media content and specialisation of user groups were particularly useful when innovating with technologies such as AI and big data analytics. As a result of historical decision spaces and strategic mechanisms, convergence was foreseeable following the introduction of AI and big data technologies. The technology-data convergence mechanism is established in the news media industry (Kunert 2020); however, more research is needed to understand how diversified content and user data can be integrated using AI technologies to create value for all stakeholders in data-sensitive industries (Gregory et al. Forthcoming; Rahwan et al. 2019).

Last, I provide insights for prospective entrepreneurs and practitioners who consider innovating with technology and data. In this study, I show how a founding entrepreneur formed a technology start-up and developed it into a large-scale news media company on the Internet by making incremental decisions towards a long-term strategy. In particular, I offer time sequences of strategic decision making and show how a start-up can be formed to allow diversification and convergence in the future. During my interactions with the practitioners of this study, I realised that they were focusing on strategising in the short-term without explicitly strategising for the long term. However, the company was strongly positioned in the dual contexts of digital content and technology since its formation. Based on this insight, the advice for practitioners is to choose a domain where the range of options is increasing over time and to use multiple mechanisms to redirect innovation outcomes. At present, technologies provide basic infrastructure for almost all organisations, regardless of the particular domain in which they operate (Vial 2019). The advice for organisations in data-centric industries is to first develop adequate and expandable infrastructure to collect and organise data and then use diversification and convergence mechanisms to generate value for their stakeholders. As shown in this study, developing advanced infrastructure and collecting data over time is particularly useful for innovating with technology and data.

6.6. Conclusion

In this study, I asked: *How is a strategic path towards technology- and data-driven innovation created?* I found that a strategic path is created through complementary decision spaces where managers directed their innovation trajectories. I believe that the theoretical insights generated here concerning how a strategic path is created over time as it navigates through complementary decision spaces are both valuable and intriguing. However, I note that this study has limitations in that I only examined the creation of a strategic path towards technology- and data-driven innovation at a specific organisation. This study was focused on the online news industry and did not account for innovation in other domains. Therefore, future research can study decision spaces and strategic mechanisms that are salient in other contexts and times. Although the specific decision spaces that an innovation trajectory emerges through will vary across specific contexts and times, I believe that these findings regarding decision spaces and mechanisms of pivoting, diversification and integration are likely to be relevant more broadly and provide a useful starting point for exploring the strategies for innovating with digital technologies and data in various domains.

Chapter 7.

Discussion

Overall, this thesis develops an understanding on the future of work from an organisational history perspective in the context of emerging technologies. Drawing on the three historical case studies and their theoretical contributions, this thesis sheds light on how organisational history shapes the future of work in the context of emerging technologies. While each of the three studies (in Chapter 4, 5 and 6) presents contributions relating to its particular organisational context, this chapter synthesises and discusses the contributions for the future of work topic from a holistic view on their organisational histories. Before the discussion, a summary of the three studies is presented in Table 14.

Table 14. Summary of the Three Studies			
Context	Study 1: Pre-digital Organisation	Study 2: Digitally Reformed Organisation	Study 3: Born-digital Organisation
Future of work focus	Digital platforms and business analytics	RPA	AI- and data-driven innovation
Historical context	An organisation that was founded in 1960 and adopted technologies in 2000	An organisation that was reformed in 2000 and adopted RPA in 2014	An organisation that was founded in 2006 and adopted AI technologies in 2015
Research approach	Tracing the history (1960-2020) of a traditional family-owned retail business organisation using 750 pages of archival material and 465 pages of interview transcripts	Tracing the history (1990-2020) of a reformed government administration service organisation using 800 pages of archival material and 392 pages of interview transcripts	Tracing the history (2000-2020) of a born-digital news media publishing organisation using 500 pages of archival material and 478 pages of interview transcripts
Key findings	<ul style="list-style-type: none"> • Practices of combining tradition and emerging technologies • Strategies for managing the interplay 	<ul style="list-style-type: none"> • Practices of realising process knowledge for RPA • Strategies for organising workforce and work roles 	<ul style="list-style-type: none"> • Practices of innovating with technology and data • Strategies for decision making in digital innovation

First, based on an in-depth historical analysis of a pre-digital organisation, study 1 (in Chapter 4) develops an understanding of how the technological and hereditary history of an organisation, following the introduction a new digital technology, leads to the

evolution of a *digital imprint* and how managers are reshaping it. Next, study 2 (in Chapter 5) builds on a historical investigation of a digitally reformed organisation to understand the practices of realising process knowledge for automation through strategically *embodying organisational memory*. Finally, study 3 (in Chapter 6) draws on a case study of an online news media organisation to present an understanding of the creation of a strategic path through *technology- and data-decision spaces* towards AI-driven innovation. In the following, the findings from the three studies are integrated into a framework, implications for research and practice are discussed, and future research directions are presented.

7.1. An Organisational History Perspective on the Future of Work

The integration of the three historical case studies presented in this thesis provides insights into the distant, intermediate and immediate organisational histories, their effects on the future of work and the strategic mechanisms for organising with emerging technologies. As discussed in the literature review (see Chapter 2), studies that motivate research on the future of work from an evolutionary perspective consider the embedded and evolving nature of the sociotechnical issues arising in organisations with the increasing adoption of emerging technologies (Davison and Ou 2017; Lyytinen et al. Forthcoming; Sarker et al. 2019). Such disruptive effects can appear as surface-level effects or deep-level effects in organisations (Baptista et al. 2020; Silva and Hirschheim 2007). By taking an organisational history perspective to understand the deep effects of emerging technologies in organisations, this thesis reveals that these effects may have started evolving followed by events that occurred in distant, intermediate and immediate organisational histories (Buckley 2016). Drawing from historical theories and research methods, this thesis develops an understanding of how the historical evolution of emerging technologies in organisations sets the conditions for the future of work. Table 15 summarises the conceptualisations of this thesis into a framework. The framework illustrates how historical conditions in organisations inform the future of work and ongoing strategising in organisations to adopt emerging technologies.

Table 15. A Framework of the Future of Work From an Organisational History Perspective

Context	Organisational Histories	Effects on the Future of Work	Strategic Mechanisms for Organising with Emerging Technologies
Study 1. Pre-digital	<p>Distant: Limited availability of technologies at the time of formation</p> <p>Intermediate: New technologies disrupt and augment existing practices</p> <p>Immediate: Managerial attempt for increasing digital work practices</p>	<p>Surface-level effects:</p> <ul style="list-style-type: none"> • Traditional staff often reverts to manual routines • Communities co-create and learn IT together <p>Deep-level effects:</p> <ul style="list-style-type: none"> • Manual workarounds manifest into legacy practices • Digital work offers new ways of social organising 	<ul style="list-style-type: none"> • Workforce reinvention with digital capabilities while preserving the tradition • Rewriting IT policies and sharing them on an online dashboard to streamline processes • Establishment of exclusive community networks for industrial trading
Study 2. Digitally reformed	<p>Distant: Standardisation of common work tasks at the time of reformation</p> <p>Intermediate: Automation of routine and repetitive work tasks using IT</p> <p>Immediate: Administration staff obtains new technical skills for work</p>	<p>Surface-level effects:</p> <ul style="list-style-type: none"> • New job designs involve unique and complex tasks • Automated reports contain some complex errors <p>Deep-level effects:</p> <ul style="list-style-type: none"> • Learning on the job makes work more challenging • Visual tools make complex tasks more enjoyable 	<ul style="list-style-type: none"> • Involvement of existing staff and in-house capability development • Open awareness creation of new digital interventions and workplace disruption using online and offline mediums • Development of new work roles and unique talent that stands out in the industry
Study 3. Born-digital	<p>Distant: Establishment of digital capabilities at the time of formation</p> <p>Intermediate: Expansion of business innovation on digital infrastructure</p> <p>Immediate: Integration of technology and data contexts for innovation</p>	<p>Surface-level effects:</p> <ul style="list-style-type: none"> • Innovation needs context and analytical skills • New forms of organising entail teams-on-demand <p>Deep-level effects:</p> <ul style="list-style-type: none"> • Need for re-innovation makes work more stressful • Moving across teams offers new opportunities 	<ul style="list-style-type: none"> • Demonstration of an innovation driven work culture to attract new and expert talent • Innovation focused through encouraging continuous experimentation and organising innovation contests • Positioning of teams as pioneering and leading in the target industry

The organisational histories of the three case study organisations had different distant, intermediate and immediate trajectories based on their time of founding and environmental conditions throughout their evolution. These aspects of organisational founding and environmental conditions complement Stinchcombe's (1965) assumptions on founding structures and their persistence. The pre-digital organisation considered in this thesis was formed at a time when technologies were limited and persisting processes were built based on manual expertise. The digitally reformed and born-digital organisations were formed in the digital era; thus, their structures support the constant introduction of emerging technologies. Whereas the trajectory of the pre-digital organisation was gradually changing, at the digitally reformed organisation, the reformation escalated the speed and scope of technology adoption and the born-digital organisation applied drastic changes in very short timeframes for innovation. Further analysis on the immediate history of the pre-digital organisation revealed that its tradition and technological history reshaped its digital work practice and strategy. In the digitally reformed organisation, although the structures were more suitable for adopting emerging technologies, realising process knowledge became a long-term process involving human team work (Williamson and Sutton 2014) and human-machine organising (Lyytinen et al. Forthcoming). The case study of the born-digital organisation sheds light on how an organisation can be strategically positioned in both digital and domain-specific spaces from the time of its formation to experiment and innovate using emerging technologies. All these aspects of organisational histories condition the future of work and strategy making in the context of emerging technologies.

Because of their founding conditions and technological histories, organisations develop deep effects into the future when adopting emerging technologies. One of the observations at the pre-digital organisation was that most experienced employees often reverted back to their usual pre-digital routines, thus creating manual workarounds to bypass the technology. On the contrary, the community practices, as also suggested by Marquis (2003), increased, and the collective construction (Lippmann and Aldrich 2016) of technologies has become a new way of socialising and organising locally within the traditional community networks. The reformation initiative resulted in the changing of work roles and crafting of new jobs. The time period of switching job roles was often overlooked by organisational managers when they moved from one strategic initiative to the next, as discussed by Henfridsson and Yoo (2014) in their study on the liminal periods

of entrepreneurial innovation. During the period of switching jobs, employees faced difficulties in learning new capabilities while performing the old job. However, the visual and easy-to-learn features of emerging technologies (Vertesi 2012) have made complex problem-solving tasks more enjoyable. In contrast to other organisations, employees in born-digital organisations had a constant need for re-innovation, which made their work more stressful. Nevertheless, forming temporary teams for innovation offered them with unique opportunities to learn about different contexts when experimenting using AI technologies and big data sets. These surface- and deep-level effects that evolved throughout organisational histories provide implications for strategy making in the digital age.

Strategic mechanisms for organising with emerging technologies are shaped by both the conditions of organisational histories and the effects of emerging technologies. When managing capabilities, the pre-digital and digitally reformed organisations focused on internally developing digital skills for designing, implementing and using emerging technologies, whereas, the born-digital organisation developed an innovation-driven work culture to attract new and expert talent. When communicating strategic mechanisms, the pre-digital organisation started with the basic steps of updating and sharing IT policies on an online dashboard. Managers at the digitally reformed organisation conducted organisation wide awareness campaigns using both online and offline mediums to prepare people's mindset early on for automation. The born-digital organisation communicated its vision of non-stop innovation by organising innovation contests and encouraging experimentation with emerging technologies. When considering beyond organisational boundaries, the pre-digital organisation extended its attachment to local communities through online platforms. The digitally reformed organisation developed unique digital talent in the industry, thus leading to inter-organisational partnerships for sharing technology expertise across their professional domain. Thought leadership was the strategy at the born-digital organisation; thus, the managers positioned their teams as pioneering and leading in the industry. Above and beyond, the organisational histories, surface- and deep-level effects and strategic mechanisms presented in this thesis contribute to wider implications for research and practice.

7.2. Implications for Research

This thesis contributes to research by incorporating qualitative case study and historical narrativist approaches to understand the future of work in the context of emerging technologies. By doing so, in addition to the implications discussed in the individual studies, it provides implications for studies that motivate research from historical perspectives (Allen 2017; Argyres et al. 2020) and take an evolutionary perspective on the future of work (Bailey and Barley 2020; Baptista et al. 2020) and digital strategy making (Chanias et al. 2019; Kirtley and O'Mahony Forthcoming) in organisations.

First, by adopting historical research methods and theories to conceptualise the context of emerging technologies, this thesis takes one step forward in the direction of historically inspired research that is becoming increasingly common in management and organisation studies to explore organisational trajectories over time (Argyres et al. 2020; Suddaby and Foster 2017). Through narrative construction (Rowlinson et al. 2014) and chronologically tracing organisational trajectories related to emerging technologies (Garud et al. 2014) in three organisational contexts, this thesis provides explanations on how organisational history shapes the future of work. Studies that take the organisational history perspective emphasise the roles of founders (Basque and Langley 2018; Cailluet et al. 2018), entrepreneurial teams (Beckman and Burton 2008; Bryant 2014), families (Erdogan et al. 2020; Sasaki et al. 2020), founding structures (Dobrev and Gotsopoulos 2010; Johnson 2007) and micro-foundations (Cardinale 2018; Suddaby et al. 2020) as important considerations for organisational evolution and future strategising. This thesis draws from and extends the literature on organisational history by incorporating historical research methods and theories to understand the changes in organisational trajectories enabled by emerging technologies. The thesis provides explanations on the interplay between tradition and technology at a pre-digital organisation using an imprinting lens (Erdogan et al. 2020; Kammerlander et al. 2015), the embodiment of process knowledge at a digitally reformed organisation using organisational memory (Stein and Zwass 1995; Walsh and Ungson 1991) and the creation of a strategic path (Garud et al. 2010; Schreyögg and Sydow 2011) at a born-digital organisation, in addition to the holistic framework discussed in this chapter that integrates the different organisational histories. This thesis is an early attempt and thus can be an exemplar for future scholars interested

in adopting historical methods and theories in explaining the complexities of emerging technologies.

Second, this thesis extends the current focus in research on the future of work from the future-oriented perspective to a past-oriented historical perspective. Most IS research on the future of work considers the aspects of economic impact and shrinking labour markets (Brynjolfsson and McAfee 2014; Susskind and Susskind 2015); however, little is known about the organisational trajectories that account for the past. This thesis addresses this gap by focusing on how organisational history shapes the future of work. The organisational history perspective adopted in this thesis can help me interpret the present status of an organisation by looking at its distant, intermediate and immediate histories (Buckley 2016). Integrating the findings of the three historical case studies, this thesis addresses specific surface- and deep-level effects of emerging technologies on the future of work, therefore contributing to the studies that motivate an evolutionary view of the future of work (Bailey et al. 2019; Baptista et al. 2020; Faraj et al. 2018). By studying the future of work phenomena through the lens of organisational history, this thesis reveals how historical conditions related to organisational formation and the use of technologies over time inform and reshape future trajectories. The specific surface- and deep-level effects of emerging technologies revealed here provide some explanations for the intended and unintended consequences that organisations experience through the design, implementation and use of emerging technologies. These findings extend previous literature on workaround practices (Davison and Ou 2017), collective construction of technologies (Lippmann and Aldrich 2016), work role changes (Lacity and Willcocks 2015; Sergeeva et al. 2020), human-machine organising (Grønsund and Aanestad 2020; Lyytinen et al. Forthcoming) and digital innovation (Kirtley and O'Mahony Forthcoming; Oborn et al. 2019).

