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**Organisational decision-making processes  
behind incorporating Autonomous Task-  
Performing Technology and its Impact on the  
Future of Work**

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## **Abstract**

In recent years there have been mounting discussions among scholars, business people, governments, and scientists to understand the impact of emerging technologies such as automation and AI and their subsequent impact on the future of work. The concern for the future of work has primarily circulated around predictions estimating that up to half of the workforce, if not more, could be impacted by these technologies by the year 2030. Despite these predictions, there remains a need to understand the impact of emerging technologies on the future of work from the perspective of organisations, which has largely been omitted from previous research into this phenomenon. One of the prominent limitations throughout the literature circulates around the assumption that organisations will adopt these technologies. In light of this, there remains unanswered questions pertaining to the extent in which organisations will use emerging technology and whether adopting this technology inherently leads to job loss. It is vital to develop insights into what drives organisational decision-making processes to adopt these technologies to understand better the relationship between organisations, employees, and emerging technologies. When it comes to understanding the future of work, there remains a distinct difference between the impact on a job task versus an entire job. To address this, Autonomous Task Performing Technology (ATPT) has been adopted throughout this paper to reflect on how emerging technologies can impact employees to different extents.

The present study was designed to understand the organisational decision-making process behind adopting ATPT and the subsequent impact on the future of work. Two primary participant groups were identified using purposive sampling with the snowball approach to address this research, which includes a total of 34 top managers and 10 union representatives. The 34 top manager participants are made up of 17 top managers from the public sector and 17 top managers from the private sector representing twenty-two different industries/ line of work

across telecommunications, agriculture, finance, healthcare, business, education, transportation, technology, architecture, energy, technical services, engineering, retail, produce, manufacturing, finance, social services, marketing, research, legal, environment, and emergency services. The data with top managers were collected using in-depth semi-structured interviews with an average interview time of just over 1 hour which translated to over 34 hours in total of interview recordings. The 10 union representatives consisted of four participants from the public sector and six from the private sector covering six different industries spanning across finance, education, business, retail, transportation, and healthcare. Data collected with union representatives utilised the critical incident technique to understand the impact of ATPT on employees from incidents where organisations adopted ATPT with an average interview time of over 25 minutes. Although the design of this research was to understand the organisational decision-making processes behind adopting ATPT, it remained critical to understand this phenomenon from both perspectives of top managers and unions. Triangulation was used to compare and analyse the data using thematic analysis with the Framework method between top managers and union representatives. This approach provided valuable insight into how organisations adopt ATPT and how the impact is experienced by employees.

The findings from this research place distinct emphasise on how ATPT does not inherently predetermine job loss. Rather, the findings capture the highly variable nature of organisational adoption of ATPT and the subsequent impact on the future of work through the development of the ATPT impact Framework. The ATPT impact Framework was conceptualised through the underpinning of three core themes in this research: organisational drivers behind ATPT adoption, scenarios of ATPT adoption, and the outcome of organisational adoption of ATPT on employees/ and the future of work. Ultimately, the future of work is not determined by the capabilities of ATPT, but rather by the ATPT impact Framework and the ethical responsibility of organisations to use ATPT responsibly. The impact of ATPT on the

future of work does not fall on the shoulders of organisations alone, but rather requires an ongoing collaboration and open dialogue between organisations, government, policy makers, scholars, employees and unions to establish a form of good practice and ethical responsibility behind adopting ATPT as society continues to navigate through the challenges of how to effectively use ATPT.

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# CHAPTER 1: INTRODUCTION

## 1.1. Background

The notion of the fourth industrial revolution (Schwab, 2017) has emerged amidst ongoing discussions among scholars, business people, governments, and scientists to understand the impact of emerging technologies such as automation and Artificial Intelligence (AI) on the future of work (Mrowinski, Brougham, & Tappin, 2019). These discussions have been ongoing ever since the concept of AI was first coined by mathematics professor John McCarthy at Dartmouth College in 1956 (Moor, 2006), which has led to a limitless array of possibilities for the use of AI, including the extreme polarising views of either a dystopian or utopian future of work (Canhoto & Clear, 2020; Kearney, Wojcik, & Babu, 2020; Morris, 2004). While the dystopian future of AI has been a concept more likened to science fiction, there remains a cautionary approach from business magnates with the likes of Elon Musk raising concern around AI being the biggest threat to humanity and encouraging a form of “regulatory oversight, maybe at the national and international level, just to make sure that we don’t do something very foolish” (Gibbs, 2014, p. 1). On the other end of the spectrum, business magnate Jack Ma raises the potential for AI to lead to a more utopian future resulting in fewer working hours and a better quality of life (Locke, 2019). Although arriving at either end of the spectrum (or possibly somewhere inbetween) is likely to occur at incremental stages, Neubert and Montañez (2020) believe the difference between arriving at either a utopian or dystopian future will align with what ethical framework businesses use when adopting such technology. Understanding the ethical framework behind technology adoption and use remains highly relevant, considering the historical implications technology has had on the workforce during previous industrial revolutions.

History suggests that while technology can introduce profound benefits to society, it can also result in profound consequences with wide-scale disruption across the employment

landscape. Such effects have been witnessed dating back to the first industrial revolution in the 1760s, which marked the first prominent period of technological disruption with the emergence of steam power and the subsequent establishment of the factory system (Ashton, 1948). The factory system largely replaced old working methods, where entire industries were made obsolete in favour of technology capable of reducing costs while enhancing production capabilities. This sparked the first of many employment trends, which saw the workforce move from agriculture to manufacturing and presently the service sector (Dosi & Virgillito, 2019). Although the previous industrial revolutions witnessed widescale disruption, there has always been a chronological path of transition, moving from one industry to the next.

With automation and AI on the horizon, mounting predictions estimate the fourth industrial revolution will have the same, if not greater, impact on employment than previous industrial revolutions due to technology becoming increasingly more capable of performing both physical and cognitively demanding jobs. This raises further uncertainties as to whether AI and the fourth industrial revolution will mark the end for the workforce or if AI will continue the trend of recent industrial revolutions and lead to the emergence of new industries because of technological capabilities.

To further explore the background of this issue concerning the context of this thesis, the next section of this chapter (sub-section 1.1.1) enters a discussion towards defining emerging technologies in the fourth industrial revolution which will be used throughout this thesis. This is followed by one of the core issues with sub-section 1.1.2 presenting a preliminary discussion of emerging technologies and the predicted impact on the future of work. Later sections of this chapter address the decision-making processes (DMP) behind incorporating emerging technologies (section 1.2), and the closing segments of this chapter address the problem statement (section 1.3) followed by section 1.4 which outlines the research question for this thesis.

### **1.1.1. Understanding Emerging Technologies in The Fourth Industrial Revolution**

Both automation and AI have been widely, and somewhat erroneously, used since their inception in the mid-1900s. It has only been in the last decade or so where AI and automation have entered the forefront of emerging technology with viable solutions being integrated by organisations. Despite this, there is still an open and undistinguished vagueness surrounding definition of both automation and AI this vagueness will be addressed in sub-section 1.1.1.1 on automation and 1.1.1.2 on AI.

#### *1.1.1.1. Automation*

Automation was first defined in the early 1940s, when Harder, the vice-president of Ford Motors referred to the “automatic handling of discrete parts between progressive processing operations.” (Weinberg, 1955, p. 63). At the time, automation was characterised as mechanical automation capable of impacting physically demanding jobs, such as the introduction of the automatic conveyor belt in manufacturing. Since then, the concept of automation has transformed into what Rizk et al. (2020) define in terms of as the process of specifically designing software capable of automating simple and repetitive tasks including the likes of chatbots, and general business process tasks. This largely includes cognitive aspects of a job such as workflow improvement, decision making, task automation, form filling, chatbot, and data mining (Rizk et al., 2020), which we are already seeing emerge across businesses throughout New Zealand and across the globe. While automation capabilities are predicted to continue to grow, early indicators suggest that automation will have a significant impact on routine and repetitive jobs within the next decade, particularly within the service sector (Acemoglu & Restrepo, 2019c). Automation is largely restricted to the programming and coding of routine and repetitive jobs due to the lack of the ‘intelligence’ component which is one of the primary components which distinguishes AI from automation.

### *1.1.1.2 Artificial Intelligence*

With AI still largely in the developmental phase, there has been an abundance of literature attempting to define exactly what AI is. While almost all aspects of automation could theoretically be considered as AI, AI goes one step further than automation by requiring what Wang (2019) considers the ‘intelligence’ component, which is not required for the automation of routine and repetitive jobs. Silver et al. (2017) further recognise the intelligence component as being central towards defining AI, where they outline the objective to achieving AI as an “algorithm that learns” (p. 1). Additionally, Kaplan (2016) associates the core characteristics of AI as the creation of “computer programs or machines capable of behavior we would regard as intelligent if exhibited by humans” (p. 1). One of the most significant breakthroughs towards achieving AI has been widely recognised as ‘AlphaGo Zero’, which demonstrated the capability to learn the board game ‘Go’ without any supervision or human input (Silver et al., 2017). While more breakthroughs are expected in the coming years, evidence suggests technological capabilities are still years away from reaching any viable business solution towards achieving AI. Such evidence is presented in the findings provided by Atkinson (2018), Goasduff (2019) and Walsh (2018), which all predict AI to be decades away from being developed. Thus, despite the excessive use of the term of AI throughout the media and businesses alike, the technology likely to impact workforce in the present day is automation, with AI expected to impact the workforce in the near future as it continues to be developed. This comes as a report produced by McKinsey Global Institute in 2017 estimates that up to 30% of job tasks have the potential to be automated with currently available technology (Manyika, 2017). While this report may impose a dampening outlook on the future of work, there remains little evidence indicating how automation will actually impact employment, with scarce insight available into the organisational DMP behind incorporating such technology. This can best be recognised as an understanding that automation and AI alone do not impact

employment, but rather require a form of decision as to how such technology will be used. The concept of organisational DMP around the use of emerging technologies has been addressed in greater detail in sub-section 1.1.1.3.

### *1.1.1.3 Autonomous Task Performing Technology*

While the capabilities of emerging technology such as automation and AI have the potential to result in significant disruption across the workforce (as previously discussed in sub-sections 1.1.1.1 and 1.1.1.2), there remains a disconnect in the literature towards recognising the relationship between organisational DMP to adopt emerging technology and the subsequent impact on the future of work. This disconnect has largely persisted due to a lack of literature around organisational DMP behind the adoption emerging technology, and the numerous terminologies which have been included and at times overstated in the literature. Automation inherently implies technology replaces employees with little insight into how organisations are using the technology, while notions of AI, robotics (Franceschetti, 2018), and machine learning (Kelleher, 2019) represent a more advanced baseline from automation with the capability to exhibit human capabilities both physically and cognitively (Kaplan , 2016). What remains heavily uncertain is whether organisations are using emerging technology to replace employees like for like, or there are other strategic DMP which influence how technology is being used. To address this disconnect, this thesis has adopted the use of Autonomous Task Performing Technology (ATPT) which has been defined by Mrowinski, Tappin, and Brougham (2021) as “the practical application of disruptive technologies that have the capability to independently and autonomously perform physical and cognitive aspects of a job task that a worker would otherwise perform” (p.14).