Third, this thesis contributes to strategy literature by discussing the evolution of the strategic mechanisms that organisations used as mechanisms to navigate the context of emerging technologies. From the historical perspective, these strategic mechanisms were developed based on the conditions of organisational histories and effects of emerging technologies. By explaining the specific mechanisms of managing pre-digital tradition in the digital era, this thesis extends previous literature on digital strategy making in pre-digital organisations (Chanias et al. 2019; Davison and Ou 2014). By providing a view of organisational memory that can be embodied through knowledge codification and human-

machine organising mechanisms (Grønsund and Aanestad 2020; Lyytinen et al. Forthcoming; Willcocks 2020), it contributes to literature on automation strategies (Lacity and Willcocks 2017; Willcocks and Lacity 2016). Tracing the trajectories of a born-digital organisation and providing an evolutionary view of managing technologies throughout its history towards innovating with AI and big data sets (Bean 2018; Faraj et al. 2018), this thesis informs previous literature on innovation strategies (Kirtley and O'Mahony Forthcoming; Oborn et al. 2019). The strategic mechanisms for organising with emerging technologies discussed in this chapter provide implications for both research and practice by explaining the mechanisms for managing people, communicating internally and cooperating with external parties.

7.3. Implications for Practice

The implications of this thesis for practice are directed towards three specific areas: management of people, internal communication about introducing emerging technologies and cooperation beyond organisational boundaries. First, all three thesis studies suggest strategic mechanisms for managing people and their capabilities for adopting technologies in the future of work. For example, the pre-digital organisation reinvented its structure by hiring new employees and encouraging them to work together with existing employees. Through this workforce reinvention initiative, the employees managed to learn both traditional practices and emerging technologies from each other. The digitally reformed organisation involved its existing staff in the design, implementation and use of emerging technologies. In this way, the organisation could preserve its valuable employees by designing new job roles to organise the work with emerging technologies. The born-digital organisation developed an innovation-driven culture that attracted new and expert talent in the industry.

Second, all the organisations created awareness about their strategic initiatives to adopt technologies using different types of communication mediums. Managers at the pre-digital organisation started with the basics by rewriting IT policies and sharing them on an online dashboard to be accessed and followed by all employees. They used a performance metrics to assess the recognition of policies and the subsequent use of technologies. When digitally reforming their organisation, the managers did an organisation-wide awareness campaign and opened up avenues for their workforce to take advantage of new opportunities. The born-digital organisation kept their workforce

focused on constant re-innovation by encouraging experimentation and organising innovation contests. In this sense, strategic communication is identified as an important aspect to change the mindset of employees and prepare them for future technologies when managers plan to introduce new technologies.

Finally, cooperating with external parties beyond organisational boundaries is becoming increasingly important in the future of work. For example, the collective establishment of exclusive customer and supplier networks for industrial trading using digital platforms has helped the pre-digital organisation to retain competitive advantage in the digital age. Relocating administration employees, training them to obtain digital capabilities, realising their knowledge using RPA and changing their work roles to become technology experts provided the organisation with a unique competitive advantage. These employees later became the “go to” persons for RPA implementations in their professional domain. Thought leadership – that is, positioning of teams as pioneering and leading in the industry – is the strategic mechanism used by the born-digital organisation when positioning itself beyond the organisational boundaries. Within the organisation, such teams were organised as a federation of start-ups for achieving their innovation strategies.

7.4. Limitations and Future Research Directions

I note that the findings of this thesis are limited to the extent that I examined the future of work only in three organisational contexts that adopt specific emerging technologies. Yet, I believe the insights are valuable and generative, hence, future research is needed to verify and elaborate on them. Accordingly, this thesis proposes several key future research directions to explore the future of work phenomena, in addition to the proposed directions in the individual studies.

The first research direction is to extend the proposed historical perspective in understanding the future of work phenomena. One avenue I propose is based on a general observation of historical data across the studies of this thesis. While constructing narratives a general theme emerged related to the external environmental contexts of the organisations. In particular, country-level government strategies and policy interventions related to digitalisation seem to have a substantial impact on organisational-level technology adoption (Kettl 2000). Therefore, future research should study how external forces shape technology adoption throughout an organisation’s history and inform the

future of work. Likewise, it is indeed a limitation that this thesis does not include a cross-case analysis of the three studies. Therefore, a future research avenue is proposed to discuss factors such as the type of organisation, organisational structures, industry and geographic location to draw conclusions across organisations. Another avenue is based on the different types of historical research approaches proposed by organisational historians. This thesis adopts the historical narrativist approach suggested by Kipping and Lamberg (2017). Based on my experience and complementing (Kipping and Lamberg), future scholars are encouraged to draw from and incorporate other historical research methods to learn and explain the otherwise arbitrary situations that evolve into the future. Finally, although this thesis provides in-depth and long-term views, the findings are not generalisable to every organisation; therefore, it encourages more longitudinal studies and quantitative research from historical perspectives.

The second research direction proposed by this thesis is related to the future of work. In the three studies, I presented how work practices and strategies are reshaping because of the emerging technologies. The studies discuss some of the surface- and deep-level effects of emerging technologies on the future of work based on the historical contexts that the organisations were situated in. However, this thesis did not consider the historical evolution of technologies in-depth, meaning how previous events and actions are reshaping the design of black-box technologies such as AI (Duan et al. 2019; Holtel 2016). So far, the debate is ongoing with regard to the bright and dark sides of AI (Newell and Marabelli 2015); one way of exploring this phenomenon is to study how big data sets in specific contexts evolve over time and the trajectories of incorporating those data sets into AI technologies (Rahwan et al. 2019). Another research need is to understand human-machine hybrid control. Human-machine hybridisation is an emerging scenario in many contemporary organisations. Despite the advent of robotic systems that mimic organisational processes (Daugherty and Wilson 2018; Lyytinen et al. Forthcoming), little is known about the deceptive and deviant behaviours of both machines and humans within their enmeshed interactions. Moreover, the ongoing COVID-19 pandemic is inevitably changing our future of work. The research approach followed in this thesis can show us ways to construct historical narratives in understanding pre- and post-pandemic organisational trajectories in the context of emerging technologies.

The third research direction is motivated by the focus on digital strategy in all three studies of this thesis. Although a certain level of cross case integration has been achieved

in the discussion, it is a limitation that common digital strategies across the organisations have not been identified and generalised. First, drawing on the pre-digital organisation's case study, understanding the role of history-as-resource and -constraint in other organisations' strategy making could have been interesting, thus is an avenue for future research. Second, pivoting is conceptualised as a reorientation in an organisation's "strategy to change its direction through reallocating of activities, resources and attention" to spawn innovation (Kirtley and O'Mahony Forthcoming). I only studied pivoting in the born-digital organisation, hence future research can look into pivoting in other organisations, particularly in resource intensive industries. Third research avenue is to explore the changing nature of middle-level management roles, observed in all three studies, as it is not well-studied in the existing literature that focuses more on individual workers (Deng et al. 2016; Dunn 2020) and entrepreneurs (Grimes 2018; Li et al. 2018) in the future of work. Furthermore, IS research should look into small businesses that network within their families and communities to investigate their unique ways of digital strategy making (Erdogan et al. 2020).

7.5. Concluding Remarks

Over the past two decades, the future of work has evolved from basic workplace tools to automated work with intelligent algorithms (Faraj et al. 2018). This evolution in the context of emerging technologies has transformed not only the socio-economic labour markets but also the work and structures of organising in many organisations (Bailey et al. 2019; Baptista et al. 2020). In this thesis, I explore three types of organisational contexts in the future of work and conceptualise their historical trajectories in understanding the evolution of work practices (Lacity and Willcocks 2015), forms of human-machine organising (Grønsund and Aanestad 2020), strategy making (Chanias et al. 2019) and innovating (Oborn et al. 2019) using emerging technologies. The integration of the three studies contributes a discussion on distance, intermediate and immediate organisational histories (Buckley 2016), surface- and deep-level effects of emerging technologies on the future of work (Baptista et al. 2020) as well as the interrelated strategic mechanisms (Argyres et al. 2020). In doing so, I sincerely hope that the historical perspective (Buckley 2016; Kipping and Lamberg 2017) inspired in this thesis is useful not only to guide future research but also to help organisations navigate towards digitalisation for the future.

References

- Abrahamson, E. 2011. "The Iron Cage: Ugly, Uncool, and Unfashionable," *Organization Studies* (32:5), pp. 615-629.
- Agarwal, R., and Dhar, V. 2014. "Editorial—Big Data, Data Science, and Analytics: The Opportunity and Challenge for IS Research," *Information Systems Research* (25:3), pp. 443-448.
- Aguirre, S., and Rodriguez, A. 2017. "Automation of a Business Process Using Robotic Process Automation (RPA): A Case Study," *Proceedings of the Communications in Computer and Information Science*, Cham, Switzerland, pp. 65-71.
- Alam, S. L., and Campbell, J. 2017. "Temporal Motivations of Volunteers to Participate in Cultural Crowdsourcing Work," *Information Systems Research* (28:4), pp. 744-759.
- Alam Sultana, L. 2020. "Many Hands Make Light Work: Towards a Framework of Digital Co-Production to Co-Creation on Social Platforms," *Information Technology & People* (Sep:1), pp. 1-32.
- Allen, R. C. 2017. "Lessons from History for the Future of Work," *Nature* (550), pp. 321-324.
- Andal-Ancion, A., Cartwright, P. A., and Yip, G. S. 2003. "The Digital Transformation of Traditional Business," *MIT Sloan Management Review* (44:4), pp. 34-41.
- Ansoff, H. I. 1965. *Corporate Strategy*. New York, NY: McCraw-Hill.
- Argyres, N. S., De Massis, A., Foss, N. J., Frattini, F., Jones, G., and Silverman, B. S. 2020. "History-Informed Strategy Research: The Promise of History and Historical Research Methods in Advancing Strategy Scholarship," *Strategic Management Journal* (41:3), pp. 343-368.
- Arthur, W. B. 1989. "Competing Technologies, Increasing Returns, and Lock-in by Historical Events," *The Economic Journal* (99:394), pp. 116-131.
- Arthur, W. B., Ermoliev, Y. M., and Kaniovski, Y. M. 1987. "Path-Dependent Processes and the Emergence of Macro-Structure," *European Journal of Operational Research* (30:3), pp. 294-303.
- Asatiani, A., and Penttinen, E. 2016. "Turning Robotic Process Automation into Commercial Success – Case Opuscapita," *Journal of Information Technology Teaching Cases* (6:2), pp. 67-74.
- Autor, D. H. 2015. "The Paradox of Abundance: Automation Anxiety Returns," in *Performance and Progress: Essays on Capitalism, Business, and Society*, S. Rangan (ed.). Oxford, UK: Oxford University Press, pp. 237-260.
- Bailey, D. E., and Barley, S. R. 2020. "Beyond Design and Use: How Scholars Should Study Intelligent Technologies," *Information and Organization* (30:2), pp. 1-12.
- Bailey, D. E., Faraj, S., Hinds, P., von Krogh, G., and Leonardi, P. 2019. "Special Issue of Organization Science: Emerging Technologies and Organizing," *Organization Science* (30:3), pp. 642-646.
- Baiyere, A., Salmela, H., and Tapanainen, T. 2020. "Digital Transformation and the New Logics of Business Process Management," *European Journal of Information Systems* (29:3), pp. 238-259.
- Baptista, J. 2009. "Institutionalisation as a Process of Interplay between Technology and Its Organisational Context of Use," *Journal of Information Technology* (24:4), pp. 305-319.

- Baptista, J., Stein, M.-K., Klein, S., Watson-Manheim, M. B., and Lee, J. 2020. "Digital Work and Organisational Transformation: Emergent Digital/Human Work Configurations in Modern Organisations," *The Journal of Strategic Information Systems* (29:2), pp. 1-10.
- Baptista, J., Stein, M.-K., Lee, J., Watson-Manheim, M. B., and Klein, S. 2017. "Call for Papers: Strategic Perspectives on Digital Work and Organizational Transformation," *The Journal of Strategic Information Systems* (26:4), pp. 1-3.
- Barley, S. R., and Kunda, G. 2001. "Bringing Work Back In," *Organization Science* (12:1), pp. 76-95.
- Barrett, M., Oborn, E., Orlikowski, W. J., and Yates, J. 2012. "Reconfiguring Boundary Relations: Robotic Innovations in Pharmacy Work," *Organization Science* (23:5), pp. 1448-1466.
- Basque, J., and Langley, A. 2018. "Invoking Alphonse: The Founder Figure as a Historical Resource for Organizational Identity Work," *Organization Studies* (39:12), pp. 1685-1708.
- Bean, R. 2018. "How Big Data and AI Are Driving Business Innovation in 2018," *MIT Sloan Management Review* (Feb:1), pp. 1-3.
- Beckman, C. M., and Burton, M. D. 2008. "Founding the Future: Path Dependence in the Evolution of Top Management Teams from Founding to IPO," *Organization Science* (19:1), pp. 3-24.
- Berg, M. 1994. *The Age of Manufactures, 1700-1820: Industry, Innovation and Work in Britain*. London, UK: Routledge.
- Besson, P., and Rowe, F. 2012. "Strategizing Information Systems-Enabled Organizational Transformation: A Transdisciplinary Review and New Directions," *The Journal of Strategic Information Systems* (21:2), pp. 103-124.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., and Venkatraman, N. 2013. "Digital Business Strategy: Toward a Next Generation of Insights," *MIS Quarterly* (37:2), pp. 471-482.
- Bharadwaj, S. S., Saxena, K. B. C., and Halemane, M. D. 2010. "Building a Successful Relationship in Business Process Outsourcing: An Exploratory Study," *European Journal of Information Systems* (19:2), pp. 168-180.
- Blackler, F. 1995. "Knowledge, Knowledge Work and Organizations: An Overview and Interpretation," *Organization Studies* (16:6), pp. 1021-1046.
- Boeker, W. 1989a. "The Development and Institutionalization of Subunit Power in Organizations," *Administrative Science Quarterly* (34:3), pp. 388-410.
- Boeker, W. 1989b. "Strategic Change: The Effects of Founding and History," *Academy of Management Journal* (32:3), pp. 489-515.
- Boell, S. K., and Hoof, F. 2020. "Accounting for Information Infrastructure as Medium for Organisational Change," *Accounting History Review* (30:1), pp. 45-68.
- Bryant, P. T. 2014. "Imprinting by Design: The Microfoundations of Entrepreneurial Adaptation," *Entrepreneurship Theory and Practice* (38:5), pp. 1081-1102.
- Brynjolfsson, E., and McAfee, A. 2012. "Winning the Race with Ever-Smarter Machines," *MIT Sloan Management Review* (53:2), pp. 53-60.
- Brynjolfsson, E., and McAfee, A. 2014. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York, NY: W.W. Norton.
- Brynjolfsson, E., and Mitchell, T. 2017. "What Can Machine Learning Do? Workforce Implications," *Science* (358:6370), pp. 1530-1534.
- Bucheli, M., and Wadhwani, R. D. 2014. *Organizations in Time: History, Theory, Methods*. Oxford, UK: Oxford University Press.

- Buckley, P. J. 2016. "Historical Research Approaches to the Analysis of Internationalisation," *Management International Review* (56:6), pp. 879-900.
- Burton, M. D., and Beckman, C. M. 2007. "Leaving a Legacy: Position Imprints and Successor Turnover in Young Firms," *American Sociological Review* (72:2), pp. 239-266.
- Bygstad, B. 2017. "Generative Innovation: A Comparison of Lightweight and Heavyweight IT," *Journal of Information Technology* (32:2), pp. 180-193.
- Cailluet, L., Gorge, H., and Özçağlar-Toulouse, N. 2018. "'Do Not Expect Me to Stay Quiet': Challenges in Managing a Historical Strategic Resource," *Organization Studies* (39:12), pp. 1811-1835.
- Cardinale, I. 2018. "Beyond Constraining and Enabling: Toward New Microfoundations for Institutional Theory," *Academy of Management Review* (43:1), pp. 132-155.
- Carlile, P. R. 2004. "Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge across Boundaries," *Organization Science* (15:5), pp. 555-568.
- Chanias, S., Myers, M. D., and Hess, T. 2019. "Digital Transformation Strategy Making in Pre-Digital Organizations: The Case of a Financial Services Provider," *The Journal of Strategic Information Systems* (28:1), pp. 17-33.
- Chen, D. Q., Mocker, M., Preston, D. S., and Teubner, A. 2010. "Information Systems Strategy: Reconceptualization, Measurement, and Implications," *MIS Quarterly* (34:2), pp. 233-259.
- Chughtai, H. 2021. "Taking the Human Body Seriously," *European Journal of Information Systems* (30:1), pp. 46-68.
- Clark, A. 2001. *Mindware: An Introduction to the Philosophy of Cognitive Science*. New York, NY: Oxford University Press.
- Clark, A. 2006. "Language, Embodiment, and the Cognitive Niche," *Trends in Cognitive Sciences* (10:8), pp. 370-374.
- Clark, A. 2008. *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*. New York, NY: Oxford University Press.
- Clark, A., and Chalmers, D. 1998. "The Extended Mind," *Analysis* (58:1), pp. 7-19.
- Clark, E. A. 2004. *History, Theory, Text: Historians and the Linguistic Turn*. Cambridge, UK: Harvard University Press.
- Clark, P., and Rowlinson, M. 2004. "The Treatment of History in Organisation Studies: Towards an 'Historic Turn'?", *Business History* (46:3), pp. 331-352.
- Colbert, A., Yee, N., and George, G. 2016. "The Digital Workforce and the Workplace of the Future," *Academy of Management Journal* (59:3), pp. 731-739.
- Connie, J. G. G. 1991. "Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm," *The Academy of Management Review* (16:1), pp. 10-36.
- Constantinides, P., Henfridsson, O., and Parker, G. G. 2018. "Introduction—Platforms and Infrastructures in the Digital Age," *Information Systems Research* (29:2), pp. 381-400.
- Cook, S. D. N., and Brown, J. S. 1999. "Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing," *Organization Science* (10:4), pp. 381-400.
- Cross, R., and Baird, L. 2000. "Technology Is Not Enough: Improving Performance by Building Organizational Memory," *Sloan Management Review* (41:3), pp. 69-78.
- Crowston, K., and Myers, M. D. 2004. "Information Technology and the Transformation of Industries: Three Research Perspectives," *The Journal of Strategic Information Systems* (13:1), pp. 5-28.

- Dacin, M. T., Dacin, P. A., and Kent, D. 2019. "Tradition in Organizations: A Custodianship Framework," *Academy of Management Annals* (13:1), pp. 342-373.
- Daugherty, P. R., and Wilson, H. J. 2018. *Human + Machine: Reimagining Work in the Age of AI*. Boston, MA: Harvard Business Press.
- Davenport, T. H., and Brain, D. 2018. "Before Automating Your Company's Processes, Find Ways to Improve Them," *Harvard Business Review* (June), pp. 1-5.
- Davenport, T. H., and Kirby, J. 2015. "Beyond Automation," *Harvard Business Review* (93:6), pp. 58-65.
- David, P. A. 1985. "Clio and the Economics of Qwerty," *The American Economic Review* (75:2), pp. 332-337.
- Davison, R. M., and Ou, C. X. J. 2014. "Digital Work in a Pre-Digital Organizational Culture," *Proceedings of the 22nd European Conference on Information Systems*, Tel Aviv, Israel, pp. 1-7.
- Davison, R. M., and Ou, C. X. J. 2017. "Digital Work in a Digitally Challenged Organization," *Information & Management* (54:1), pp. 129-137.
- Decker, S. 2013. "The Silence of the Archives: Business History, Post-Colonialism and Archival Ethnography," *Management & Organizational History* (8:2), pp. 155-173.
- Decker, S., Hassard, J., and Rowlinson, M. Forthcoming. "Rethinking History and Memory in Organization Studies: The Case for Historiographical Reflexivity," *Human Relations*, pp. 1-33.
- Demarest, M. 1997. "Understanding Knowledge Management," *Long Range Planning* (30:3), pp. 374-384.
- Deng, X. N., Joshi, K. D., and Galliers, R. D. 2016. "The Duality of Empowerment and Marginalization in Microtask Crowdsourcing: Giving Voice to the Less Powerful through Value Sensitive Design," *MIS Quarterly* (40:2), pp. 279-302.
- Denis, J.-L., Dompierre, G., Langley, A., and Rouleau, L. 2011. "Escalating Indecision: Between Reification and Strategic Ambiguity," *Organization Science* (22:1), pp. 225-244.
- Dobrev, S. D., and Gotsopoulos, A. 2010. "Legitimacy Vacuum, Structural Imprinting, and the First Mover Disadvantage," *Academy of Management Journal* (53:5), pp. 1153-1174.
- Donaldson, D. R., and Conway, P. 2015. "User Conceptions of Trustworthiness for Digital Archival Documents," *Journal of the Association for Information Science and Technology* (66:12), pp. 2427-2444.
- Dougherty, D., and Dunne, D. D. 2012. "Digital Science and Knowledge Boundaries in Complex Innovation," *Organization Science* (23:5), pp. 1467-1484.
- Du, W., Pan, S. L., Leidner, D. E., and Ying, W. 2019. "Affordances, Experimentation and Actualization of Fintech: A Blockchain Implementation Study," *The Journal of Strategic Information Systems* (28:1), pp. 50-65.
- Duan, Y., Edwards, J. S., and Dwivedi, Y. K. 2019. "Artificial Intelligence for Decision Making in the Era of Big Data – Evolution, Challenges and Research Agenda," *International Journal of Information Management* (48), pp. 63-71.
- Dunn, M. 2020. "Making Gigs Work: Digital Platforms, Job Quality and Worker Motivations," *New Technology, Work and Employment* (35:2), pp. 232-249.
- Elish, M. C., and boyd, d. 2018. "Situating Methods in the Magic of Big Data and AI," *Communication Monographs* (85:1), pp. 57-80.

- Ellis, S., Aharonson, B. S., Drori, I., and Shapira, Z. 2017. "Imprinting through Inheritance: A Multi-Generational Study of Entrepreneurial Proclivity," *Academy of Management Journal* (60:2), pp. 500-522.
- Erçek, M., and Günçavdı, Ö. 2016. "Imprints of an Entrepreneur and Evolution of a Business Group, 1948–2010," *Business History* (58:1), pp. 89-110.
- Erdogan, I., Rondi, E., and De Massis, A. 2020. "Managing the Tradition and Innovation Paradox in Family Firms: A Family Imprinting Perspective," *Entrepreneurship Theory and Practice* (44:1), pp. 20-54.
- Faraj, S., Pachidi, S., and Sayegh, K. 2018. "Working and Organizing in the Age of the Learning Algorithm," *Information and Organization* (28:1), pp. 62-70.
- Fichman, R. G., Dos Santos, B. L., and Zheng, Z. 2014. "Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum," *MIS Quarterly* (38:2), pp. 329-353.
- Ford, M. 2015. *Rise of the Robots: Technology and the Threat of a Jobless Future*. New York: Basic Books.
- Forman, C., King, J. L., and Lyytinen, K. 2014. "Special Section Introduction—Information, Technology, and the Changing Nature of Work," *Information Systems Research* (25:4), pp. 789-795.
- Fountaine, T., McCarthy, B., and Saleh, T. 2019. "Building the AI-Powered Organization," *Harvard Business Review* (Jul-Aug), pp. 63-73.
- Frey, C. B., and Osborne, M. A. 2017. "The Future of Employment: How Susceptible Are Jobs to Computerisation?," *Technological Forecasting and Social Change* (114:1), pp. 254-280.
- Garud, R., Gehman, J., and Giuliani, A. P. 2014. "Contextualizing Entrepreneurial Innovation: A Narrative Perspective," *Research Policy* (43:7), pp. 1177-1188.
- Garud, R., and Karnøe, P. 2001. "Path Creation as a Process of Mindful Deviation," in *Path Dependence and Creation*, R. Garud and P. Karnøe (eds.). New York, NY: Psychology Press, pp. 1-38.
- Garud, R., and Karnøe, P. 2003. "Bricolage Versus Breakthrough: Distributed and Embedded Agency in Technology Entrepreneurship," *Research Policy* (32:2), pp. 277-300.
- Garud, R., Kumaraswamy, A., and Karnøe, P. 2010. "Path Dependence or Path Creation?," *Journal of Management Studies* (47:4), pp. 760-774.
- Garud, R., and Rappa, M. A. 1994. "A Socio-Cognitive Model of Technology Evolution: The Case of Cochlear Implants," *Organization Science* (5:3), pp. 344-362.
- Garud, R., Tuertscher, P., and Ven, A. H. V. d. 2013. "Perspectives on Innovation Processes," *Academy of Management Annals* (7:1), pp. 775-819.
- Gasparin, M., and Neyland, D. 2018. "We Have Always Been Modern(Ist): Temporality and the Organisational Management of 'Timeless' Iconic Chairs," *Organization* (25:3), pp. 354-373.
- Ghemawat, P., and Levinthal, D. 2008. "Choice Interactions and Business Strategy," *Management Science* (54:9), pp. 1638-1651.
- Glaser, B. G., and Strauss, A. L. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago, IL: Aldine de Gruyter.
- Gregor, S. 2006. "The Nature of Theory in Information Systems," *MIS Quarterly* (30:3), pp. 611-642.
- Gregory, R. W., Henfridsson, O., Kaganer, E., and Kyriakou, H. Forthcoming. "The Role of Artificial Intelligence and Data Network Effects for Creating User Value," *Academy of Management Review*.

- Grimes, M. G. 2018. "The Pivot: How Founders Respond to Feedback through Idea and Identity Work," *Academy of Management Journal* (61:5), pp. 1692-1717.
- Grønsund, T., and Aanestad, M. 2020. "Augmenting the Algorithm: Emerging Human-in-the-Loop Work Configurations," *The Journal of Strategic Information Systems* (29:2), pp. 1-16.
- Grover, V., and Kohli, R. 2013. "Revealing Your Hand: Caveats in Implementing Digital Business Strategy," *MIS Quarterly* (37:2), pp. 655-662.
- Gruber, M. 2010. "Exploring the Origins of Organizational Paths: Empirical Evidence from Newly Founded Firms," *Journal of Management* (36:5), pp. 1143-1167.
- Gupta, B., Iyer, L., and Aronson, J. 2000. "Knowledge Management: Practices and Challenges," *Industrial Management & Data Systems* (100:1), pp. 17-21.
- Hallikainen, P., Bekkhus, R., and Pan, S. L. 2018. "How Opuscapita Used Internal RPA Capabilities to Offer Services to Clients," *MIS Quarterly Executive* (17:1), pp. 41-52.
- Hannan, M. T. 1998. "Rethinking Age Dependence in Organizational Mortality: Logical Formalizations," *American Journal of Sociology* (104:1), pp. 126-164.
- Hannan, M. T., and Freeman, J. 1989. "Organizations and Social Structure," in *Organizational Ecology*, M.T. Hannan and J. Freeman (eds.). Cambridge, MA: Harvard University Press, pp. 3-27.
- Hansen, P. H. 2012. "Business History: A Cultural and Narrative Approach," *The Business History Review* (86:4), pp. 693-717.
- Henfridsson, O., Mathiassen, L., and Svahn, F. 2014. "Managing Technological Change in the Digital Age: The Role of Architectural Frames," *Journal of Information Technology* (29:1), pp. 27-43.
- Henfridsson, O., and Yoo, Y. 2014. "The Liminality of Trajectory Shifts in Institutional Entrepreneurship," *Organization Science* (25:3), pp. 932-950.
- Hinings, B., Gegenhuber, T., and Greenwood, R. 2018. "Digital Innovation and Transformation: An Institutional Perspective," *Information and Organization* (28:1), pp. 52-61.
- Hirschheim, R., and Klein, H. K. 2012. "A Glorious and Not-So-Short History of the Information Systems Field," *Journal of the association for information systems* (13:4), pp. 188-235.
- Holtel, S. 2016. "Artificial Intelligence Creates a Wicked Problem for the Enterprise," *Procedia Computer Science* (99), pp. 171-180.
- Hoof, F., and Boell, S. K. 2019. "Culture, Technology, and Process in 'Media Theories': Toward a Shift in the Understanding of Media in Organizational Research," *Organization* (26:5), pp. 636-654.
- Hsu, D. H., and Lim, K. 2014. "Knowledge Brokering and Organizational Innovation: Founder Imprinting Effects," *Organization Science* (25:4), pp. 1134-1153.
- Huang, J., Henfridsson, O., Liu, M. J., and Newell, S. 2017. "Growing on Steroids: Rapidly Scaling the User Base of Digital Ventures through Digital Innovation," *MIS Quarterly* (41:1), pp. 301-314.
- Hupfer, S. 2020. "Talent and Workforce Effects in the Age of AI," Deloitte, New York, NY.
- Iansiti, M., and Lakhani, K. R. 2020. "Competing in the Age of AI," *Harvard Business Review* (Jan), pp. 1-12.
- Iglesias, O., Ind, N., and Schultz, M. 2020. "History Matters: The Role of History in Corporate Brand Strategy," *Business Horizons* (63:1), pp. 51-60.