Expanding on the definition of ATPT, there are two core components which need to be emphasised. Firstly, the use of ‘Autonomous’ refers to the technological capability of emerging technology which has the ability to perform a job or job task that a worker would otherwise be

able to perform. The use of ATPT draws upon the ‘task-based’ framework developed by Acemoglu and Restrepo (2019b), which recognises that organisational jobs are broken up into tasks for labour allocation purposes. Furthermore, ATPT moves away from the standard use of a particular technology such as automation and places more emphasis on the capabilities of the technology which is required to understand the impact on the future of work. The second aspect is in recognition of the ‘Task Performing Technology’ component which takes into consideration the organisational DMP behind how organisations make decisions about incorporating such technology into organisational operations and the subsequent impact on the workforce. The recognition of the Organisational DMP behind adopting ATPT is critical for the context of this thesis and its wider contribution to existing literature.

One of the key contributions of this research is the ‘ATPT Impact Framework’ which draws upon key drivers behind organisational adoption of ATPT to reflect on the highly variable nature behind how ATPT can lead to a positive and/or negative outcome on the future of work. This is particularly important for the context of this research as the ATPT Impact Framework provides much needed insight into how the adoption of ATPT does not necessarily equate to the loss of jobs which has been heavily predicted throughout the literature. It is not to say jobs will not be impacted by ATPT in the future, but rather highlights the importance of recognising the organisational DMP behind ATPT adoption to understand the relationship between organisations, ATPT, and the impact on the future of work. Organisational insights into the adoption of ATPT was a key component missing throughout existing literature which the findings of this research aim to address. Although the ATPT Impact Framework comes into fruition through the results and discussion sections in Chapter 5 and Chapter 6, it is important to present the contribution at the forefront of this research as it provides a contextual overview and direction of this thesis.

The following two sections will introduce current research into the impacts of ATPT on the future of work (section 1.2) and the subsequent DMP which is critical to understand how organisations actually intend to use ATPT (section 1.3).

## **1.2 Predictions of ATPT on The Future of Work**

As ATPT becomes more readily available over the next decade, there is mounting concern around what impact such technologies will have on the future of work. Predictions around the notion that ‘robots will take our jobs’ have been circulating since the concept of AI was first introduced. This has become a more immediate concern in recent time due to the rapid increase in technological developments we are now witnessing. To date, there has been an increased presumption that ATPT will impose a negative impact on the future of work (Stewart, De, & Cole, 2015) with routine and repetitive jobs being labelled as highly susceptible to ATPT (Acemoglu & Restrepo, 2019c). This comes as leading research predicts the likely impact of ATPT on the future of work within the United States, with estimates that as few as 9% (Arntz, Gregory, & Zierahn, 2016) and as many as 60% (Bowles, 2014) of jobs will be affected by ATPT by the year 2030 (Lund et al., 2019). Since these estimations have been presented there has been heightened concern as how ATPT will impact the future of work across a range of disciplines including strategic management, governance, education, employment, Human Resource Management, business ethics, and unions.

Despite predictions from Frey and Osborne (2017) estimating up to 47% of jobs could be impacted as a result of ATPT in the future, there remains little insight indicating how organisations intend to incorporate ATPT into organisational operations. This lack of organisational insight largely contributes towards what Stewart et al. (2015) emphasise as an increasing bias throughout the literature due to an inherent tendency to associate ‘impact’ with a negative connotation such as the displacement of workers (Petropoulos, 2018) and shortage of work (Schwab, 2017) leading to what is commonly identified as a dystopian future.

While the negative impact may be drawing upon comparisons to previous industrial revolutions which resulted in significant disruption across the employment landscape, it is important to recognise how both society and business practice have evolved vastly since then, which has led to significantly improved employment conditions since the First Industrial Revolution (Noble, 2017). For instance, ATPT also has the potential to have a positive impact on the future of work including job creation (Gartner, 2017), improvement of employee skill-sets (Bresnahan, Brynjolfsson, & Hitt, 2002), and introduction of more meaningful work (Berg, Dutton, & Wrzesniewski, 2013), and more rewarding jobs (Bresnahan et al., 2002). Despite recognition of the potential positive impacts of ATPT, there remains a longstanding notion that ATPT will ultimately result in mass unemployment unless measures are taken to offset the negative impact ATPT will have on the future of work (Agrawal, Gans, & Goldfarb, 2019; Makridakis, 2017; Trist, 1981). However, with scarce research around organisational DMP, little certainty can be given as to how organisations intend to incorporate ATPT and the subsequent impact on employment. This highlights one of the critical components of this thesis where social construction of organisational DMP is required to understand how employees are likely to be impacted as a result of ATPT as there is no guarantee organisations will use the technology to replace employees directly, as assumed by the literature to date. Further to this point, while the present section focused on presenting insight into current research throughout the literature, the following section (section 1.3) expands on the concept of ATPT through presenting the significance of understanding organisational DMP behind incorporating ATPT.

### **1.3 Decision-Making Processes Behind Incorporating ATPT**

While there are mounting predictions that ATPT will result in significant disruption across the employment landscape, there are still significant limitations in the research due to a lack of recognition and acknowledgement for the role organisational DMP plays when it comes to understanding the impact of ATPT on the future of work. The significance of understanding



the organisational DMP is due to the complex dimensions of the ever-changing systems in which organisations operate, including business ethics and subsequent frameworks which can be used to help guide businesses to make informed ethical decisions (Ferrell & Fraedrich, 2016; Hatch, 2018). While there is currently no organisational DMP (in relation to ATPT adoption) presence in the literature, a workable solution to understand the reason for the exclusion can be partially linked to the assumption of the capitalist system, where organisations act in their own best interest when it comes to the adoption of technology, including the adoption of ATPT for their own financial advantage (Smith, 2007). On this basis, it can be loosely assumed organisations would adopt ATPT for its potential benefits such as higher outputs and improved business performance and reliability (Chui, Manyika, & Miremadi, 2015). However, this does not guarantee every process is suitable for adopting ATPT (Santos, Pereira, & Vasconcelos, 2019) or that corporate governance aligns with the use of ATPT (Cihon, Schuett, & Baum, 2021). While previous industrial revolutions saw a lack of corporate governance, this has become more prominent in recent years, which requires additional acknowledgement in this thesis.

In previous industrial revolutions, the capitalist system had serious implications for the workforce, with little regulation and few organisational policies when it came to investing and adopting technology. This meant organisational decisions were able to be driven predominantly by the best financial outcome with little consideration of the consequences for wider social implications including the deterioration of employment rights at the time (Commons, Andrews, & Perlman, 1918; Mokyr, 1998). It is important to note that, when raising this issue, this thesis is not attempting to align with a type of luddite movement, but rather address the issues to establish good practice moving forward as ATPT becomes more prominent throughout the fourth industrial revolution. It is fair to make the assumption that organisations will follow the same patterns as previous industrial revolutions by favoring technology. It is, however, also

important to consider whether ongoing developments in corporate capitalism, such as the promotion of greater accountability and the consideration of social implications, will shape organisational DMP. One clear example of this is the emergence of Corporate Social Responsibility (CSR) (Madrakhimova, 2013) where Kazmi, Leca, and Naccache (2016) highlight the impact that CSR is having on organisations, whereby improved corporate financial performance is becoming increasingly linked to positive corporate social performance. To explore this issue, this thesis will reflect on Stakeholder theory as a wider component of CRS which is required to understand how all stakeholders (including social contracts) influence organisational DMP (Freeman & Dmytriiev, 2017). Ultimately, unlike previous industrial revolutions, the fourth industrial revolution is fostered with an array of developments across employment and social rights, stakeholder expectations, and business good practice, which have the potential to shape how ATPT feature in organisational DMP.

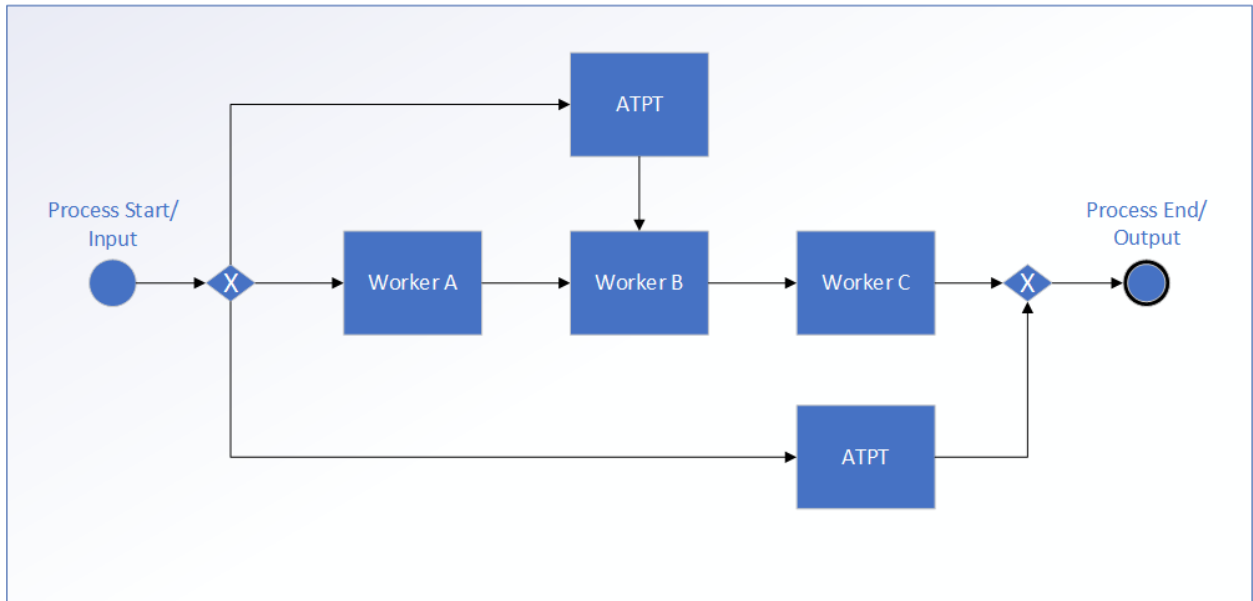
The recognition and involvement of organisational DMP remains a vital element of this thesis as it formulates a pathway away from specific technological capabilities (such as AI and automation) and places more emphasis towards understanding practical applications behind how organisations make decisions. Simply put – just because a form of ATPT exists does not guarantee it will result in the loss of jobs. To clearly distinguish this, the following section (section 1.3.1) presents a theoretical scenario on the significance of organisational DMP when adopting ATPT.

### **1.3.1 Scenario of Organisational Adoption of ATPT**

While ATPT is predicted to have a significant impact on employment, it is important to recognise that ATPT is likely to impact a job and job task in different ways. As outlined earlier, a report produced by McKinsey Global Institute in 2017 estimates that up to 30% of job tasks have the potential to be automated with currently available technology. In contrast to this, only 2% of entire jobs have the potential to be automated with currently available technology

(Manyika, 2017). Spitz-Oener (2006) define a job as a form of responsibility which often comprises multiple functions or tasks which need to be performed to complete the job. In reflection of the 2017 report produced by McKinsey Global Institute, this largely indicates that while a job task may be impacted by ATPT, if a job consists of seven job tasks and only one job task is automated, the employee has the potential to still perform six other job tasks. This in turn comes back to the organisational DMP, which are necessary to understand how an employee will be impacted if one or several job tasks are impacted by ATPT.