- livari, J., Hirschheim, R., and Klein, H. K. 2004. "Towards a Distinctive Body of Knowledge for Information Systems Experts: Coding Isd Process Knowledge in Two IS Journals," *Information Systems Journal* (14:4), pp. 313-342.
- Ingram, P., Rao, H., and Silverman Brian, S. 2012. "History in Strategy Research: What, Why, and How?," in *History and Strategy*, J.K. Steven, S.S. Brian and A.C. Michael (eds.). Emerald Group Publishing Limited, pp. 241-273.
- Jackson, P. 2012. "Transactive Directories of Organizational Memory: Towards a Working Data Model," *Information & Management* (49:2), pp. 118-125.
- Jarrahi, M. H., Philips, G., Sutherland, W., Sawyer, S., and Erickson, I. 2019. "Personalization of Knowledge, Personal Knowledge Ecology, and Digital Nomadism," *Journal of the Association for Information Science and Technology* (70:4), pp. 313-324.
- Johnson, S. L., Gray, P., and Sarker, S. 2019. "Revisiting IS Research Practice in the Era of Big Data," *Information and Organization* (29:1), pp. 41-56.
- Johnson, V. 2007. "What Is Organizational Imprinting? Cultural Entrepreneurship in the Founding of the Paris Opera," *American Journal of Sociology* (113:1), pp. 97-127.
- Kammerlander, N., Dessì, C., Bird, M., Floris, M., and Murru, A. 2015. "The Impact of Shared Stories on Family Firm Innovation: A Multicase Study," *Family Business Review* (28:4), pp. 332-354.
- Kaplan, J. 2015. *Humans Need Not Apply: A Guide to Wealth and Work in the Age of Artificial Intelligence*. New Haven, CT: Yale University Press.
- Kaplan, S., and Orlikowski, W. J. 2013. "Temporal Work in Strategy Making," *Organization Science* (24:4), pp. 965-995.
- Karimi, J., and Walter, Z. 2015. "The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry," *Journal of Management Information Systems* (32:1), pp. 39-81.
- Kettl, D. F. 2000. "The Transformation of Governance: Globalization, Devolution, and the Role of Government," *Public Administration Review* (60:6), pp. 488-497.
- Kimberly, J. R. 1975. "Environmental Constraints and Organizational Structure: A Comparative Analysis of Rehabilitation Organizations," *Administrative Science Quarterly* (20:1), pp. 1-9.
- Kimberly, J. R. 1979. "Issues in the Creation of Organizations: Initiation, Innovation, and Institutionalization," *Academy of Management Journal* (22:3), pp. 437-457.
- Kipping, M., and Lamberg, J.-A. 2017. "History in Process Organization Studies: What, Why, and How," in *The Sage Handbook of Process Organization Studies*, A. Langley and H. Tsoukas (eds.). Los Angeles, CA: Sage Publications, pp. 303-320.
- Kipping, M., Wadhwani, R. D., and Bucheli, M. 2014. "Analyzing and Interpreting Historical Sources: A Basic Methodology," in *Organizations in Time: History, Theory, Methods*, M. Bucheli and R.D. Wadhwani (eds.). Oxford, UK: Oxford University Press, pp. 305-329.
- Kirtley, J., and O'Mahony, S. Forthcoming. "What Is a Pivot? Explaining When and How Entrepreneurial Firms Decide to Make Strategic Change and Pivot," *Strategic Management Journal*.
- Klein, H. K., and Myers, M. D. 1999. "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems," *MIS Quarterly* (23:1), pp. 67-93.
- Kotlarsky, J., Scarbrough, H., and Oshri, I. 2014. "Coordinating Expertise across Knowledge Boundaries in Offshore-Outsourcing Projects: The Role of Codification," *MIS Quarterly* (38:2), pp. 607-627.

- Kroezen, J. J., and Heugens, P. P. M. A. R. 2019. "What Is Dead May Never Die: Institutional Regeneration through Logic Reemergence in Dutch Beer Brewing," *Administrative Science Quarterly* (64:4), pp. 976-1019.
- Kunert, J. 2020. "Automation in Sports Reporting: Strategies of Data Providers, Software Providers, and Media Outlets," *Media and Communication* (8), pp. 5-15.
- Lacity, M., and Willcocks, L. 2015. "What Knowledge Workers Stand to Gain from Automation," *Harvard Business Review* (19:6), pp. 1-6.
- Lacity, M., and Willcocks, L. 2016. "Robotic Process Automation at Telefónica O2," *MIS Quarterly Executive* (15:1), pp. 21-35.
- Lacity, M., and Willcocks, L. 2017. "A New Approach to Automating Services," *MIT Sloan Management Review* (58:1), pp. 40-49.
- Lall, S. 1992. "Technological Capabilities and Industrialization," *World Development* (20:2), pp. 165-186.
- Lamberg, J.-A., and Peltoniemi, M. 2020. "The Nanoeconomics of Firm-Level Decision-Making and Industry Evolution: Evidence from 200 Years of Paper and Pulp Making," *Strategic Management Journal* (41:3), pp. 499-529.
- Langley, A. 1999. "Strategies for Theorizing from Process Data," *Academy of Management Review* (24:4), pp. 691-710.
- Leonardi, P. M., and Barley, S. R. 2010. "What's under Construction Here? Social Action, Materiality, and Power in Constructivist Studies of Technology and Organizing," *Academy of Management Annals* (4:1), pp. 1-51.
- Leung, A., Der Foo, M., and Chaturvedi, S. 2013. "Imprinting Effects of Founding Core Teams on Hr Values in New Ventures," *Entrepreneurship Theory and Practice* (37:1), pp. 87-106.
- Li, L., Su, F., Zhang, W., and Mao, J.-Y. 2018. "Digital Transformation by Sme Entrepreneurs: A Capability Perspective," *Information Systems Journal* (28:6), pp. 1129-1157.
- Lifshitz-Assaf, H., Lebovitz, S., and Zalmanson, L. Forthcoming. "Minimal and Adaptive Coordination: How Hackathons' Projects Accelerate Innovation without Killing It," *Academy of Management Journal*.
- Lim, J.-H., Stratopoulos, T. C., and Wirjanto, T. S. 2011. "Path Dependence of Dynamic Information Technology Capability: An Empirical Investigation," *Journal of Management Information Systems* (28:3), pp. 45-84.
- Lippmann, S., and Aldrich, H. E. 2016. "A Rolling Stone Gathers Momentum: Generational Units, Collective Memory, and Entrepreneurship," *Academy of Management Review* (41:4), pp. 658-675.
- Lyytinen, K., Nickerson, J. V., and King, J. L. Forthcoming. "Metahuman Systems = Humans + Machines That Learn," *Journal of Information Technology*.
- Maclean, M., Harvey, C., Sillince, J. A. A., and Golant, B. D. 2018. "Intertextuality, Rhetorical History and the Uses of the Past in Organizational Transition," *Organization Studies* (39:12), pp. 1733-1755.
- Maclean, M., Harvey, C., Suddaby, R., and Clegg, S. 2021. "Historical Organization Studies : Advancing New Direction for Organizational Research," in *Historical Organization Studies*, M. Maclean, S. Clegg, R. Suddaby and C. Harvey (eds.). Taylor & Francis, pp. 3-22.
- Madsen, P. M., and Desai, V. 2010. "Failing to Learn? The Effects of Failure and Success on Organizational Learning in the Global Orbital Launch Vehicle Industry," *Academy of Management Journal* (53:3), pp. 451-476.
- Manyika, J., Chui, M., Madgavkar, A., and Lund, S. 2017. "Technology, Jobs, and the Future of Work," McKinsey Global Institute, San Francisco, CA, pp. 1-6.

- Marabelli, M., and Galliers, R. D. 2017. "A Reflection on Information Systems Strategizing: The Role of Power and Everyday Practices," *Information Systems Journal* (27:3), pp. 347-366.
- Marquis, C. 2003. "The Pressure of the Past: Network Imprinting in Interorganizational Communities," *Administrative Science Quarterly* (48:4), pp. 655-689.
- Marquis, C., and Huang, Z. 2010. "Acquisitions as Exaptation: The Legacy of Founding Institutions in the U.S. Commercial Banking Industry," *Academy of Management Journal* (53:6), pp. 1441-1473.
- Marquis, C., and Tilcsik, A. 2013. "Imprinting: Toward a Multilevel Theory," *Academy of Management Annals* (7:1), pp. 195-245.
- Mendling, J., Decker, G., Richard, H., Hajo, A., and Ingo, W. 2018. "How Do Machine Learning, Robotic Process Automation, and Blockchains Affect the Human Factor in Business Process Management?," *Communications of the Association for Information Systems* (43), pp. 297-320.
- Meyer, J. W., and Rowan, B. 1977. "Institutionalized Organizations: Formal Structure as Myth and Ceremony," *American Journal of Sociology* (83:2), pp. 340-363.
- Mills, K. G. 2018. *Fintech, Small Business & the American Dream: How Technology Is Transforming Lending and Shaping a New Era of Small Business Opportunity*. Cham, Switzerland: Springer International Publishing.
- More, T. 1516. *Utopia*. Habsburg, Netherlands: More Publishing.
- Myers, M. D., and Newman, M. 2007. "The Qualitative Interview in IS Research: Examining the Craft," *Information and Organization* (17:1), pp. 2-26.
- Nambisan, S., Lyytinen, K., Majchrzak, A., and Song, M. 2017. "Digital Innovation Management: Reinventing Innovation Management Research in a Digital World," *MIS Quarterly* (41:1), pp. 223-238.
- Nature. 2019. "The Past Matters [Editorial]," *Nature* (573:7775), pp. 464-464.
- Nayak, P. R., and Kettinger, J. M. 1986. *Breakthroughs!* New York, NY: Rawson Associates.
- Nerkar, A. 2003. "Old Is Gold? The Value of Temporal Exploration in the Creation of New Knowledge," *Management Science* (49:2), pp. 211-229.
- Newell, S. 2015. "Managing Knowledge and Managing Knowledge Work: What We Know and What the Future Holds," *Journal of Information Technology* (30:1), pp. 1-17.
- Newell, S., and Marabelli, M. 2015. "Strategic Opportunities (and Challenges) of Algorithmic Decision-Making: A Call for Action on the Long-Term Societal Effects of 'Datification'," *The Journal of Strategic Information Systems* (24:1), pp. 3-14.
- Ni Sullivan, B., Tang, Y., and Marquis, C. 2014. "Persistently Learning: How Small-World Network Imprints Affect Subsequent Firm Learning," *Strategic Organization* (12:3), pp. 180-199.
- Nonaka, I. 1994. "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science* (5:1), pp. 14-37.
- Nunes, M. B., Annansingh, F., Eaglestone, B., and Wakefield, R. 2006. "Knowledge Management Issues in Knowledge-Intensive Smes," *Journal of Documentation* (62:1), pp. 101-119.
- Oborn, E., Barrett, M., Orlikowski, W., and Kim, A. 2019. "Trajectory Dynamics in Innovation: Developing and Transforming a Mobile Money Service across Time and Place," *Organization Science* (30:5), pp. 1097-1123.

- Oertel, S., Thommes, K., and Walgenbach, P. 2016. "Organizational Failure in the Aftermath of Radical Institutional Change," *Organization Studies* (37:8), pp. 1067-1087.
- Oshri, I., Pan, S. L., and Newell, S. 2005. "Trade-Offs between Knowledge Exploitation and Exploration Activities," *Knowledge Management Research & Practice* (3:1), pp. 10-23.
- Osmundsen, K., Iden, J., and Bygstad, B. 2019. "Organizing Robotic Process Automation: Balancing Loose and Tight Coupling," *Proceedings of the 52nd Hawaii International Conference on System Sciences*, Grand Wailea, Maui, pp. 6918-6926.
- Pan, S. L., Pan, G., and Devadoss, P. R. 2008. "Managing Emerging Technology and Organizational Transformation: An Acculturative Analysis," *Information & Management* (45:3), pp. 153-163.
- Pan, S. L., and Tan, B. 2011. "Demystifying Case Research: A Structured-Pragmatic-Situational (SPS) Approach to Conducting Case Studies," *Information and Organization* (21:3), pp. 161-176.
- Papageorgiou, D. 2018. "Transforming the Hr Function through Robotic Process Automation," *Benefits Quarterly* (34:2), pp. 27-30.
- Pee, L. G., Pan, S. L., and Cui, L. 2019. "Artificial Intelligence in Healthcare Robots: A Social Informatics Study of Knowledge Embodiment," *Journal of the Association for Information Science and Technology* (70:4), pp. 351-369.
- Penttinen, E., Kasslin, H., and Asatiani, A. 2018. "How to Choose between Robotic Process Automation and Back-End System Automation?," *Proceedings of the 26th European Conference on Information Systems*, Portsmouth, UK: Association for Information Systems, pp. 1-14.
- Perkmann, M., and Spicer, A. 2014. "How Emerging Organizations Take Form: The Role of Imprinting and Values in Organizational Bricolage," *Organization Science* (25:6), pp. 1785-1806.
- Pettersen, L. 2019. "Why Artificial Intelligence Will Not Outsmart Complex Knowledge Work," *Work, Employment and Society* (33:6), pp. 1058-1067.
- Pillai, S. D., Goldfarb, B., and Kirsch, D. A. 2020. "The Origins of Firm Strategy: Learning by Economic Experimentation and Strategic Pivots in the Early Automobile Industry," *Strategic Management Journal* (41:3), pp. 369-399.
- Plattfaut, R. 2019. "Robotic Process Automation-Process Optimization on Steroids?," *Proceedings of the 40th International Conference on Information Systems* Munich, Germany: Association for Information Systems, pp. 1-8.
- Polanyi, M. 1966. *The Tacit Dimension*. London, UK: Routledge & Kegan Paul.
- Powell, W. W., and Sandholtz, K. W. 2012. "Amphibious Entrepreneurs and the Emergence of Organizational Forms," *Strategic Entrepreneurship Journal* (6:2), pp. 94-115.
- Prieto, I. M., and Easterby-Smith, M. 2006. "Dynamic Capabilities and the Role of Organizational Knowledge: An Exploration," *European Journal of Information Systems* (15:5), pp. 500-510.
- Puranam, P., Alexy, O., and Reitzig, M. 2014. "What's "New" About New Forms of Organizing?," *Academy of Management Review* (39:2), pp. 162-180.
- Rahwan, I., Cebrian, M., Obradovich, N., Bongard, J., Bonnefon, J.-F., Breazeal, C., Crandall, J. W., Christakis, N. A., Couzin, I. D., Jackson, M. O., Jennings, N. R., Kamar, E., Kloumann, I. M., Larochelle, H., Lazer, D., McElreath, R., Mislove, A., Parkes, D. C., Pentland, A. S., Roberts, M. E., Shariff, A., Tenenbaum, J. B., and Wellman, M. 2019. "Machine Behaviour," *Nature* (568:7753), pp. 477-486.

- Raisch, S., and Krakowski, S. 2021. "Artificial Intelligence and Management: The Automation-Augmentation Paradox," *Academy of Management Review* (46:1), pp. 192-210.
- Ranerup, A., and Henriksen, H. Z. 2019. "Value Positions Viewed through the Lens of Automated Decision-Making: The Case of Social Services," *Government Information Quarterly* (36:4), pp. 1-13.
- Ransbotham, S., Fichman, R. G., Gopal, R., and Gupta, A. 2016. "Special Section Introduction—Ubiquitous IT and Digital Vulnerabilities," *Information Systems Research* (27:4), pp. 834-847.
- Raviola, E., and Norbäck, M. 2013. "Bringing Technology and Meaning into Institutional Work: Making News at an Italian Business Newspaper," *Organization Studies* (34:8), pp. 1171-1194.
- Remane, G., Hanelt, A., Nickerson, R. C., and Kolbe, L. M. 2017. "Discovering Digital Business Models in Traditional Industries," *Journal of Business Strategy* (38:2), pp. 41-51.
- Reynolds, P., and Yetton, P. 2015. "Aligning Business and IT Strategies in Multi-Business Organizations," *Journal of Information Technology* (30:2), pp. 101-118.
- Rich, A. S., and Gureckis, T. M. 2019. "Lessons for Artificial Intelligence from the Study of Natural Stupidity," *Nature Machine Intelligence* (1:4), pp. 174-180.
- Ross, J. W., Sebastian, I., Beath, C., Mocker, M., Moloney, K., and Fonstad, N. 2016. "Designing and Executing Digital Strategies," *Proceedings of the 37th International Conference on Information Systems*, Dublin, Ireland: Association for Information Systems, pp. 1-17.
- Rossi, M., Mueller-Bloch, C., Thatcher, J. B., and Beck, R. 2019. "Blockchain Research in Information Systems: Current Trends and an Inclusive Future Research Agenda," *Journal of the Association for Information Systems* (20:9), pp. 1388-1403.
- Rowlinson, M., Hassard, J., and Decker, S. 2014. "Research Strategies for Organizational History: A Dialogue between Historical Theory and Organization Theory," *Academy of Management Review* (39:3), pp. 250-274.
- Sabherwal, R., Hirschheim, R., and Goles, T. 2001. "The Dynamics of Alignment: Insights from a Punctuated Equilibrium Model," *Organization Science* (12:2), pp. 179-197.
- Sambamurthy, V., and Zmud, R. W. 2000. "Research Commentary: The Organizing Logic for an Enterprise's IT Activities in the Digital Era—a Prognosis of Practice and a Call for Research," *Information Systems Research* (11:2), pp. 105-114.
- Santana, M., and Cobo, M. J. 2020. "What Is the Future of Work? A Science Mapping Analysis," *European Management Journal* (38:6), pp. 846-862.
- Sanzogni, L., Guzman, G., and Busch, P. 2017. "Artificial Intelligence and Knowledge Management: Questioning the Tacit Dimension," *Prometheus* (35:1), pp. 37-56.
- Sarker, S., Chatterjee, S., Xiao, X., and Elbanna, A. 2019. "The Sociotechnical Axis of Cohesion for the IS Discipline: Its Historical Legacy and Its Continued Relevance," *MIS Quarterly* (43:3), pp. 695-720.
- Sarker, S., Xiao, X., and Beaulieu, T. 2013. "Guest Editorial: Qualitative Studies in Information Systems: A Critical Review and Some Guiding Principles," *MIS Quarterly* (37:4), pp. iii-xviii.
- Sasaki, I., Kotlar, J., Ravasi, D., and Vaara, E. 2020. "Dealing with Revered Past: Historical Identity Statements and Strategic Change in Japanese Family Firms," *Strategic Management Journal* (41:3), pp. 590-623.

- Savage, N. 2020. "How AI Is Improving Cancer Diagnostics," *Nature* (579:March), pp. S14-S16.
- Schreyögg, G., and Sydow, J. 2011. "Organizational Path Dependence: A Process View," *Organization Studies* (32:3), pp. 321-335.
- Sebastian, I., Ross, J., Beath, C., Mocker, M., Moloney, K., and Fonstad, N. 2017. "How Big Old Companies Navigate Digital Transformation," *MIS Quarterly Executive* (16:3), pp. 197-213.
- Sergeeva, A. V., Faraj, S., and Huysman, M. 2020. "Losing Touch: An Embodiment Perspective on Coordination in Robotic Surgery," *Organization Science* (31:5), pp. 1053-1312.
- Siebert, S., Wilson, F., and Hamilton, J. R. A. 2017. "'Devils May Sit Here:' the Role of Enchantment in Institutional Maintenance," *Academy of Management Journal* (60:4), pp. 1607-1632.
- Silva, L., and Hirschheim, R. 2007. "Fighting against Windmills: Strategic Information Systems and Organizational Deep Structures," *MIS Quarterly* (31:2), pp. 327-354.
- Simsek, Z., Fox, B. C., and Heavey, C. 2015. "'What's Past Is Prologue': A Framework, Review, and Future Directions for Organizational Research on Imprinting," *Journal of Management* (41:1), pp. 288-317.
- Singh, R., Mathiassen, L., and Mishra, A. 2015. "Organizational Path Constitution in Technological Innovation: Evidence from Rural Telehealth," *MIS Quarterly* (39:3), pp. 643-666.
- Sinha, P. N., Jaskiewicz, P., Gibb, J., and Combs, J. G. 2020. "Managing History: How New Zealand's Gallagher Group Used Rhetorical Narratives to Reprioritize and Modify Imprinted Strategic Guideposts," *Strategic Management Journal* (41:3), pp. 557-589.
- Sinn, D., and Soares, N. 2014. "Historians' Use of Digital Archival Collections: The Web, Historical Scholarship, and Archival Research," *Journal of the Association for Information Science and Technology* (65:9), pp. 1794-1809.
- Slavova, M., and Karanasios, S. 2018. "When Institutional Logics Meet Information and Communication Technologies: Examining Hybrid Information Practices in Ghana's Agriculture," *Journal of the Association for Information Systems* (19:9), pp. 775-812.
- Smart, P., Heersmink, R., and Clowes, R. W. 2017. "The Cognitive Ecology of the Internet," in *Cognition Beyond the Brain: Computation, Interactivity and Human Artifice*, S.J. Cowley and F. Vallée-Tourangeau (eds.). Cham, Switzerland: Springer International Publishing, pp. 251-282.
- Sminia, H. 2011. "Institutional Continuity and the Dutch Construction Industry Fiddle," *Organization Studies* (32:11), pp. 1559-1585.
- Snyder, T., and Judt, T. 2013. *Thinking the Twentieth Century*. London: Random House.
- Soares, J. A. 1997. "A Reformulation of the Concept of Tradition," *International Journal of Sociology and Social Policy* (17:6), pp. 6-21.
- Stein, E. W., and Zwass, V. 1995. "Actualizing Organizational Memory with Information Systems," *Information Systems Research* (6:2), pp. 85-117.
- Stinchcombe, A. L. 1965. "Social Structure and Organizations," in *Handbook of Organizations*, J.G. March (ed.). London, UK: Routledge, pp. 142-193.
- Strauss, A. L., and Corbin, J. M. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. London, UK: Sage Publications.
- Suddaby, R., Coraiola, D., Harvey, C., and Foster, W. 2020. "History and the Micro-Foundations of Dynamic Capabilities," *Strategic Management Journal* (41:3), pp. 530-556.

- Suddaby, R., and Foster, W. M. 2017. "History and Organizational Change," *Journal of Management* (43:1), pp. 19-38.
- Susskind, R., and Susskind, D. 2015. *The Future of the Professions: How Technology Will Transform the Work of Human Experts*. Oxford, UK: Oxford University Press.
- Sutton, J. 2006. "Introduction: Memory, Embodied Cognition, and the Extended Mind," *Philosophical Psychology* (19:3), pp. 281-289.
- Svahn, F., Mathiassen, L., and Lindgren, R. 2017. "Embracing Digital Innovation in Incumbent Firms: How Volvo Cars Managed Competing Concerns," *MIS Quarterly* (41:1), pp. 239-254.
- Swaminathan, A. 1996. "Environmental Conditions at Founding and Organizational Mortality: A Trial-by-Fire Model," *The Academy of Management Journal* (39:5), pp. 1350-1377.
- Sydow, J., Schreyögg, G., and Koch, J. 2009. "Organizational Path Dependence: Opening the Black Box," *Academy of Management Review* (34:4), pp. 689-709.
- Syed, R., Suriadi, S., Adams, M., Bandara, W., Leemans, S. J., Ouyang, C., ter Hofstede, A. H., van de Weerd, I., Wynn, M. T., and Reijers, H. A. 2020. "Robotic Process Automation: Contemporary Themes and Challenges," *Computers in Industry* (115:103162), pp. 1-15.
- Terho, H., Suonsyrjä, S., Karisalo, A., and Mikkonen, T. 2015. "Ways to Cross the Rubicon: Pivoting in Software Startups," *Lecture Notes in Computer Science* (9459), pp. 555-568.
- Thrane, S., Blaabjerg, S., and Møller, R. H. 2010. "Innovative Path Dependence: Making Sense of Product and Service Innovation in Path Dependent Innovation Processes," *Research Policy* (39:7), pp. 932-944.
- Tim, Y., Hallikainen, P., Pan, S. L., and Tamm, T. 2020. "Actualizing Business Analytics for Organizational Transformation: A Case Study of Rovio Entertainment," *European Journal of Operational Research* (281:3), pp. 642-655.
- Tsoukas, H., and Vladimirou, E. 2001. "What Is Organizational Knowledge?," *Journal of Management Studies* (38:7), pp. 973-993.
- Tuomi, I. 1999. "Data Is More Than Knowledge: Implications of the Reversed Knowledge Hierarchy for Knowledge Management and Organizational Memory," *Journal of Management Information Systems* (16:3), pp. 103-117.
- Tushman, M. L., and Romanelli, E. 1985. "Organizational Evolution: A Metamorphosis Model of Convergence and Reorientation," *Research in Organizational Behavior* (7), pp. 171-222.
- Vaara, E., and Lamberg, J.-A. 2016. "Taking Historical Embeddedness Seriously: Three Historical Approaches to Advance Strategy Process and Practice Research," *Academy of Management Review* (41:4), pp. 633-657.
- van der Aalst, W. M. P., Bichler, M., and Heinzl, A. 2018. "Robotic Process Automation," *Business & Information Systems Engineering* (60:4), pp. 269-272.
- van der Aalst, W. M. P., and Kumar, A. 2003. "Xml-Based Schema Definition for Support of Interorganizational Workflow," *Information Systems Research* (14:1), pp. 23-46.
- Vergne, J.-P., and Durand, R. 2010. "The Missing Link between the Theory and Empirics of Path Dependence: Conceptual Clarification, Testability Issue, and Methodological Implications," *Journal of Management Studies* (47:4), pp. 736-759.

- Vertesi, J. 2012. "Seeing Like a Rover: Visualization, Embodiment, and Interaction on the Mars Exploration Rover Mission," *Social Studies of Science* (42:3), pp. 393-414.
- Vial, G. 2019. "Understanding Digital Transformation: A Review and a Research Agenda," *The Journal of Strategic Information Systems* (28:2), pp. 118-144.
- Waardenburg, L., Sergeeva, A., and Huysman, M. 2018. "Hotspots and Blind Spots: A Case of Predictive Policing in Practice," in *Living with Monsters? Social Implications of Algorithmic Phenomena, Hybrid Agency, and the Performativity of Technology*, U. Schultze, M. Aanestad, M. Mähring, C. Østerlund and K. Riemer (eds.). Cham, Switzerland: Springer, pp. 96-109.
- Wadhvani, R. D., and Bucheli, M. 2014. "The Future of the Past in Management and Organization Studies," in *Organizations in Time: History, Theory, Methods*, M. Bucheli and R.D. Wadhvani (eds.). Oxford, UK: Oxford University Press, pp. 3-32.
- Walsh, J. P., and Ungson, G. R. 1991. "Organizational Memory," *Academy of Management Review* (16:1), pp. 57-91.
- Walsham, G. 1995. "Interpretive Case Studies in IS Research: Nature and Method," *European Journal of Information Systems* (4:2), pp. 74-81.
- Walsham, G. 2006. "Doing Interpretive Research," *European Journal of Information Systems* (15:3), pp. 320-330.
- Weick, K. E. 2007. "The Generative Properties of Richness," *Academy of Management Journal* (50:1), pp. 14-19.
- Willcocks, L. 2020. "Robo-Apocalypse Cancelled? Reframing the Automation and Future of Work Debate," *Journal of Information Technology* (35:4), pp. 286–302.
- Willcocks, L., and Lacity, M. 2016. *Service Automation Robots and the Future of Work*. Warwickshire, UK: Steve Brookes Publishing.
- Williamson, K., and Sutton, J. 2014. "Embodied Collaboration in Small Groups," in *Brain Theory: Essays in Critical Neurophilosophy*, C.T. Wolfe (ed.). London, UK: Palgrave Macmillan, pp. 107-133.
- Wilson, H., and Bataller, C. 2015. "How People Will Use AI to Do Their Jobs Better," *Harvard Business Review*, pp. 2-5.
- Wright, D., Witherick, D., and Gordeeva, M. 2018. "The Robots Are Ready. Are You?," Deloitte, London, UK, pp. 1-23.
- Yates, J. 1990. "For the Record: The Embodiment of Organizational Memory, 1850-1920," *Business and Economic History* (19), pp. 172-182.
- Yeow, A., Soh, C., and Hansen, R. 2018. "Aligning with New Digital Strategy: A Dynamic Capabilities Approach," *The Journal of Strategic Information Systems* (27:1), pp. 43-58.
- Yoo, Y., Henfridsson, O., and Lyytinen, K. 2010. "Research Commentary—the New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research," *Information Systems Research* (21:4), pp. 724-735.
- Yoo, Y., Lyytinen, K., and Heo, D. 2007. "Closing the Gap: Towards a Process Model of Post-Merger Knowledge Sharing," *Information Systems Journal* (17:4), pp. 321-347.
- Yoo, Y., Richard J. Boland, J., Lyytinen, K., and Majchrzak, A. 2012. "Organizing for Innovation in the Digitized World," *Organization Science* (23:5), pp. 1398-1408.
- Zhang, N., and Liu, B. 2019. "Alignment of Business in Robotic Process Automation," *International Journal of Crowd Science* (3:1), pp. 26-35.