Agrawal, Gans, and Goldfarb (2018) recognize the core purpose of a job or job task as taking an input and processing an output for organisational distribution depending on the general function of the organisation. Take ordering an item for example as seen in Figure 1, where Worker A is responsible for confirming the availability of an item. Worker B is responsible for confirming payment and Worker C for sending the order. If confirming the availability of an item was automated (Worker A's job task), the input would go directly to Worker B to confirm the payment., and then on to Worker C for sending the item. Subsequently, if all three job tasks were automated, ATPT could check availability, confirm the payment, and arrange for shipment without any human intervention.



*Figure 1: Scenario of ATPT impact on organisational processing/employment*

While this is but a theoretical model, the main issue this alludes to is the DMP behind incorporating ATPT and the outcome as to how employees might be impacted. Simply put, just because Worker A's job task is automated does not guarantee that Worker A will be made redundant. It is predicted that the impact of ATPT on job tasks will be more significant than its impact on entire jobs (Chui, Manyika, & Miremadi, 2016). There is, however, still limited understanding as to the organisational DMP behind the adoption of ATPT, and there is also uncertainty around what is ethically and socially acceptable when it comes to the incorporation of ATPT by organisations. More so, research to date has the tendency to associate the term 'impact' with job loss (Acemoglu & Restrepo, 2019c; Brynjolfsson, Mitchell, & Rock, 2018) as opposed to potential work redesign as well as understanding what the relationship between ATPT and employees might look like.

Due to the limitation of organisational DMP behind adopting ATPT in the literature, there is a need for this thesis to construct this social reality. The literature shows that there is a limited understanding of organisational DMP behind the adoption of ATPT, and this thesis aims to construct this social reality. To assist in the process, the thesis reflects on three

theoretical underpinnings: organisation theory, stakeholder theory and sociotechnical systems theory which will be introduced in the following sub-section (section 1.3.2)

### **1.3.2 Theoretical Underpinnings of Organisational Decision Making Processes**

It is important to address early in this sub-section the relationship between theory and research used in this thesis. The relationship between theory and research used in this thesis will be discussed in greater depth in Chapter 7. It is likely that this section on ‘theoretical underpinnings’ will cause confusion concerning the approach taken by this research, namely whether it uses a standard deductive or an inductive theoretical approach (Bryman & Bell, 2015). While the inclusion of theoretical underpinnings alludes to a deductive approach, this thesis was initially more aligned towards an inductive approach due to the nature of enquiry through constructing the organisational DMP behind adopting ATPT. However, due to the inherent and complex nature in which organisations operate, it became vital to draw upon theory to break down the complexity of organisational DMP behind adopting ATPT and the impact on the future of work.

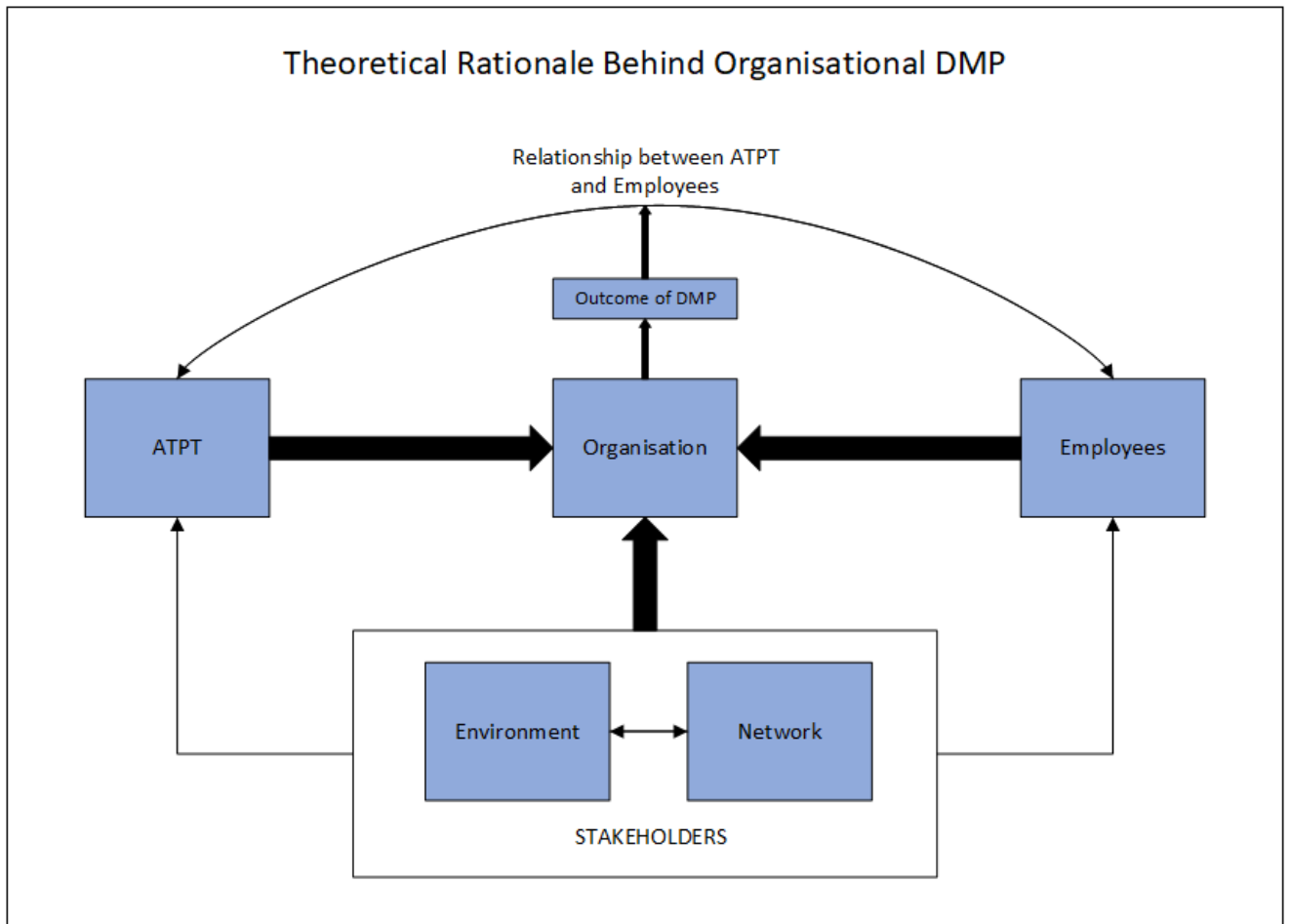
While the theories recognised in this thesis do not deduce a form of hypothesis, they deserve equal recognition for the contribution they have played towards shaping the direction of this research. Taking this into consideration, this research applies an abductive approach (Tavory & Timmermans, 2014) as this thesis draws upon organisation theory, stakeholder theory and STS theory to assist in the process towards unravelling the complexity of the issue.

The recognition of organisation theory has played a crucial role in designing the line of enquiry for this research through its ability to conceptualise the organisational network and environment spanning across multiple interrelated layers including employees, customers, unions, competitors, economy, social, political, and technology (Hatch, 2018). Further to this,

organisation theory recognises technology as a core component through the creation of an input leading to an output (Cunliffe & Luhman, 2012) which was discussed earlier in section 1.3.1, with Figure 1 detailing the input/output scenario of ATPT impacting organisations/employment. While this theory does not drive this research, it assists with the compartmentalisation of the business process behind adopting ATPT.

While components of organisation theory acknowledge the influence of stakeholders, the recognition of stakeholder theory in this research is required to reinforce the ethical implications of organisational DMP (Gibson, 2000) which is an important consideration when it comes to reflecting on the implications of DMP for the future of work. The implications of organisational DMP leads into the final (and most critical) theory recognised in this thesis. Sociotechnical systems (STS) theory brings together the core components of this thesis to understand how organisational DMPs impact the adoption of ATPT, and how the subsequent adoption of ATPT affects the future of work. This feeds directly into STS theory through understanding the relationship between employees and ATPT (Trist, 1981). While this seems to be a positivist approach, this thesis recognises the near impossibility of understanding a singular truth behind the organisational DMP behind adopting ATPT. Without getting too deep into research paradigms which will be covered in depth in Chapter 7, the focal point of this research is approached through interpreting how organisations make decisions and the subsequent impact on the future of work.

To support the theoretical rationale behind the collective combination of these three theories, Figure 2 below displays the initial representation at a high level. As discussed earlier in this sub-section, the inclusion of these three theories is designed to conceptualise the complexity behind organisational DMP while also forward looking to the relationship between ATPT and employees which is attributed to STS theory and the potential ethical implications this has.



*Figure 2: Theoretical rationale to interpret complexity of organisational DMP*

Primarily, the theoretical rationale contributes to identifying the gap in the literature by compartmentalising the complexity of organisations. It is worth noting that, despite the use of these three theories, this research does not formulate any form of assumption such as the requirement to take stakeholder expectations into consideration when making decisions.

Up until this point of the thesis, the focus has been to provide an overview of the impact ATPT is predicted to have on the future of work while recognising the limitation of organisational DMP throughout the literature. The following section (section 1.4) of this thesis summarises this through introducing the problem statement followed by the research question in section 1.5.

## **1.4 The Problem Statement**

Despite mounting predictions estimating ATPT will have a significant impact on the future of work, organisational DMP has been consistently excluded from the literature when these predictions have been made. This is highly significant as many of these predictions have been made without recognition of how organisational DMP might influence the way ATPT impacts the future of work. Due to the complex environment in which organisations operate, there is no guarantee what shape or form ATPT adoption will look like, or, more importantly, whether adopting ATPT actually leads to the reduction of jobs. This further highlights the significance of recognising STS theory in this research through conceptualising the relationship between organisations, employees, and ATPT and what the outcome of this relationship might look like – i.e. will employees be the users of ATPT as opposed to ATPT displacing employees. Earlier research into managers' perceptions of automation and artificial intelligence summarises this clearly, where simply because a form of ATPT exists “does not guarantee it will fit within business operations” (Mrowinski, Brougham, & Tappin, 2020, p. 87). Insight into organisational DMP will help to understand this process while establishing potential solutions identified throughout the DMP to identify good practice behind incorporating ATPT. Taking this into consideration, the following section (section 1.5) presents the research question for this thesis.

## **1.5 Research Questions**

Continuing on from the discussion on the problem statement in section 1.4, this thesis is designed to address the primary question: what are the organisational decision-making processes behind incorporating ATPT and the subsequent impact on the future of work? In addition to the primary research question, this research is further designed to address three subsidiary questions to support in understanding this phenomenon:



1. Identification of the key drivers behind organisational adoption of ATPT across the public and private sectors.
2. Identification of the impact that ATPT adoption will have on employees.
3. Identification of ethical practice that underpin organisational decision-making processes behind adopting ATPT.

To address the primary research question and the three sub questions, top managers within the organisational hierarchy who are responsible for the institutional decision making and organisational strategy (Hatch, 2018) have been identified as the participants for this research. The rationale behind identifying top managers is due to the relevant information they hold regarding knowledge responsible for the DMP and organisational oversight.