- Zhang, Y., Jatowt, A., and Tanaka, K. 2016. "Causal Relationship Detection in Archival Collections of Product Reviews for Understanding Technology Evolution," *ACM Transactions on Information Systems* (35:1), pp. 3:1-3:41.
- Zuboff, S. 1988. *In the Age of the Smart Machine: The Future of Work and Power*. New York, NY: Basic Books

Appendices

Appendix A: Supporting Materials of Study 1 (in Chapter 4)

Table A1. Key Literature on Emerging Technologies and Pre-digital Organisations				
Reference	Objective	Focus	Methods	Key Findings and Implications
Chanas et al. (2019)	To study digital strategy making in pre-digital organisations	Technology and strategy	Qualitative case study	<ul style="list-style-type: none"> • Pre-digital organisations require strategies for digitalising existing processes in addition to making new digital products or services
Davison and Ou (2017)	To study tensions between IT governance and workarounds	Technology, organisational culture and people	Exploratory field study	<ul style="list-style-type: none"> • Increasing number of digitally literate employees in pre-digital organisations engage in acts of bricolage or simply workarounds • Such workarounds create tensions between employees and governance structures
Sebastian et al. (2017)	To study how pre-digital organisations navigate digitalisation	Technology and strategy	Cross-case analysis of 25 companies	<ul style="list-style-type: none"> • Organisations formed in the pre-digital economy can utilise customer engagement and digitalised solutions as strategies to navigate their digitalisation journey
Davison and Ou (2014)	To study the pre-digital organisational culture	Technology, and organisational culture	Exploratory field study	<ul style="list-style-type: none"> • Pre-digital organisations face tensions between digital natives (i.e. newcomers) and digital immigrants (i.e. long-term employees)

Bharadwaj et al. (2013)	To conceptualise the combination of IT strategy and business strategy	Technology and strategy	Special issue editorial	<ul style="list-style-type: none"> • Digital technologies are fundamentally changing business strategies • Digital business strategy considers digital scope, scale, speed as well as sources of business value creation
Besson and Rowe (2012)	To understand the IS enabled organisational transformation	Technology and strategy	Literature review	<ul style="list-style-type: none"> • The key themes are organisational inertia, process, agency and performance • Organisational inertia makes transformation an important problem for research
Chen et al. (2010)	To investigate IS strategy construct and propose a typology	Technology and strategy	Literature review	<ul style="list-style-type: none"> • IS strategy is considered as an organisational level strategy • IS strategy guides IT investment and deployment decisions
Crowston and Myers (2004)	To understand the industry transformation in different perspectives	Technology and industry transformation	Literature review and exemplary industry	<ul style="list-style-type: none"> • Economic, institutional and socio-cultural perspectives are suggested to study industry level transformation enabled by technologies

Table A2. Interview Protocol for MasonMart	
Category	Questions
Your personal journey with MasonMart	<ul style="list-style-type: none"> • When and how did you join? • How did your role change since then? • What are your personal successes and battles?
MasonMart strategies and your role in strategy	<ul style="list-style-type: none"> • What is Mason's overall vision and values? • What are the future strategic initiatives? • How do you plan to achieve them?
History of MasonMart	<ul style="list-style-type: none"> • What do you know about the history of MasonMart? • What are some of the significant events in the past as you remember? • How would you describe your past work life compared to the present? • How would you imagine your future at MasonMart?
Your role	<ul style="list-style-type: none"> • What is your specific role and responsibilities? • How would you explain a regular day at work? • What are the procedures you follow? • How did you learn them? • Are they used organisation wide or only at the local store?
Use of IT	<ul style="list-style-type: none"> • Do you often use the [IT systems] or any other technologies? • For what kind of work do you use the [IT system]? • How do you work with [IT system]? Would you show a few functionalities? • What do you do with the other technologies and online networks?
Current challenges and your suggestions for improvement	<ul style="list-style-type: none"> • What are the current challenges you face in daily work life? • Do you have any suggestions for future improvements? • How do you see the application of digital technologies to solve those problems?

Table A3. List of Interviewees from MasonMart		
Role	Description	Number of Interviewees
Founder	The 97-year-old (at the time of the interview in 2019) founder of MasonMart who shared its story from the beginning to the present stage.	1
Second generation family members	The eldest son of the founder (the successive managing director), his sisters, brothers and extended family members of the second generation explaining the MasonMart history and use of technology.	7
Third generation family members	One of the grand daughters of the founder (IT manager), grand sons and extended family members of the third generation explaining their understanding of the MasonMart history and digitalisation initiatives.	3
Nonfamily managers	Managers (from outside the family) explaining their journey with MasonMart, including historical stories and strategies.	8
Long-term employees	Employees (from outside the family) explaining their journey with MasonMart, including historical stories and practices.	6
New employees	Recently joined employees (from outside the family) explaining how they learn traditional knowledge and trade practices from long-term employees and share their technological skills with them.	5

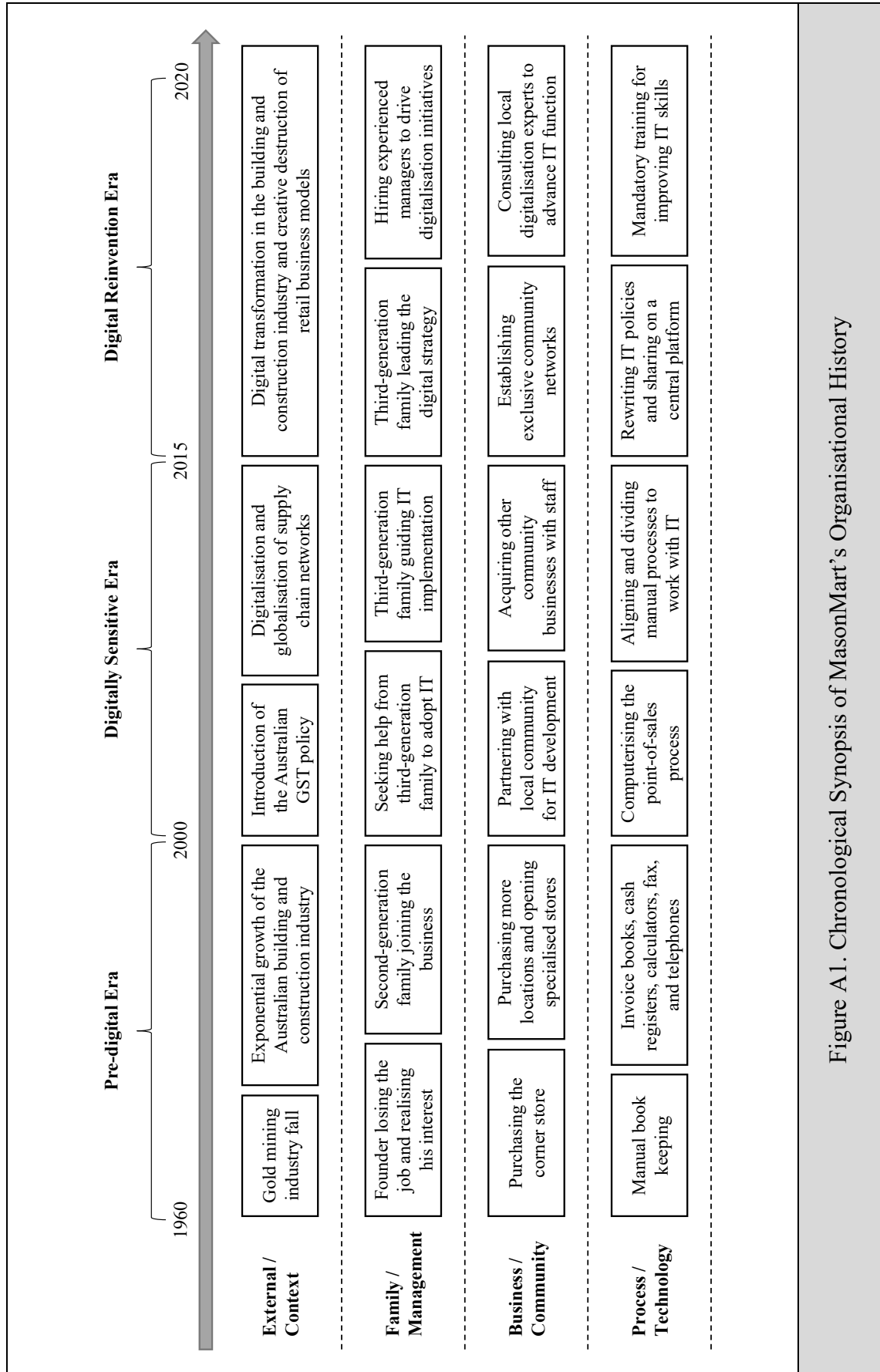


Figure A1. Chronological Synopsis of MasonMart's Organisational History

Table A4. Data Structure of the Case Study at MasonMart		
Exemplary Quotations	Second-order Concepts	Theoretical Concepts
<ul style="list-style-type: none"> • “There’s a little story that I remember dad said... I overheard, the guy that owned it, was prepared his time for a week and show these new people how it worked. And dad overheard him telling customers, “These people know nothing. They won’t last six months, and I’ll have the business back.” [laughing] So that has to drive the market a bit more.” (General manager/second-generation family, 2019, interview) • “Five decades ago [the founder] was dubbed the ‘[Local] Pioneer’. Since then he has employed, literally, thousands of people in a successful and expanding business. The 88-year-old admits he is proud of this but, for him, gratitude is the most important message on the celebration of [MasonMart]’s 50th birthday. “I thrived on the challenge of running the business,” [the founder] said “and I’d like to thank my children for going into the business and for all the support they give me”” (Local newspaper, 2011, archival) 	Founder and family generations	Imprinter
<ul style="list-style-type: none"> • “And there were sort of like a mechanical sort of machine and you’d bring in...you get the ledger card out, physical ledger card for the customer and you’d probably clean the thing and it would make the machine go to certain spots on the card” (Accounting manager/second-generation family, 2019, interview) • “It would against each ledger card was a copy statement that went over the top and it would go into the statement and also the ledger column, whether it was carbonised, I can’t quite recall. And then at the end of the month, once the invoices were processed, they were put into alphabetical order so that could be got together for that person’s statement went something like that. And then in the mid-80s, we put in a computer system to do the debtors and 	Technological history	Historical conditions

creditors” (General manager/second-generation family, 2019, interview)		
<ul style="list-style-type: none"> • “So, what we have done is, we’ve taken something small...we’ve taken something out of it and created a business. So, the first one was building supplies because they could see the value in that. These are cement and bulky builder’s materials. Then in ‘64 we opened a plumbing and supplies store. ‘65, we commenced bathroom, kitchen, and laundry appliances. Essentially, we’ve got a history of taking something out of what we’ve got and making a specialised business out of it” (Founder, 2019, interview) • “We had these invoice books and there’s still some up in the office. I know they had a carbon paper between them. So, there was three copies. The yellow copy...the top copy went with the goods with the customer. The pink copy was in the book and it was costed after the customer had left and the white copy stayed in as the first copy in the book” (Accounting manager/second-generation family, 2019, interview) 	Hereditary history	
<ul style="list-style-type: none"> • “What had happened along the way as other businesses were going into computerisation, many staff that didn’t like computers and the constraints they put on them, they’d come to us. And then we had thrust it on them” (Marketing manager, 2018, interview) • “Generally, what I teach somebody initially is the product. What questions to ask to find out what the most suitable product for that customer is. They might want solar, but it’s not going to work because they don’t have the right roof space. They don’t have the right supply. You know, they’ve got just electric but want to gas-boosted solar, but they can’t because they don’t have gas. So, asking the questions: How many people are in the house? How many kids? How long do they take in the shower? but not to ask, how much water they use and then they go, I don’t know. So then you can know how much hot water they use, and help them make the decision” (Store manager, 2019, interview) 	Disregarding digital literacy (preserving tradition and constraining technology)	Digital imprinting process

<ul style="list-style-type: none"> • “The process was just manual, while we were leveraging a little bit of technology. The other problem we had is that a customer sends us a text message, but we take the conversion from a text message to an email to get the detailed order, but I can’t text it to a department, I then need to convert that to a printed document to process, sign and file” (Sales assistant, 2019, interview) • “We looked at what’s happened in the yard instead of moving something to here and there, and came up with a way to cut down their workload. He’s color-coded it, so the north run and the south, run the West run. So when the order comes in and it’s coded, that’s a north run. That’s yellow and that goes on these racks with all the yellow stuff so they can find the paperwork or the address easily because it’s marked in yellow. You know, instead of having to read them all in order to locate where they are” (Delivery manager, 2019, interview) 	Coordinating workarounds (preserving tradition and augmenting technology)	
<ul style="list-style-type: none"> • “Well, the system did not provide a lot of reports in the beginning... you can’t just generate the reports easily out of the system. So, we’ve started extracting various reports from the system and then combining them and putting up together or just tidying them up and just give the management very simplified reports” (Data analyst, 2019, interview) • One of the testing scenarios of a function requested by [MasonMart] from the community developers: <ul style="list-style-type: none"> ▪ TEST NO 1: ▪ Aim: Receipt a Purchase Order that contains special costs via a linked Promotion. Receipt the Purchase Order using the "Receipt Details From Scanner" option and answer NO to the "Do you want to unpack and scan each product individually ?" question. ▪ Check the “Receipts to Stock Report” and G/L posting Summary report to ensure the cost has not been reverted from Promotional cost to Standard Cost (IT system documentation, 2000-2020, archival) 	Localised IT co-creating (reshaping tradition and constraining technology)	

<ul style="list-style-type: none"> • “There was really no talk about moving to computers. They were not really interested. It was too scary. But then they realised that their competitors were moving into the technical realm and decided, “Well, we better do something. So, they created an IT department and brought me in” (IT manager/third-generation family, 2019, interview) • “[General manager of operations/third-generation family] had been doing some work with us on a consultancy basis. He brought The Four Disciplines of Execution. He started it at one of the branches and it went well. Then my brother [assistant general manager/second-generation family] said, “look we better recruit him”. Then he came on board as the general manager of operations, with the aim to cut down the silos we had” (Managing director/second-generation family, 2019, interview) 	<p>Invoking future generations (reshaping tradition and augmenting technology)</p>	
<ul style="list-style-type: none"> • “So, in the early years, we were very focused on product knowledge and specialisation. But we talked about it in main meetings. Now we are focusing on attitude and train everyone for both product and digital knowledge. But we are slow learners” (Managing director/second-generation family, 2019, interview) • “Well, here we put with a buddy. Normally it’s the manager of the department or a really strong person that’s in policies, procedures, and processes and they know everything well. So, we always buddy a new person up with them so they’re never out on their own. It works really well because we were used to just get them to watch what was happening. But you don’t absorb when you’re watching. So now it’s there in place, they’re doing it. And they’re trained on the spot and they absorbed so much better. And managers also learn latest technologies from them” (Store manager, 2019 interview) 	<p>Co-developing IT capabilities</p>	<p>Impact on digital strategy</p>
<ul style="list-style-type: none"> • “It was a manual process that would happen every month. When I came in I said, “Oh, I know there’s a better way to do this,” so we moved on to an improved platform where we can, basically, upload all of that data, specifically designed database where we can 	<p>Reorganising IT policies</p>	