In addition to top managers, union representatives have also been identified as participants for this research. While the focus of this research pertains to organisational DMP, it is important to triangulate the findings to ensure that both perspectives are recognised. This importance is further reiterated through reflecting on STS theory, where to understand the relationship between organisations, ATPT, and employees, both organisations and employee perspectives require equal consideration in this research. In depth rationale behind the identification of participants is discussed in Chapter 7.

Current research to date provides a much-needed insight into how ATPT will impact the future of work by estimating the number of jobs expected to be automated (Frey & Osborne, 2017; Lund et al., 2019), and by understanding employee perceptions on the future of work (Brougham & Haar, 2017). This study intends to expand on this by including both organisations and unions to help bridge the gap between organisations and employees to promote social dialogue between the two.

The primary motivation behind this research is to address the current knowledge gap of the organisations' DMP behind the adoption of ATPT and the subsequent impact on the future of work. This thesis is intended to introduce the significance of organisational DMP to the literature while creating a social dialogue between organisations, unions, researchers, and policymakers to collaboratively manage the impact of ATPT on the future of work and to establish a form of good practice as ATPT becomes more prominent throughout the fourth industrial revolution.

To establish the both the direction and significance of this research question, Chapter 2 introduces the literature review framework which was used to conduct an in-depth review of the literature throughout the duration of this thesis.

# **CHAPTER 2: LITERATURE REVIEW**

## **2.1. Introduction**

The structure of this chapter has been broken down into several key sections which take into consideration the literature review methodology followed by the current literature and themes relevant to this research. To help guide the audience through this extensive chapter, the sequential order of this chapter begins with the literature review methodology (section 2.2) to explore the framework used to conduct the literature review. Proceeding the literature review methodology, this chapter presents the relevant literature that emerged which consists of five sections that cover the historical impact of technology in section 2.3, technological trends (section 2.4), ATPT and the future of work (section 2.5), Decision Making and Stakeholder Theory (section 2.6), and concludes with the final section on sociotechnical systems theory in section 2.7. The structure of this chapter presents a short summary at the end of each section to encapsulate the essence of the literature discussed and to provide a clear transition point between the sections that embody this chapter.

## **2.2. Literature Review Methodology**

Documenting the systematic process that was used to conduct the literature review remains one of the ongoing strategies adapted to maintain ongoing transparency throughout this thesis. The premises for maintaining greater transparency is built of both Baker (2000) and Xiao and Watson (2019), who recognise the need to improve the detail behind the literature review methodology to ensure validity, reliability, repeatability, and transparency are adhered to. The relevance of documenting the literature review process is not only beneficial to the audience of this research, but also to assist in the management of identifying and using relevant literature ranging from filtering, collecting, reviewing, and analysing the literature. To conduct the

literature review, two approaches were taken into consideration consisting of a traditional literature review and a systematic literature review.

A traditional approach has been classified by Jesson, Matheson, and Lacey (2011) as the process of conducting a conceptual and critical review of the literature. A conceptual and critical review entails establishing patterns and trends to identify gaps in the literature. In the context of this research, a traditional approach held certain appeal through the ability to provide a comprehensive analysis of the gaps and inconsistencies concerning the organisational DMP, ATPT, and the future of work. However, the use of a traditional approach has not come without challenges due to the limitation of reputable literature within the domain of research. Since the beginning of the 21<sup>st</sup> century, concepts including automation, AI, and the future of work generated frequent social interest that has led to an inundation of discussion and opinion papers, which at times, has overshadowed genuine research. And where genuine research was conducted, insight into organisational adoption of ATPT has generally been excluded from future of work predictions. On a more positive note, the historical implications of technology have been well documented throughout the literature, which an essential requirement to the future of work literature as it establishes a valuable foundation to interpret the potential impact of ATPT.

One of the criticisms of a traditional approach posited by Petticrew and Roberts (2008) pertains to the lack of methodology in comparison to the explicitly defined criteria of a systematic literature review. According to Petticrew and Roberts (2008), the use of systematic literature reviews adheres to a more rigorous scientific method designed to reduce bias and synthesize all relevant literature. A systematic literature review maintains certain similarities with a traditional approach, through the process of mapping areas of uncertainty and gaps throughout the literature (Petticrew & Roberts, 2008).

With consideration for both a traditional literature review and systematic literature review, the decision was made to apply a blended approach across the two literature review practices. The justification for a blended approach was primarily down to both the challenges surrounding limitations of the literature and the scale of literature review required to establish gaps and inconsistencies within the domain of this thesis. In recognition of these two requirements, a systematic system was necessary to support what Jesson et al., (2011) labelled as the process of filtering the literature through identification, screen, eligibility, and final inclusion criteria. More specifically, the literature review methodology adopted the use of PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analysis) framework which Moher, et al., (2010) defines as the systematic process of identifying, screening, eligibility refinement for the final phase of inclusion in the literature review. This approach to the literature enabled the ability to build the foundational body of knowledge required to understand the research problem (Paré, Trudel, Jaana, & Kitsiou, 2015) while having a documented methodology in place for how the literature review was conducted (Xiao & Watson, 2019). The use of the PRISMA framework particularly important when it came to the refinement of the literature search criteria to ensure that the searches were able to be repeated across multiple databases and at different times throughout writing this thesis.

The process of conducting the literature review can be comprehended in three phases throughout the duration of writing this thesis. The first phase of the literature review was conducted during the period from 1 May 2019 to 4 September 2020. This initial period was solely dedicated to conducting the literature review while shaping the direction of the research. The second phase of the literature review was established through the importance to constantly review the literature to identify new articles. This phase was conducted on a monthly basis between the period of 5 September 2020 to 28 October 2021. However, the second phase consisted of more restrictive filters on the literature with a specified date range from 2019

onwards to ensure only newly published articles were captured. This further iterates the importance of the use of the PRISMA framework to ensure that the research results were recorded and able to be repeated. The importance of repeating the literature searches at regular intervals is to ensure that any relevant newly published articles were captured (Baker, 2000). The third and final phase of literature review was conducted between 29 October 2021 to the 31 January 2022 just prior to thesis submission. This final phase consisted of revisiting the literature to validate the relevance of this thesis and to ensure no new critical literature emerged prior to thesis submission.

The following section (section 2.1) presents the inclusion/exclusion criteria for the literature review which was used in practice with the PRISMA framework.

### **2.2.1. Literature Inclusion/Exclusion Criteria**

As outlined in section 2.2, the literature review for this thesis was approached using a traditional method in support of the systematic review process. The use of a systematic approach with the PRISMA framework was predominantly designed to support with the review process due to the large sample of literature identified which included 3244 articles. To support the literature review process, a four phase PRISMA approach was adapted from Moher et al., (2010), which consists of identification, screening, eligibility, and literature included for full review which can be seen in Figure 3 on the following page.

To conduct the literature review for this thesis, several databases were regularly used including: Business Source Complete, Google Scholar, Discover, Scopus, and Index New Zealand. These databases were identified individually with the support of subject librarians at Massey University to ensure no key databases were overlooked. Applying searches to multiple databases proved beneficial throughout the literature review as Scopus and Index New Zealand expanded the search results for articles that were not initially identified using more generic

databases like Google Scholar and Discover. The use of multiple databases for this literature review further established the need to adopt the PRISMA framework to ensure search criteria for each database was recorded for future use. The importance of replicating the literature research is heightened in this domain of research due to new articles regularly published throughout the year.

One of the early challenges for this thesis was to narrow down the literature review to ensure only relevant articles were identified due to search results across the various databases producing over one million results per search. To begin refining the populated results, the types of literature included in the literature search was specified to only journal articles, books, book chapters, webpages, grey literature, and hand searching. To further refine the literature search results peer-reviewed journals, English language, and a date range from 2004 onwards was applied. The justification for dating the literature search back to 2004 (and not more recently) was to ensure early publications within the field of automation and artificial intelligence were captured. This was an important distinction as factory automation was widely used between the period of 1950's to the late 1990's.

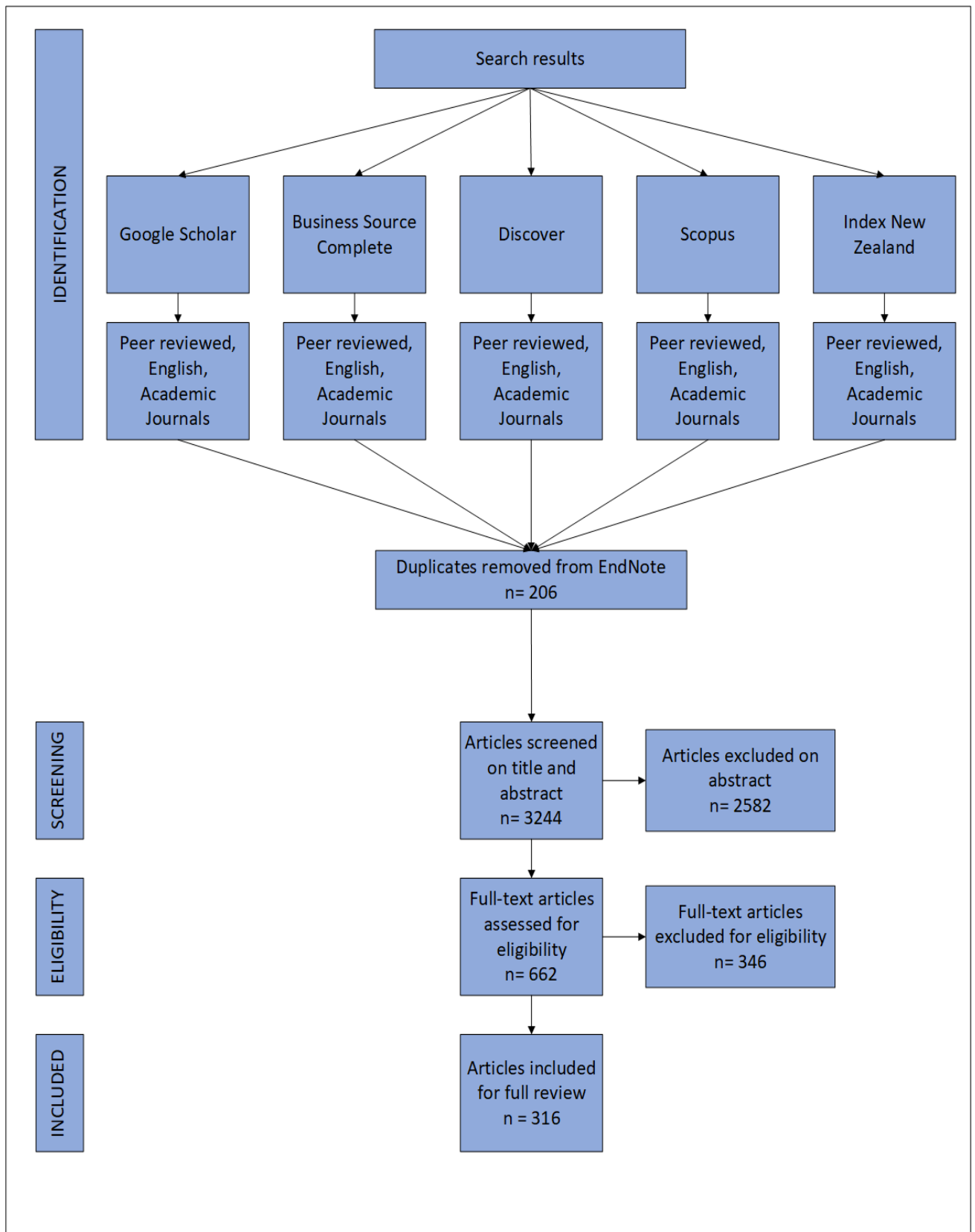


Figure 3: Literature Review and the four phases of the PRISMA framework (adapted from Moher et al., 2010).



However, on this note, there were two exemptions to the 2004 date criteria. The first exception criteria was the historical impact of technology on employment which required an open date range in the literature search due to relevant articles being published as early as the 1800's. The second exemption was hand searching which was conducted without a date range due to identifying specific articles. Search results were documented and saved to repeat the searches in intervals of three weeks to identify newly published journal articles (Ridley, 2012). Table 1 on the following page outlines the research terms and refinement criteria which were used throughout the literature review.

Initially, the key search terms started with the 'impact of automation on employment'. This expanded throughout the course of the literature review through each layer of enquiry as the body of knowledge continued to expand. When relevant literature was identified, the articles were exported to EndNote, which was used to order and manage all bibliographical references. The use of EndNote further enabled the ability to make commentaries on each article and outline the significance for the research. Each article was also cross checked against the references used to identify any significant literature which was used through hand searching. This method of handsearching acted as a cross check against the literature search to ensure that no vital articles were overlooked.

In total, 3244 articles were identified, exported, and reviewed for the first phase of screening in EndNote. The screening was conducted in accordance with standard practice for a systematic approach by reviewing the title and abstract of the articles (Jesson et al., 2011; Moher et al., 2010). The inclusion/exclusion screening criteria was based off the PRISMA checklist (Prisma., 2019) which included screening questions on the basis of rational, objectives, methods, and discussion/results (Page et al., 2021). The decision to not include certain articles was made on the basis that they either drawing too much attention away from

Key search terms	Refinement criteria	Database
<ul style="list-style-type: none"> <li>Automation</li> <li>Artificial intelligence</li> <li>Robotics</li> <li>Machine intelligence</li> <li>Disruptive Technology</li> </ul>	<ul style="list-style-type: none"> <li>English language</li> <li>peer-reviewed journals</li> <li>Types of literature:                             <ul style="list-style-type: none"> <li>journal articles,</li> <li>books, book chapter,</li> <li>webpages, grey literature</li> </ul> </li> <li>Date range after 2004</li> <li>Hand searching</li> </ul>	<ul style="list-style-type: none"> <li>Business Source Complete</li> <li>Google Scholar</li> <li>Discover</li> <li>Scopus</li> <li>Index New Zealand</li> </ul>
<b>AND/OR</b>	<u>Exemptions to criteria:</u>	
<ul style="list-style-type: none"> <li>Employment</li> <li>Future of Work</li> <li>Technological change</li> <li>Industrial sociology</li> <li>Industrial Revolution</li> <li>Division of labour</li> <li>Social impact</li> <li>Stakeholders</li> <li>Responsibility</li> <li>Organisation theory</li> <li>Meaning of work</li> <li>Business ethics</li> <li>Decision-making</li> <li>Relationship with employees</li> <li>Work redesign</li> <li>Sociotechnical systems theory</li> <li>Employee skill sets</li> <li>Corporate Social Responsibility</li> </ul>	<ul style="list-style-type: none"> <li>Literature on historical impact of technology on employment dates back to 1800's.</li> <li>Hand searching</li> </ul>	

Table 1: Key search terms adopted in the literature review

the scope of this research, used as a pathway to approach the subject matter (i.e., published literature reviews) or were used as an additional resource to establish background resource for in-depth knowledge of the subject. Due to the nature of this research being in an infancy phase, large proportions of literature consisted of commentary on existing research which was one of the regular outcomes for exclusion.

Following the initial screening criteria, the articles identified were reduced from 3244 to 662 identified in the eligibility phase. The eligibility phase followed the same review criteria using the PRISMA framework. However, in addition to only reviewing the title and abstract (as in the screening phase), the eligibility phase also reviewed consisted included the introduction, method, and results section of the articles. Following this process, this resulted in a further refinement of the literature with only 316 articles identified as included in the literature review for full in-depth review of the literature.

One of the ongoing challenges of this thesis has been the limited literature of organisational DMP behind the adoption of ATPT. Because of this limitation, clear gaps were identified while also attempting to bridge the gap between existing literature to forge a pathway forward. While this has marked a brief chapter, it was paramount to establish the methodology used due to the complex process when conducting a wide scale literature review.

### **2.2.2. Summary**

In summary, this section documented the methodological approach used to review the literature which consisted of a blended approach between a traditional literature review and a systematic literature review using the PRISMA framework. The PRISMA framework led to recognisable benefits that were perceived not only in the literature review component, but the underpinnings of this thesis. The underpinning benefits were evident through the ability to effectively manage and refine the literature for gap analysis leading to greater refinement of the research questions.

This was particularly relevant for this present research due to limitations of the literature requiring the need to establish links and bridge the gap between various and in some instances unrelated literature.

One of the links established through the literature review is evident in the next section (section 2.2). Section 2.2 presents the importance of understanding the historical impact of technology through the lens of previous industrial revolutions as a mechanism to produce insight on what this could mean for ATPT and the future of work.

### **2.3. Historical Impact of the Industrial Revolution**

The notion of technology impacting the workforce has been a prominent issue dating back to the early 1760's, a period that Ashton (1948) and Toynbee (1969) define as the 'first industrial revolution' which saw the establishment of factories harnessing steam power to mass produce goods and services. The first industrial revolution gave rise to significant disruption across both the employment and social landscape which saw the way people live and work drastically change from a state of proto-industrialisation to industrialization through steam power replacing the old ways of working (Gutmann & Leboutte, 1980; Houston & Snell, 1984). Since then, the notion of 'industrial revolution' has been widely used throughout the literature including the second industrial revolution in the 1870s with the emergence of electricity (Mokyr, 1998) followed by the third industrial revolution in the 1950s with computer power (Greenwood, 1999; Stearns, 2018). Now, there is the belief society is heading towards the fourth industrial revolution (Schwab, 2017) with the emergence of ATPT with the likes of automation and AI on the horizon.

While the core focus of this thesis is to understand organisational DMP behind adopting ATPT and the impact on the future of work, it remains important to present the historical implications of technology from previous industrial revolutions to construct a foundational platform on what this might mean for the future of work. One of the common complexities associated with presenting the industrial revolution is the nature where technology has historically impacted different regions and countries across the globe at different times, with some parts of the world yet to experience the technology introduced in the first and second industrial revolutions (Outman & Outman, 2003). One prime example of this is the comparison between Britain and the United States. The first industrial revolution emerged in Britain in the mid 1700's (Broadberry, Campbell, & Van Leeuwen, 2013; Gregg, 1966), but it was not until the mid 1800's where the United States started to see similar levels of industrial impact

(Atkeson & Kehoe, 2007; Deane, 1979). Outman and Outman (2003) and Toynbee (1969) attribute one of the key reasons behind delay in the industrial revolution going beyond Brittan was due to strict government regulation at the time prohibiting other countries from gaining access to the technology or the relevant blueprints to develop the technology. While the timing of the industrial revolutions is important, this thesis will place restraint on entering the debate on the specific occurrence of each industrial revolution as it places an unnecessary divergent on the focus of this research.

To explore the historical impact of the industrial revolution on the workforce, this section of the literature has been divided into two key sub-sections. The first section (section 2.3.1) covers the literature on technological trends during the industrial revolution. The second section (2.3.2) focuses on how the technological trends have impacted both the employment and social landscape, including employment displacement, division of labour, and changes to employment rights, which transpired throughout the course of the industrial revolutions to date. The structure of this section provides a more narrative view of the literature to establish a theoretical background of the impact and drivers behind previous industrial revolutions to reinforce the implications of current predictions that ATPT is expected to have on the future of work in the fourth industrial revolution.

### **2.3.1. Technological Trends During the Industrial Revolution**

*“The Industrial Revolution did not start with a formal declaration, or with mobs storming a fortress of the old order, or with dramatic speeches and slogans that would move the hearts and minds of men and women for generations afterwards – Instead, the Industrial Revolution took place one small step at a time”*

(Outman & Outman, 2003, p. 9)

One of the common complexities which has been reiterated throughout this chapter is around presenting literature on technological innovation is due to the nature in which different countries experienced the impact of the industrial revolution at different rates. A clear example of this was raised by Schwab (2017) who recognised how some third world countries today have still been unable to industrialise with a lack of access to electricity, running water, and the internet, which were technologies and infrastructure introduced in the second and third industrial revolutions. However, this section of the chapter attempts to break through this inconsistent phase of technology by recognising the core characteristics and technological trends which occurred throughout the previous industrial revolutions. This section on technological trends during the industrial revolution is broken down into two additional subsections which explore the classification of technological change (section 2.3.1.1), and technological trends (section 2.3.1.2). These classifications and trends establish vital connections with emerging ATPT capabilities which have deepening implications on what this could mean for the future of work.

### *2.3.1.1. Classification of technological change*

Understanding technological change has been a reoccurring issue of importance throughout the literature, and more so than ever with the rapid advancement of technological capabilities such as ATPT. Freeman (1984) developed a three-measure classification system to interpret the phases involved with technological change. The first of the three measures is classified as ‘incremental innovations’, which Freeman (1984) defines as the minor changes in technological capabilities, but still important in relation to technological progression. The second measure is recognised as ‘radical innovation’ which is identified as significant form technological development such as nylon or polyethylene which predominantly comes into effect once incremental innovations reach maturity. The final measure is recognised as ‘technological revolutions’ which is technology that leads to a pervasive effect throughout the

economy and the workforce with drastic reduction in costs of products and services such as electric, steam power (Freeman, 1984). Technological revolutions, also known as industrial revolutions for the purpose of consistency, are widely recognised as the most gradual out of the three measures due to the reliance on both incremental innovations and radical innovations to mature into an technological revolution occurs (Ettlie, Bridges, & O'keefe, 1984; Inauen & Schenker-Wicki, 2012; Perez, 1983). The industrial revolution has largely been accepted to have occurred in three instances or phases ranging between the first industrial revolution in the mid 1750's to the third industrial revolution in the 1950's. An alternative approach to recognising the three levels of technological change was presented by Perez (1983) in the form of a logistic curve.

One of the important components the logistic curve addresses is the recognition that an industrial revolution is far from an instantaneous process. Rather, is it made up of radical innovations in combination with incremental innovations. Perez (2009) recognises radical innovations as a primitive version of the eventual technology, which typically requires incremental innovations until market acceptance and technology maturity is achieved, which at that point can be considered an industrial revolution. Freeman (1984) goes on to further define a industrial revolution as representing “a major change of paradigm affecting almost all major managerial decisions in many branches of the economy” (p. 499). One clear example of this is the steam engine. Although it took several attempts to create a practical and workable version of the steam engine, without additional incremental innovations such as the railway track to developed in the initial radical innovation phase, the steam engine would have had little market value (Outman & Outman, 2003).