<p>just upload and then everyone can read. We can update those processes in a bulk manner. It is a really short time frame now. It really simplified that process. (Finance manager, 2019, interview)</p> <ul style="list-style-type: none"> • “Whenever you come in and you look at a process change and you look at a different way of doing things, it just takes time to understand why is it we do it now and then how can we do it better and then actually put that process in and do the modification” (Policy and process manager, 2019, interview) 		
<ul style="list-style-type: none"> • “We work very closely with the local community. We are a part of the plumbing group and several other community networks. We work very closely together. We are constantly mentoring each other. It’s something that many of us believe is the right way to go. Without that mentoring, without being able to rely upon somebody else to help you, it won’t work. So, we do that together a lot” (Assistant managing director/second-generation family, 2019, interview) 	Expanding local networks	
<ul style="list-style-type: none"> • “I’ve taken [general manager of operations/third-generation family] to some of our group meetings to get to familiarise themselves. We’ve spent considerable time there. He is good. He brings things to me like new technologies and he listened very well. And then I say, “What about this?” And we include them in” (managing director/second-generation family, 2019, interview) • “[IT manager/third-generation family] is the person that drives the data management system project. She is trying to lay the implementation of it and we haven’t started the project yet. Well, this was only signed off about a month or so ago, maybe six weeks ago” (Assistant managing director/second-generation family, 2019, interview) 	Inheriting digital leadership	

Appendix B: Supporting Materials of Study 2 (in Chapter 5)

Table B1. Key Literature on RPA and Organisational Processes				
Reference	Objective	Focus	Methods	Key Findings and Implications
Syed et al. (2020)	To review and synthesise existing studies on RPA	RPA and practical implications	Systematic literature review	<ul style="list-style-type: none"> • RPA studies focus on providing practical guidance • RPA lacks theoretical foundations on its design, implementation and use
Willcocks (2020)	To reframe the automation and future of work debate	Automation and the future of work	Conceptual	<ul style="list-style-type: none"> • The work is going to increase in the next few years contradicting most studies that state otherwise • There will be challenges and opportunities in adjusting skills to do the new work
Osmundsen et al. (2019)	To explore how RPA is connected with other IT systems	RPA and system integration	Case study	<ul style="list-style-type: none"> • RPA can be used to integrate existing IT systems in organisations • A central unit is introduced to control, coordinate and prioritise processes for RPA
Zhang and Liu (2019)	To analyse business alignment with RPA	RPA and strategy	Crisp-set qualitative comparative analysis	<ul style="list-style-type: none"> • A new enterprise strategy with a new leadership that has a digital-transformation perception can prompt RPA–business alignment • Low performance with stable leadership that has a digital-transformation perception can also prompt RPA–business alignment.
Davenport and Brain (2018)	To explore process improvement with RPA	RPA and process improvement	Exemplary cases	<ul style="list-style-type: none"> • RPA-enabled process transformation can bring a much higher level of performance and value

				<ul style="list-style-type: none"> • RPA in which the “P” stands for process improvement or innovation is a much more valuable tool than simple task automation.
Hallikainen et al. (2018)	To explore the hybrid organising with RPA	RPA and capabilities	Case study	<ul style="list-style-type: none"> • RPA needs different capabilities • Awareness creation among employees is crucial for RPA success • Hybrid team organising is emerging with RPA
Penttinen et al. (2018)	To explore lightweight and heavyweight IT	RPA and system integration	Case study	<ul style="list-style-type: none"> • RPA is considered as lightweight IT that is operating on the presentation layer • Lightweight IT can be a solution when the system architecture is not stable
Lacity and Willcocks (2017)	To position RPA as a new form of service automation	RPA and practical implications	Surveys and interviews	<ul style="list-style-type: none"> • Software robots can be used to amplify and augment human strengths • Organisations must create awareness and help employees understand the benefits of service automation and how it affects them
Asatiani and Penttinen (2016)	To explore business problems of RPA for teaching	RPA and practical implications	Teaching case study	<ul style="list-style-type: none"> • How to approach commercialisation of RPA? • How to align short- and long-term goals?
Lacity and Willcocks (2016)	To explore action principles for future RPA adopters	RPA and practical implications	Case study	<ul style="list-style-type: none"> • RPA can deliver faster and more accurate performance of routine back-office processes, and annual returns on investment of up to 200% • Some of the action principles are to test capabilities with experimentation and

				communicate the effects on jobs early
Willcocks and Lacity (2016)	To explore automation and the future of work	Automation and the future of work	Case studies	<ul style="list-style-type: none"> • RPA is increasingly adopted by many organisations in service sector • RPA needs new capabilities but relatively easy to learn compared with other programming systems
Lacity and Willcocks (2015)	To explore knowledge work with RPA	RPA and knowledge work	Case study	<ul style="list-style-type: none"> • The developer hoping to automate a task does not need advance programming skills • “Robots on request” allows multi-tasking with robotic co-workers • RPA does not disturb underlying computer systems

Table B2. Interview Protocol for FinServ	
Category	Questions
Background	<ul style="list-style-type: none"> • Explain my research and getting to know the interviewee • What is your current role job at FinServ? • How did you get to know about the RPA project? • Would you explain your journey with RPA?
Strategy	<ul style="list-style-type: none"> • What are the organisational strategies for automation? • Would you explain the timeline of the RPA project? • Do you see any major changes in the organisation happened because of RPA? • How do you manage the changing work roles and emerging teams?
History of FinServ	<ul style="list-style-type: none"> • What do you know about the history and formation of FinServ? • What are some of the significant events in the past as you remember? • How would you describe your past work life compared to the present? • How would you imagine your future at FinServ?
Work practices	<ul style="list-style-type: none"> • Could you explain what you are doing at work on a regular day? • How did the processes change because of RPA? (ask examples) • Did you work on process improvement for RPA? How did you do that? • How did you interact with other teams for process development? • How did you manage to work both in production and RPA projects together?
RPA	<ul style="list-style-type: none"> • When the robot flags a mistake or cannot perform a task how do you go about solving the problem? • Are you now working with the automated processes? • How do you work with the automated processes? • How did you adapt to work with the new processes? • How is this different from what you had been doing before?
Learning and knowledge sharing	<ul style="list-style-type: none"> • What were your previous knowledge/expertise? • How did you start to think about working with RPA? • How do you learn new skills to work with RPA? • How do you automate your previous process knowledge with the RPA software?
Changing nature of work	<ul style="list-style-type: none"> • Would you share your personal idea about RPA and the future of work? • Would you elaborate more about the hybrid/virtual teams? • How did you manage to work both in production and RPA projects together?

Table B3. List of Interviewees from FinServ		
Role	Description	Number of Interviewees
Managing director	FinServ is headed by the managing director, who was one of the founding directors.	1
Director, development and ICT services	The director of development and ICT services is leading all the IT and automation related projects at FinServ including the RPA project. During the interviews I understood that she was playing a main role in strategising for automation with RPA and other AI technologies.	1
Chief technology officer	The chief technology officer is responsible of managing the technical side of the IT projects. Being updated about all the upcoming technologies, sharing them among the management, and supporting to develop digital strategies is a major part of his current job compared to his old job of overseeing the IT projects.	1
Capability development manager	The HR professional FinServ hired in 2015 to handle internal employee capabilities for all the automation projects along their organisational strategy. She has been working closely with both management and employees to understand the organisational strategy and prepare the workforce for upcoming changes.	1
Project managers	Project managers from finance and HR project teams. They were assigning tasks for the employees but gave flexibility for some employees to work on RPA development work.	3
Project managers in the RPA team	Hybrid project managers, who managed finance and HR project teams, while working with the RPA team to automate the business processes of their expertise. They were supporting the RPA team to prioritise the tasks for automation. Together they made decisions on what processes are ready to be automated and what should be further reconstructed.	2
Relocated HR/finance administration employees	Employees who worked in HR/finance department handling HR/finance tasks manually and currently working with automated processes. They regularly got a report from the RPA software and report to the RPA team on issues that the software could not process on its own.	6
Relocated HR/finance administration employees who became RPA experts	RPA developers who transformed their work roles from HR/finance work to the new role of “RPA experts”. In my first data collection visit they were volunteering to implement RPA. By the time of my second visit, they have been transferred to a central RPA unit and given totally new work roles as RPA experts. The RPA experts worked together with the software as well as other employees to streamline the process automation workflow.	5

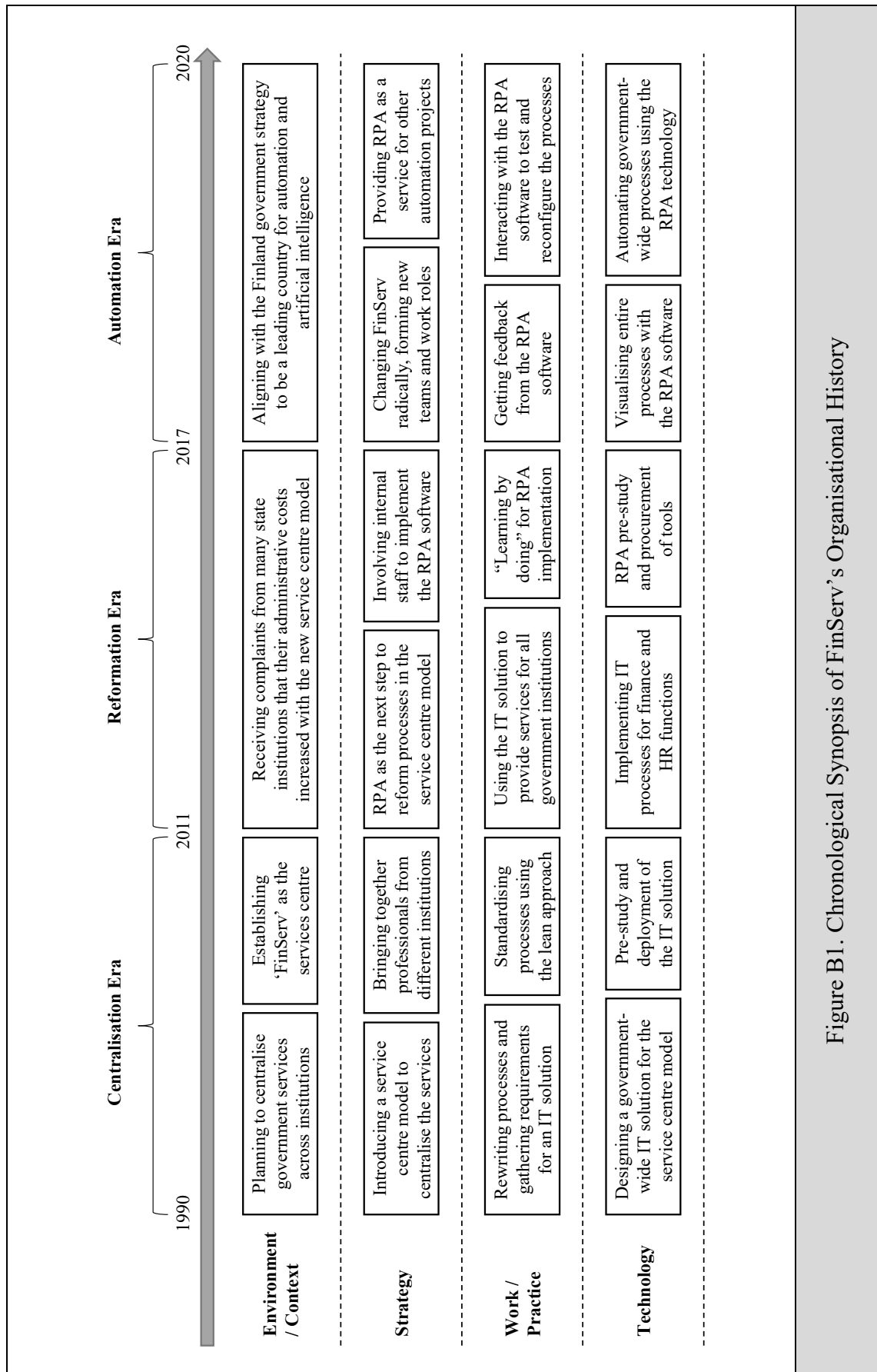


Figure B1. Chronological Synopsis of FinServ's Organisational History

Table B4. Data Structure of the Case Study at FinServ		
Exemplary Quotations	Second-order Concepts	Theoretical Concepts
<ul style="list-style-type: none"> • “It was like 10 years ago when we centralised the shared services in the government and brought these employees to [FinServ]. Early on we realised the potential of our employees” (Managing director, 2017, interview) • “My perspective is persons and especially their capabilities and learning. And I came to this organisation to improve in their inner training and knowledge of what people can do at the moment and what should they do in the future, what kind of capabilities we need linked to the strategy” (Capability development manager, 2017, interview) • “Yeah, it has taken a lot of time. It was hard for me to say to myself that you cannot know everything, you need time to learn. But it's been interesting. Every day is a really different day, and I don't regret coming here. It's been very interesting” (Relocated HR administration employee who became an RPA expert, 2017, interview) 	Perceptive reasoning	Recollecting organisational memory through human teamwork
<ul style="list-style-type: none"> • “That depends on the demands of that cooperation with process owners service production and developers. And that's the triangle which was there in the beginning when we first came here. And also, sort of, business transparency—that the business and process owners they have to tell the different parts of their processes. Okay you have written this, but you do otherwise. We have a couple of those tasks; we have realised it's too complicated. It has too many rules. So many customers are doing little variation here and there” (Relocated finance administration employee who works with automated processes, 2017, interview) • “Well, we planned for it. I was part of the planners. It gives morale to others and we started to plan that how we could implement lean to our company. And we decided that we do need a project that we all can participate, that 	Experience sharing	