While there has been a significant focus in the literature on the impact of technology on employment, Perez (2009) raises the benefits of radical and incremental innovations through the creation of “new products, services and even whole industries, building upon the innovative



space inaugurated by the initial radical innovation” (Perez, 2009, p. 7). This is an important consideration in the scope of understanding the impact of ATPT on the future of work – while ATPT may displace jobs in the future, it also has the potential to create new jobs at the same time through the creation of new products, services, and industries. One approach taken by Bresnahan and Trajtenberg (1995) is to categorise what technology constitutes an industrial revolution is through the recognition of what they define as ‘general purpose technology’, which consists of multiple radical and incremental innovations resulting a wide spread impact on the workforce and society. General purpose technology is defined as technology that has the potential for further innovational complementarities, such as how steam power and electricity formed a baseline for technological innovation with the likes of the steam engine, light bulb, and telecommunications (Bresnahan & Trajtenberg, 1995). The fourth industrial revolution is predicted to be no different, with general purpose technology expected to occur through both artificial intelligence and renewable energy (Brynjolfsson et al., 2018; Makridakis, 2017).

While each industrial revolutions has gone through the similar process of radical and incremental innovation, there remains similar trends which have emerged through what technology constitutes and industrial revolution and the subsequent incremental innovations such as a new form of energy and transportation, which will be presented in the following section (section 2.3.1.2.) on technological trends.

### *2.3.1.2. Technological trends*

Since the emergence of the first industrial revolution in the 1760’s there have been regular technological trends which have accompanied subsequent industrial or technological revolutions. Such trends have typically included a new energy source and form of transportation (Makridakis, 2017; Perez, 2009; Prisecaru, 2016). Typically, as a new form of energy is harnessed, a new form of transportation developed and a new form of communication

is established that utilises the newly discovered energy source (Prisecaru, 2016). The fourth industrial revolution is expected to be no different with the emergence of renewable energy, autonomous driving and 5G as seen in Table 2 on the following page which summarises the emerging technologies and the trends which have occurred throughout each industrial revolution.

As society edges ever closer to the fourth industrial revolution, questions begin to emerge as to what technology is on the rise and how it will impact the future of employment. Makridakis (2017) categorizes the industrial revolutions to date into three distinct phases: industrial revolution (mechanical power), digital revolution (computer power), and AI revolution (brain power). In parallel with the shift from mechanical power to computer power, employment has also changed from farm to factory and presently the service sector, with each shift coinciding with some form of technological or industrial revolution. This heightens the concern for the future of work with technology such as AI predicted to impact both physical and cognitive demanding jobs.

While the main technological breakthrough for the fourth industrial revolution, there is the expectancy that this will eventually be AI once it has been achieved. While renewable energy and 5G are not direct offsets off ATPT, they remain closely connected towards becoming a more digitised world which is likely to be one of the changes introduced by the fourth industrial revolution (Borchert et al., 2020). An example of this is an electric autonomous car, which is a combination of both artificial intelligence and renewable energy. The rise of the autonomous car is predicted to have a large impact on both the workforce and the social environment, transforming both the transportation industry and people's way of living (Herrmann, Brenner, & Stadler, 2018). Although the energy source, transportation, and communication is still in ongoing development, the trends suggest once this technology becomes available there is likely to be some form of disruption across the workforce.

<p><b>Industrial revolution (mechanical power) - first and second Industrial Revolution</b> Substituting, supplementing and/or amplifying routine manual tasks</p>	<p><b>Digital revolution (computer power) – Third Industrial Revolution</b> Substituting, supplementing and/or amplifying standardized mental tasks</p>	<p><b>AI revolution (brain power) – Fourth Industrial Revolution</b> Substituting, supplementing and/or amplifying practically all mental and physical tasks</p>
<p>1712 Newcomen's steam engine 1784 Watt's double action steam engine 1830 Electricity 1876 Otto's internal combustion engine 1890 Cars 1901 Electricity in homes 1914 Continuous production line 1919 Electricity in one-third of homes <b>Actual use of</b> 1950s Electrical appliances 1960s Cars 1970s Long-distance telephones 2010 Unattended factories</p>	<p>1946 ENIAC Computer 1950s IBM's business computers 1970s Electronic data processing (EDP) 1971 Time-sharing computers 1973 Microprocessor 1977 Apple's computer 1980s Computers with modems <b>Actual use in 2015</b> 2015 61% of Americans use smartphones 2015 Amazon most valuable US retailer (surpassing Walmart) 2015 37% of employees in USA work from home (full-time or part-time) 2015 Collecting/Exploiting Big Data</p>	<p>1990 Neural net device reads handwritten digits 1993 Robot Polly navigates using vision 1997 Deep Blue defeats the world chess champion 1998 Robotic toy Furby learns how to speak 2005 Robot ASIMO serves restaurant customers 2009 Google's first self-driving car 2011 Watson computer beats Jeopardy's 2016 AlphaGo defeats GO champions using <b>Widespread use of</b> 202? Computer translations 202? Self-driving cars 202? Deep neural learning 203? Machines reach human intelligence</p>
<p><b>Energy Source:</b> Oil and Electricity <b>Transportation:</b> Steam Engine and Car <b>Communication:</b> Morse code</p>	<p><b>Energy Source:</b> Nuclear Energy and Natural Gas <b>Transportation:</b> Plain and Car <b>Communication:</b> Telephone</p>	<p><b>Energy Source:</b> Renewable Energy <b>Transportation:</b> Autonomous Car <b>Communication:</b> 5G</p>

Table 2: Technological Trends of the Industrial Revolution (adapted from Makridakis (2017); Outman and Outman (2003); Prisecaru (2016); Toynebee (1969)).

It is important to note that these technological breakthroughs alone did not cause the industrial revolution, but rather the multitude of incremental innovations which arose from the breakthrough radical innovations which was discussed in the previous section of 2.3.1.1. Further to this point, Bresnahan and Greenstein (1996) recognise the process for technology to develop and be integrated into business operations follows the diffusion process which requires businesses to find viable solutions to use the technology. Subsequently, Hall and Khan (2003) believe the diffusion process this can either delay or speed up an industrial revolution depending on the suitability for organisations to adopt ATPT. The recognition of the diffusion process suggests that technology does not inherently replaces jobs, but rather is subject to how the technology is adopted by organisations. The prevailing association of the diffusion process with the future of work will be presented more in-depth in section 2.4 on the impact of ATPT on the future of work.

Continuing from technological development and trends, section 2.3.2 reflects on the historical implications of technology across both the employment and social landscape.

### **2.3.2 Implications of the Industrial Revolution on the employment and social landscape**

The purpose of this section is to understand the impact that technology has historically had on both the social and employment landscape through sociology of work and social economy lenses. The significance behind applying a sociology of work and social economic lenses is through the recognition that an industrial revolution is not only defined by the emergence of a new form of technology (as discussed in section 3.1), but also the subsequent impact the technology has on employment in combination with the social behaviours (Wieser, 2013) which contributes towards the adoption of technology. As outlined earlier in this chapter, the emergence of the industrial revolutions has not been a chronological sequence of dates with

different regions and countries experiencing the impact of the industrial revolution at different rates.

From this standpoint, this section of the thesis has been approached from the general impacts of the industrial revolution both employment and society in general. This section has been divided into three key sub-sections which is approached from a social economic standpoint to understand the relationship between social patterns which contributed towards the drive behind the industrial revolution. Section 2.3.2.1 introduces the social economic drivers which are widely recognised throughout the literature as key contributors towards the industrial revolution. This will be followed by section 2.3.2.2 on the impact of the industrial revolution on employment. The social impact and employment impact are important to present in different sub-sections due to the underlying relationship that sociology has in understanding the two interconnected issues. In the realm of sociology, this is particularly important as it provides an understanding of history to avoid making the same mistakes while also preparing for the emergence of ATPT. The closing segment of this section provides an overview in section 2.3.2.3 and the significance historical impact of technology in relation to the future of work.

### *2.3.2.1 Social Economic Drivers Behind the Industrial Revolution*

While it is easy for this thesis to focus solely on the historical impact technology has had on employment, the social landscape deserves equal recognition due to the significant role the social economy had in shaping the perfect conditions required enable the previous industrial revolutions to flourish. Quarter, Armstrong, and Mook (2009) broadly define social economy as the bridge between organisations social objectives to their economic objectives through the services they provide. Everling (1997) attributes the foundation of social economy to the combination of capitalism, economics, political theory and urban geography as the core premises for the construction of society. Further to this definition, Quarter et al. (2009)

developed a framework to represent the interactive nature between the social economy with the private and public sectors as seen in Figure 4 below. The interactive framework developed by Quarter et al. (2009) on the relationship between the social economy, private and public sectors is a vital component of not only this chapter, but this thesis, as it expands on the component of organisation theory through the relationship organisations have with their environment and how organisations react to the supply and demand of the social economy.

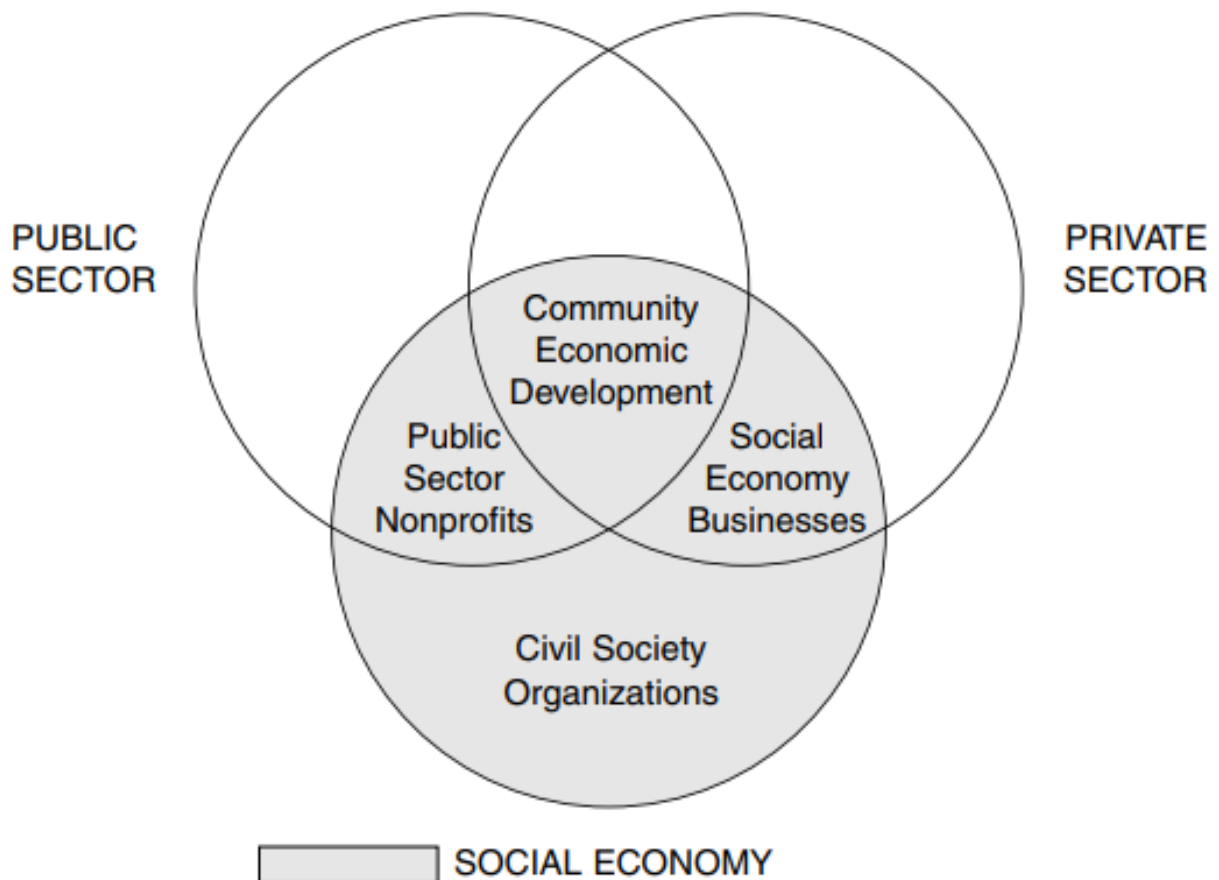


Figure 4: *The Social Economy: An Interactive Approach* (Source: Quarter et al. (2009, p. 7))

To put this into perspective in relation to this thesis, Toynbee (1969) established the connection between technology and society was due to the rapid increasing demand for products. This demand for products laid the foundation for the economic objective which organisations established as a mass production solution through the use of steam power and later enhanced by electricity and robotics. On this basis, Mantoux (1961) summarized

attributed the cultivating demand for produce down to two key areas of rapid social transformation: rapid population increase and mass migration to urban areas. It is paramount to approach this from a sociological standpoint to develop a robust understanding the social economy has towards shaping the pathway for industrial revolutions.

To explore the underlying social economy behind the industrial revolution this section has been divided into two sub-sections representing the two key areas of social transformation identified by Mantoux (1961) as the rapid population increase and mass migration to urban areas. It is important to note that there is no straightforward way to present this section due to what Schwab (2017) recognised as the inconsistencies between countries experiencing the industrial revolution at different times throughout history. To address this, the literature inclusion criteria focuses on an Anglo-Saxon model with a primary focus on the Britain and the Unites States as the two countries which is widely recognised by Ashton (1948), Broadberry et al. (2013), Matthias (1983), Mokyr (2018) and Outman and Outman (2003) as the epicenter of previous industrial revolutions. Even in consideration of both the Britain and the Unites States this thesis will be restrain from entering the debate on specific sociological timings of the industrial revolution as it will begin to distract from the purpose of this thesis.

### *Rapid Population increase and urban density*

One of the complications recording the population prior to 1801 was the inexistence of an official census or record of the population in Britain (Toynbee, 1961). Among scholars, the primary source for reconstructing the population number of Britain prior to 1801 is through the “Anglican registration of baptisms, burials and marriages” (Wrigley, 2004, p. 59) which became common practice of recording demographics in the mid sixteenth century (Toynbee, 1969). One of the insufficiencies when estimating the population of Britain at the time using Anglican registration was the exclusion of people who had religious indifferences who are not included in the records (Matthias, 1983). Nonetheless, scholars came to a general consensus on

the reconstruction of England and Wales population from 1695 to 1801 (Flinn, 1970). At the beginning of 1695, the population of England and Wales is generally accepted as approximately 5.2 million people (Flinn, 1970). This was followed by a slow rise in population over the next fifty years with just over 7 million people at the beginning of the first industrial revolution in the 1740's (Coleman, 1992; Flinn, 1970; Gregg, 1966; Toynbee, 1969; Wrigley, 1997). From 7 million people in the 1740's, the population of Britain ballooned over the next two centuries, and by the end of the second industrial revolution in the 1940's 45.8 million people were recorded in Britain, which Baines and Woods (2004) attribute to both increased birth rates and migration in Britain. According to Outman and Outman (2003), this drastic population growth had a significant impact towards the deterioration of living conditions due to a lack of infrastructure to support the population.

Similar growth patterns were experienced in the United States which saw the population grow from 5.3 million people in the early 1800's to over 140 million people by the mid 1900's (Haines, 1994). This profound population growth gave rise to over a thirty percent increase year on year between the 1800's to the mid 1900's. Similar to Britain, population growth during this time was widely attributed to a decrease in mortality rates and increased immigration in search for work (Gibson, 1975).

While there is the argument that technology such as steam power and the subsequent development of the factory resulted in the loss of jobs, there is the other side of the spectrum that there was a social need for the technology to sustain the rapid population growth. This rapid growth in population resulted in the form of chicken and egg debate, where scholars are divided on whether technological developments led to mass immigration, or mass immigration led to the need and social acceptance of technology such as steam power and electricity through the social requirement to accommodate for the demand in clothing and adequate facilities to sustain the population growth. Regardless, Matthias (1983) and Toynbee (1969) argued that



both population increase and technological development fostered the perfect environment for both to flourish due to the nature in which both occurred simultaneously throughout the industrial revolution.

The other significant social change that occurred during this time was the urbanisation, with the majority of population moving from rural to urban areas in search of work. However, during the first and second industrial revolution in Britain, this was referred to the enclosure movement through a change in government policy allowing for the private ownership of land. It is important to address this due to one of the key drivers behind the enclosure movement was for both mass food production and for the textile industry to supply wool for the factories.

### *Enclosure movement and mass migration*

The enclosure movement in many ways is one of the key contributing influences that initiated the large migration movement from rural to urban living. Prior to the first industrial revolution, rural dwellings made up approximately 75% of people who lived in Britain (Outman & Outman, 2003), and by the late 1800's less than 20% of people lived in rural areas (Davenport, 2020). Similar trends were experienced at the start of the second industrial revolution in the United States with 64 percent of the American labour force was engaged in agriculture work, and by the end of the second industrial revolution only 22 percent of the population worked in agriculture (Allen, 1994) and has been a continuing downwards trend ever since (Daly, 1981).

Clark (2018) described the enclosure process as the fencing off land, where prior to the enclosure movement, land predominantly belonged to the collective, and was worked and lived on in common. There were small signs of the enclosure movement occurring prior to the first industrial revolution, with over 200 enclosure acts passed at the time. However, these movements were almost insignificant in comparison to the events that transpired between

1760-1840, which saw over 3500 enclosure acts passed across the United Kingdom encompassing a total over 5,500,000 acres of land being enclosed (Gregg, 1966). This had a significant impact on the transformation of society which sparked agriculture worker mass migration to urban areas in search for work (Toynbee, 1969). Stott (1996) details similar trends among artisan workers, who largely migrated from rural to urban areas due to the inability to compete with factories producing manufactured goods.

The large rural unemployment and displacement of the family home ultimately drove the migration from rural to urban areas due to the gradual emergence of factories promising the prospect of work (Hudson, 2004a). Consequently, this led to large population density in urban areas, resulting in inadequate social facilities and living standards to accommodate the rapid increase in population at the time (Matthias, 1983), which coincided with technological displacement of the cottage industry at the time.

Presenting earlier industrial revolutions is no small task due to the extensive transformations that occurred throughout this time. With population increase and factories having a greater reliance on agriculture for food and wool for the textile industry lead to the government in Britain to intervene with the enclosure movement. (Outman & Outman, 2003). One thing that remains clear is the combination of numerous variables between agriculture, population increase, and technology development occurring simultaneously to foster the conditions to enable the industrial revolution to flourish.

While the impact of technology on employment has been a significant focus of this research, (Mantoux, 1961), (Mokyr, 1998) and Toynbee (1969) all recognise the relevance the social landscape had towards shaping the industrial revolution. The social implications of population increase and enclosure movement hold distinct significance when concerning the recent developments of COVID-19 and whether this will contribute towards an increased adoption of ATPT with the requirement for social distancing. With the current emergence of

COVID-19 this holds even greater relevance as to whether the pandemic will result in the relevant social conditions to rapidly increase the adoption of ATPT (Ong, 2020).

Continuing on from the social implications of the industrial revolution on society, the following section (section 2.3.2.2) presents the impact of the industrial revolution on employment.

#### *2.3.2.2. Impact of the Industrial Revolution on employment*

This section presents the historical impact of the industrial revolution on employment which is conveyed through four sub themes raised in the literature that covers proto-industrialisation, industrialization, division of labour, and the labour movement.

##### *Proto-Industrialisation*

Proto-industrialisation is recognised by Mendels (1972) as a two-phase process behind the industrial revolution. The first phase is the stage of ‘proto-industrialization’, which is recognized as the period before the mid 1700’s when the industrial revolution took place. The next phase is widely renowned by historians as the ‘industrial revolution’ (Matthias, 1983; Mokyr, 2018; Toynbee, 1961) which is the period where industrialisation took place (Mendels, 1972). The significance behind understanding the proto-industrialisation phase relates directly towards establishing the impact the industrial revolution had on transforming both the workforce and social landscape. According to both Gullickson (1983) and Mendels (1972), proto-industrialisation consisted of two primary industries, the cottage industry and the agricultural industry.

At the time, the cottage industry largely consisted of artisans who specialised in hand crafts (Rab & Snell, 1984) that would buy materials from merchants for their crats and make certain products to re-sell to the market such as clothing (Hudson, 2004b). Artisans largely ran small businesses from their own home, where all business decisions including working hours,

who to buy and sell goods to and from, work-life balance, and what products to make was all made at the discretion of the family household (Burton, 2007; Outman & Outman, 2003). In latent terms, family household would be considered in today's terminology as self-employed, where they were responsible for their own day to day management of work (Mendels, 1972).

The other key industry at the time of the proto-industrialisation was the agricultural industry, which largely consisted of individual workers working and living off of the land in common (Outman & Outman, 2003) where land was collectively rather than individually owned, which included raising livestock, crops, and gathering firewood (Fairlie, 2009) for communal purposes. The agricultural industry is often referred to as having gone through its own separate agriculture revolution due to the substantial changes that occurred in relation to land reforms with the enclosure act and agricultural related technology (Allen, 1994; Mantoux, 1961), which drastically altered the landscape of both the agriculture revolution and the industrial revolution (Clark, 2018). Although these two revolutions are viewed as separate occurrences, Toynbee (1969) recognises the relevance of both agriculture and industrial revolutions occurring simultaneously due to the social implications the industrial revolution had in driving the agriculture revolution and vice versa.

The following theme presents the phase which is widely recognised as industrialisation, and the impact on employment.

### Industrialisation

Although the purpose of this thesis is to understand the impact of ATPT on the future of work, the historical proceedings of the industrial revolution remain ever so vital to understand how technology ignited a wave of employment trends which saw the workforce transition from agriculture to manufacturing and presently the service sector (Dosi & Virgillito, 2019). Throughout the course of the three industrial revolutions to date, workers have largely been

confronted with impeding uncertainty and displacement in favour of emerging technology capable of reducing costs while enhancing production capabilities (Jensen, 1993; Kaplinsky & Cooper, 1989; Noble, 2017).

*“On the one hand, new technologies threaten established ways of doing things, working conditions and employment patterns; on the other, they provide new opportunities for economic growth and social change – so much so that, in the long run, technology has proved a formidable engine of growth and led to substantial improvements in living conditions.”*

(Dosi & Virgillito, 2019, p. 594)

Initially, work predominantly focused on individual families with standalone businesses working from home. This expanded to hiring staff and buying/investing in machinery. Initially, the cost of machinery was highly expensive for any one individual. This was followed by individuals pooling their funds to invest in factories and machinery with a shared profit. This concept introduces what is now known as ‘corporation’. From this period, the interests of the corporation dominated the interests of the employees. However, the investment into technology paid off economically, where the cost of machinery significantly reduced the cost of employees (Outman & Outman, 2003). This introduced the two key concepts of the first Industrial Revolution: cost reduction and productivity enhancement (Jevons, 1931), as the machinery was able to outperform what workers could do.