employees can do what they want to do. The main objective is that the ideas come from the employees” (Project manager, 2017, interview)		
<ul style="list-style-type: none"> • “Because when you start centralisation you start to think about all the processes how do you do it and what’s the best way to do it. And we started doing payroll services at the beginning in a new way. We used to have it separate in different locations, in different groups now we’ve put it together” (Relocated HR administration employee who works with automated processes, 2017, interview) • “For an example, we used lean principles to setup our work desk. Working in two screens is the best way. And everyone is using it right and properly and somebody use only one screen and so on. So, they start thinking and then they do things what you do and after that they show it to the group, “Okay, this is how you do it.” And you give guidance to those groups—okay do this way and do this way and you can go and ask again. And after it’s working in one group the group member goes to the other groups and they tell them that we started to do this project, and this is how it’s working” (Project manager, 2017, interview) 	Collaborative re-standardising	
<ul style="list-style-type: none"> • “I’m keen on doing it and I’m very happy that it’s changing because I don’t like doing the same thing every day. And if there’s some old stuff, I would like to develop them. And I don’t mind that things change. So, it has been difficult to understand the people who don’t want to change. It’s so weird for me” (Relocated finance administration employee who became an RPA expert, 2018, interview) • “And then we thought about also the skills the staff would need there, in addition to knowledge about the finance and HR. That’s why it’s really wise to use our old staff. They have the basic skills there. And also, sort of, like innovation that you can think that, “Oh this can be done too”. And sort of like change the codes there and change the process if needed. And, of course, technical skills too but they are 	Digital self-reforming	Embedding organisational memory through human-machine knowledge codification

learnable” (Director development and IT services, 2017, interview)		
<ul style="list-style-type: none"> • “And there are no tests or nothing from the managers. It’s always a co-worker who comes and say I have learnt how to use the tool and let me show you. Everyone goes and learns from who figures it out first” (Relocated finance administration employee who became an RPA expert, 2018, interview) • “The transformation time was actually quite challenging because then you felt that pressure because then they also thought that you only work 50% for that production team. So maybe for them it was also like because you were 50% away. Then maybe that was a big challenge for the organising the work and technology” (Relocated HR administration employee who became an RPA expert, 2018, interview) 	Experimental working	
<ul style="list-style-type: none"> • “Then [the process] can be the like a workflow file or a flow chart or just an excel sheet. So, there’s a lot of possibilities how to present it with screenshots, diagrams and so on. And it really depends on the one who is doing it” (Relocated HR administration employee who became an RPA expert, 2018, RPA demonstration) • “I have in this document different parts of this workflow. This is for [the recruitment system] and clicks on what the robot has to do. I can know where the robot should click. I go to the systems and click with the robot and then it records itself” (Relocated finance administration employee who became an RPA expert, 2018, RPA demonstration) • “This is like a basic start out and the sequence which inside has a different action and I indicate on the screen what should it do. So, it looks like this. It’s like recording. There’s one click, and I have to go further and then it clicks there and then I get this. Then it has to be saved” (Relocated finance administration employee who became an RPA expert, 2018, RPA demonstration) 	Interactive assembling	

<ul style="list-style-type: none"> • “Usually robots work in the evening and night. We schedule it to work at night. There are always one or two robots which are working daytime. Usually they are working evenings and nights” (Chief technology officer, 2018, interview) • “It’s been discussed that this robot should work once in a month. Once in a month it would go through this Excel file and checks what is in there. If there is nothing new, it doesn’t do anything. But usually there are some recruitments going on. And then it sends an email” (Relocated finance administration employee who became an RPA expert, 2018, interview) • “IT or updates when what is changing, and robots can’t realise what’s happening. Some button was here yesterday, today here the robot cannot recognise to change that in the system. So, it will stop” (Relocated HR administration employee who became an RPA expert, 2018, interview) 	Automated reporting	Rewriting organisational memory through human-machine organising
<ul style="list-style-type: none"> • “So usually someone says that here’s a problem and has anyone known this or has seen this problem before, because everyone is so new. Everything is so new to us” (Relocated finance administration employee who works with automated processes, 2018, interview) • “Operations people can ask the RPA team to help to resolve the problem or sometimes if they know what went wrong, they can do it, correct it in the system by themselves. We have 14 robots. Right now, we have 10 persons to handle the robots and we will hire two more” (Capability development manager, 2018, interview) • “If the robot cannot start, it will send an email to the team and they will know that the robot couldn’t start at night and we can start it to work when we arrive in the morning. We can manually start the robot to work and sometimes that helps but sometimes it doesn’t. And then we have to decide are we going to wait or do it 	Dynamic investigating	

manually” (Relocated HR administration employee who became an RPA expert, 2018, interview)		
<ul style="list-style-type: none"> • “You can’t think RPA is coming and then it’s fine, but you have to think about all the time how the process is developing and how you’re doing it. You can’t stop that otherwise you will kill the business completely” (Director development and ICT services, 2018, interview) • “Because you need to know the rules behind why this is done this way and so on. For example, in the customer services, we rotate that they are there for six months. And then they come back to the back office and do the job and then go there because you have to have the idea how it works in the administration. Because if you only know what you see in RPA, it become hard. So, I think that's the challenging part of the work life change nowadays. If you went to the factory in the old days, you started to do the small part of the line but here you have to do. Now you have to know the processes and you have to know how to do the payroll but then you have to know the technical side of the RPA and then combine them all. So, you are really your expert of doing like wide scale of that job” (Capability development manager, 2018, interview) 	Ongoing reconstructing	

Appendix C: Supporting Materials of Study 3 (in Chapter 6)

Table C1. Key Literature on AI and the Future of Work				
Reference	Objective	Focus	Methods	Key Findings and Implications
Iansiti and Lakhani (2020)	To explore how to rebuild traditional firms to compete in the age of AI	AI and organisational disruption	Conceptual	<ul style="list-style-type: none"> • For digital start-ups and traditional firms alike, it's essential to understand the revolutionary impact AI has on operations, strategy and competition
Raisch and Krakowski (2021)	To explore automation and augmentation with AI	AI and societal impact	Literature review	<ul style="list-style-type: none"> • Augmentation cannot be neatly separated from automation • Over-emphasising either augmentation or automation fuels reinforcing cycles with negative organisational and societal outcomes
Duan et al. (2019)	To review literature on AI	AI and societal impact	Literature review	<ul style="list-style-type: none"> • There is a necessity to fully understand the synergy of AI and big data and its implications for AI use • Government plays a critical role in safeguarding the impact of AI on society
Pettersen (2019)	To discuss how and why AI systems struggle with unique cases	AI and the future of work	Conceptual	<ul style="list-style-type: none"> • AI will not outsmart complex knowledge work simply because these kinds of complex work problems contain dimensions that are never stated but that we know • 'Knowing' is difficult to code and program because, there are no generic or universal answers

Rahwan et al. (2019)	To discuss a broad research agenda to study AI across scientific disciplines	AI and machine behaviour	Conceptual	<ul style="list-style-type: none"> • Evolutionary history can generate path dependence, explaining otherwise puzzling behaviour • At each step, aspects of the algorithms are reused in new contexts, both constraining future behaviour and making possible additional innovations • Machines may exhibit very different evolutionary trajectories, as they are not bound by the mechanisms of organic evolution
Rich and Gureckis (2019)	To discuss biases in AI systems	AI and policy implications	Conceptual	<ul style="list-style-type: none"> • Decision makers, policy makers and the public should acknowledge that these systems share many of the same limitations that inhibit human judgement
Faraj et al. (2018)	To discuss the potential transforming aspects and consequences of AI	AI and the future of work	Conceptual	<ul style="list-style-type: none"> • Learning algorithms will transform expertise in organisations, reshape work and occupational boundaries, and offer novel forms of coordination and control
Elish and boyd (2018)	To problematise the myths of AI through an interrogation of the histories and practices that shape these technologies	AI and machine limitations	Conceptual	<ul style="list-style-type: none"> • When proponents of big data, machine learning and AI rely on mobilising imaginaries of AI as limitations of technological systems run the risk of undermining the power and potential of the systems that they are building on

Brynjolfsson and Mitchell (2017)	To discuss key impacts of AI on the workforce and on the economy more broadly	AI and societal implications	Conceptual	<ul style="list-style-type: none"> • Profound change is coming, but roles for humans remain • AI can be immensely powerful in domains that are more suitable for machine learning • AI competence is dramatically narrower and more fragile than human decision making
Holtel (2016)	To discuss the challenges of AI and artificial cognitive capabilities	AI and the future of work	Conceptual	<ul style="list-style-type: none"> • The arrival of AI at the enterprise pave the way to a wicked problem: it cannot be resolved by tested methodologies, given procedures and best practices • It requires a more sophisticated approach involving wider stakeholders and value systems

Table C2. Interview Protocol for VietNews	
Category	Questions
Background	<ul style="list-style-type: none"> • Explain my research and getting to know the interviewee • What is your current role job at VietNews? • Would you explain your journey with VietNews?
Strategy	<ul style="list-style-type: none"> • Would you explain the organisation vision and strategies? • As you can remember, what were the strategic decisions made over time to achieve that vision? • Why did you select AI and data for innovation? • How do you manage the changing work roles and emerging teams?
History of VietNews	<ul style="list-style-type: none"> • What do you know about the history and formation of VietNews? • What are some of the significant events in the past as you remember? • How would you describe your work life before the introduction of AI technologies? • How would you imagine your future at VietNews?
Work practices	<ul style="list-style-type: none"> • Could you explain what you are doing at work on a regular day? • How did the processes change because of emerging technologies? (ask examples) • Did you work on AI experiments? How did you do that? • How did you interact with other teams for experimenting with AI?
AI technologies	<ul style="list-style-type: none"> • How do you choose AI technologies to experiment with? • Are you now working with AI enabled processes? • How do you evaluate the storylines generated by AI with previous storylines? • How do you constantly adapt to work with the new technologies? • How is AI different from the technologies that you have been working with before?
News and other content	<ul style="list-style-type: none"> • What are the content portals that you have been involved with? • Did you notice any differences in managing content after the introduction of AI? • How do you innovate using news content? • How do you interact with the technology team?

Table C3. List of Interviewees from VietNews		
Role	Description	Number of Interviewees
Founder	The founding entrepreneur of VietNews who shared its story from the beginning to the present stage. He also shared his personal story that led to the formation of VietNews and its innovation focus with technology and local news content.	1
Co-founder	The co-founder also shared the VietNews story from its foundation. He explained the specific strategic decisions made from the aspect of business development in different customer segments.	1
Other founding members	The other members of the founding team shared their personal journey with VietNews. Those stories include both strategic decisions, innovation development and work changes in the organisation over time.	8
Head of technology infrastructure	The lead engineer who is responsible for all the digital infrastructure projects at VietNews. He joined VietNews soon after its formation, started with open source projects and guided the organisation through many innovative infrastructure development projects such as the private cloud technology and CDN.	1
Managers of media teams	Managers of content divisions explained their role in VietNews' innovation initiatives and experimenting with content creation using different technologies.	6
AI engineers	AI team lead and engineers explained the AI development process and how they experiment with in-house content and user data.	8
Data scientists	Data scientists explained how they design and develop new content. They also explained how they use applications of big data analytics to improve their content design.	6
Other employees and interns	Recently joined employees including software engineers, content developers and a salesperson explained how they adapt to innovate constantly with technology and data. They participate in innovation contests and get to work in different teams to develop both technical skills and content knowledge.	7

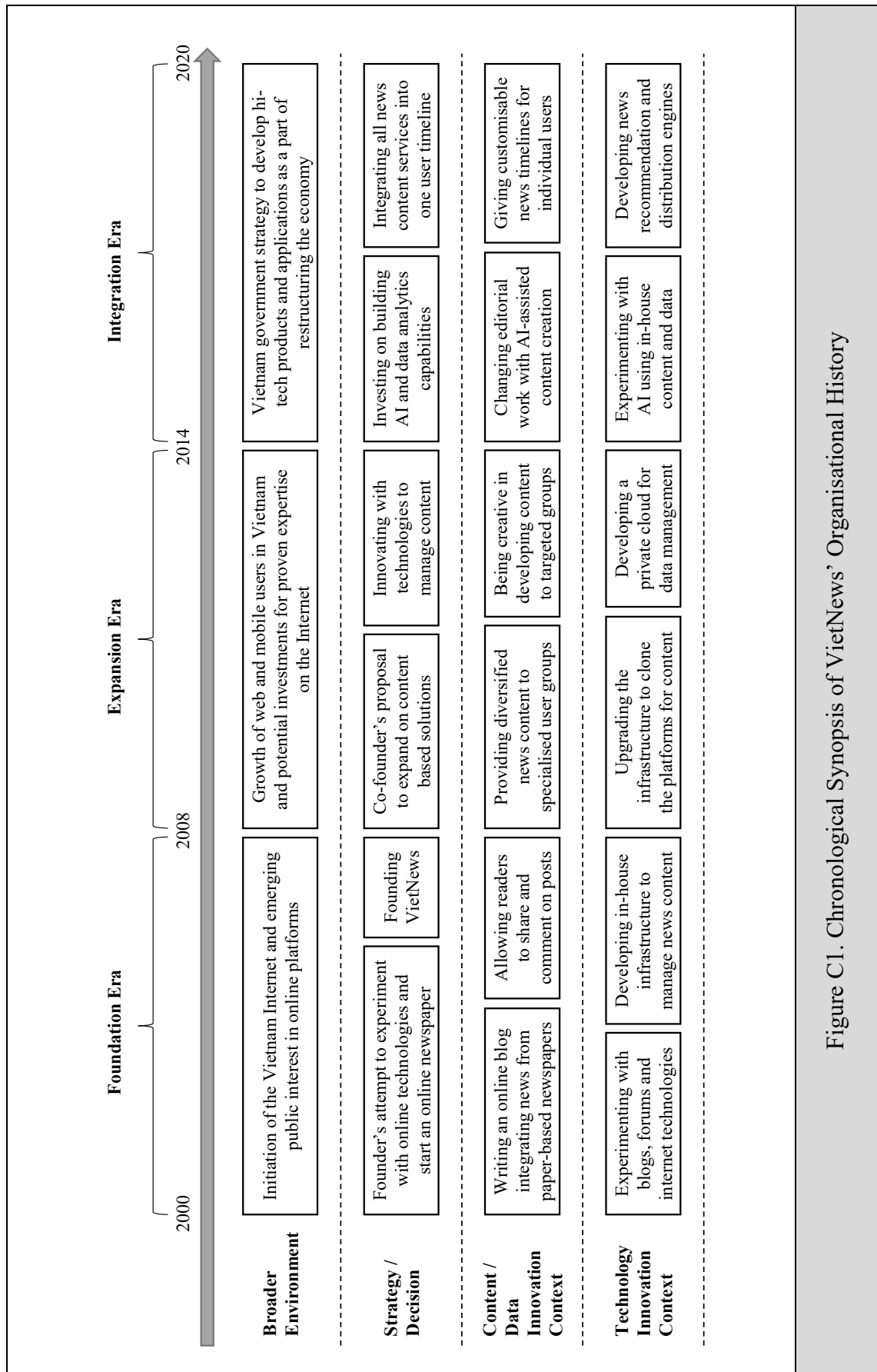


Figure C1. Chronological Synopsis of VietNews' Organisational History