The emergence of the factory had an immediate impact on the cottage industry, which saw the factory outperforming workers through reducing the cost of production while maximizing the output of goods (Gullickson, 1983; Malthus, 1989; Toynbee, 1969). Ultimately, this increased the productivity and wealth of England at the time, where “a factory employing 125 people (23 men and 100 children) could do the work of 2,000 people under the

old system” (Outman & Outman, 2003, p. 77). According to Stearns (2018) and Thompson (1963) this had a substantial impact on employment at the time, where workers were largely displaced due to the output capabilities of the factory, ultimately resulting in families migrating to urban areas in search for work. The introduction of steam power enabled the work which was initially done by several people to be done by machine fueled by water or coal at a much faster speed than humans could compete with, where Outman and Outman compare the capability of a horse to a motor, where “one or two horses could easily pull the weight of a car with its passengers, but no horse could run down the highway at sixty miles an hour, hour after hour, as a car can” (Outman & Outman, 2003, p. 33). Ultimately, in reference back to subsection 3.2.1 on technological trends, the first and second industrial revolution widely was physical demanding jobs impacted while the third industrial revolution continued to see this trend in addition to some mental tasks.

While the introduction of factories required human workers to operate the technology, the number of workers required was dramatically reduced from proto-industrialization methods of production (Mantoux, 1961). Where workers previously in the cottage industry were involved in the entire production line of goods and services, the factory introduced the concept of a task or chain in the factory, where the worker would only perform one specific task, notably reducing the skill sets workers required to perform the job (Matthias, 1983). According to Honeyman (2016) and Humphries (2010) this opened the door for the exploitation of child workers throughout the first industrial revolution. According to Humphries (2010) child workers were a regular occurrence throughout the first industrial revolution due factory owners able to pay children less than men, which was possible due to the low skill sets required at the time (Mantoux, 1961).

While the first and second industrial revolution gave rise towards an industry shift away from both the cottage and agricultural industries into the factory, the third industrial revolution

introduced a third wave of changes which saw the emergence of automation in the factory system through robotics (Carlsson, 1997). This had significant implications on the workforce which drove concerns for the future of work at the time (Hagedorn, 1984). One of the driving concerns was due to the high costs of technology which many businesses resorted to find solutions such as labour reduction as a method to recoup lost costs on technology (Bard, 1986). This led to early research into STS theory to understand the relationship between organisations, technology, and employees, where Kelly (1978) recognised that while some jobs will almost always exist with people needing to operate certain technologies, that number is far fewer than the people who are likely to lose their job. Ultimately this was many of the technological advancements at the time substitute physical labour for machinery which forced many of the more traditional highly skilled artisans out of work (Claudia & Lawrence, 1998). Although technology has resulted in disruption of previous industries, Christopher (1998) refers to the destruction and creation process, that while an industry may be made obsolete, new industries almost always arise requiring different skill sets which initially may appear foreign to people, but eventually become the norm through gradual transition. This raises questions for the fourth industrial revolution as to whether ATPT will displace workers and lead to a dystopian future, or the similar trend will continue and a new industry will arise with new jobs as a result. Although new industries have historically emerged as a result, the nature in which work is performed with the division of labour became more pressing issues towards designing meaningful work.

The next theme presented in this sub-section details the emergence of the division of labour, which was a significant shift in the way organisations conduct their processes and the subsequent deterioration of meaningful work as a result.

### *Division of Labour*

Although modern day technology such as ATPT is largely associated with a greater demand for skilled and educated workers (Acemoglu, 2002), this has not always been the case where the first and second industrial revolutions introduced was largely referred to as the division of labour and the subsequent deskilling of the workforce. Trist (1981) defines the division of labour as job tasks which a broken down into basic elements to reduce the expense in training people while increasing the potential to hire unskilled workers due to the redundancy of parts being easily replaceable. Further to this, Smith (2007) recognizes the division of labour as dividing the production processes into specific tasks where no one individual completed an entire process. The notion of division of labour and the deskilling of employees was central to the design of the factory to increase production while reducing operating costs (Jensen, 1993).

The division of labour saw profound benefits for organisations through the ability to maximise outputs through placing workers on specific tasks which aligned with the capabilities of the workers (Rosen, 1978). However, while organisations received the benefit of greater output and production capabilities through the division of labour, workers were placed in unfavorable circumstances required to perform highly routine and repeatable tasks (Durkheim, 2014). The introduction of highly routine and repeatable tasks led to an increased recognition of the removal of meaningful work. With ATPT having the potential to automate highly routine and repetitive tasks suggest there is the potential to create more meaningful work in the future.

To reduce operating costs, the production within factories were designed into specific tasks what would not require highly skilled artisan workers to operate, but rather unskilled workers including children working in factories (Humphries, 2010), which ultimately saw highly skilled artisan workers substituted in favor of unskilled labor (Goldin & Katz, 1998).



Further to this point, while artisan workers were involved in the end to end making of a product, the factories divided labour where a worker was involved in only a portion of making the product. For instance, in a shoe production factory a worker would only be responsible for making the shoelace and someone else for attaching the shoelace (Durkheim, 2014). The introduction of the division of labour made workers more easily expendable due to the ability to train on one specific task as opposed to being required to know the entire operational process.

While the division of labour can still occur without the intervention of technology, Faunce (1965) recognises the benefit it has for organisations through providing more insight into organisational efficiencies, this enabling more in-depth DMP behind how to maximise efficiencies through automation. Acemoglu and Restrepo (2019b) further emphasises this at the process of labour allocation where organisations can effectively allocate labour on the basis of what can and cannot be automated. The idea of labour allocation ultimately turns back to the demand and supply of labour (Abbott & Ashenfelter, 1976), where theoretically, if certain jobs are automated then the supply and demand for that particular job could be impacted.

The final theme that emerged consisted of developments of the labour movement, and more specifically the establishment of the union to represent employee interests and rights through a period of deteriorating employment conditions.

### Labour Movement

The political landscape during the first industrial revolution has laid the foundations for what we know as democracy today (Outman & Outman, 2003). This was initiated through factory owners wanting a greater presence and voice within government, which was latter challenged by employees also wanting a greater presence and voice within government. This began enquiries into workers rights and the conditions of employment, which was challenged by factory owners.

Britain had no industrialization policy in the first industrial revolution (Harris, 2004) which subsequently had large consequences on working conditions and employment rights throughout the first industrial revolution (Outman & Outman, 2003) which gave rise to poor working conditions, and exploitation of workers. Due to the harsh working conditions in the first industrial revolution, worker rights became more prominent in parliament towards the end of the first industrial revolution, where the Factory Act of 1833 prohibited children to work long hours and required children to have a lunch break (The Factory Act, 1833). Prior to the introduction of the Factory Act of 1833, child workers were a common place in the factory, primarily due to the low skill level required to operate the factory in addition to families needing the additional income to survive.

The impact of technological developments on employment is a wide scale issue, expanding across all corners of the social setting. Child labor is vastly undocumented for the specific start and end date, (which constitutes with the gradual buildup and decline of the first Industrial Revolution), however, the emergence of child labor throughout the first industrial revolution is widely accepted throughout the literature (Floud & Johnson, 2004; Honeyman, 2016; Humphries, 2010; Outman & Outman, 2003). Understanding the dynamics of child labour in the first Industrial Revolution is a vastly complex issue of social layering dependent on several variables circling around the concept of ‘economic condition’ (Humphries, 2010). The emergence of child labour increased in the first industrial revolution (Outman & Outman, 2003), where Humphries (2010) outlines the increase in child labour as an offset through employment and social conditioning. The primary reason for this is the shift in family infrastructure and means of income is directly related to new technological infrastructure of factories, where the average household businesses could no longer compete with factory outputs (Floud & Johnson, 2004). Due to the financial burden and constraints placed on families throughout the first industrial revolution, children became a common site throughout

the workplace with mills and mines becoming regular sites of work for children (Humphries, 2010). Believes that child labor originated from the technological redundancy of skills through the replacing of the agricultural and cottage industries, children had the same set of skills necessary to work in a factory and were cheaper than adults (Honeyman, 2016; Humphries, 2010)

Harris (2004) and Toynbee (1961) both recognised the majority of government policy and regulation favoring organisations over employees to support requirements and demands of factory owners. The lack of initial policy and regulation has significant impact on employment and social conditions at the time, which saw employees rights neglected leading to what Outman and Outman (2003) associates as opening the door for factory owners to exploit workers. As discussed in the division of labour, this lead to child workers becoming a prominent place within the factory due to low skill levels and cheap labour. It was not until the end of the first industrial revolution where employment conditions and workers' rights became more prominent in Parliament which was The Factory Act (1833) prohibit children from work long hours, and required children to have a lunch break. The Factory act (1833) marked one of the first occasions throughout the first industrial revolution where workers' rights prioritized over demands of factory owners who were viewed to be in favor of government policy to encourage industrial development in Britain (Mantoux, 1961). While the industrial revolution is commonly associated with technological and industrial development, it is also widely associated with underlying poor employment conditions during the periods of transition (Toynbee, 1961). Amidst the vast employment and social changes, The Factory Act of 1833 and the establishment of employment unions were prominent features throughout the first and second industrial revolutions.

Similar to the first industrial revolution with The Factory Act (1833), a continuation of poor working, living conditions, and demand for work led to the establishment of labor unions

throughout the course of the second industrial revolutions (Fine, 1953). One of the early works into trade unions was led by Webb and Webb (1902) who defines a trade union as “a continuous association of wage-earners for the purpose of maintaining or improving the conditions of their employment” (p. 1). Prior to the establishment of trade unions, corporations held large influence over political parties, in which workers rights were marginalized to enable rapid industrial growth (Commons et al., 1918). According to Commons et al. (1918), the rise of trade/labor union movements arose from particular conditioning of economic, industrial, and political conditions which where workers began to protest for employment rights.

The notion of trade unions became more prominent throughout the second industrial revolution when the balance between wages, workload, and cost of living became disproportionate to each other (Quinlan, 2018). One of the major breakthroughs of labor unions was through the eight-hour movement. According to Fine (1953) the National Labor Union, American Federation of Labor, Federation of Organized Trades, and Labor Unions secured workers’ rights to the eight-hour working day in the United Stated, throughout the period between 1888 to 1891. By May 15, 1886 the impact of the eight-hour working day was in action, with 192,000 workers reporting to have gained shorter working hours (Fine, 1953). Similar outcomes pertaining to improving employment practices in the first industrial revolution such as The Factory Act (1833) begs the question of the relationship between industrial transformation and improving employment practices. Furthermore, this ask the additional question as whether improving employment practices can be developed at the start of an industrial revolution such as business good practice and meaningful work (Berg et al., 2013) with the introduction of ATPT, or whether employment needs to be impacted in a negative way to pressure organisations to introduce better employment practices such as in the first and second industrial revolutions (Gunton, 1889). This raises the question as to how the

emergence of ATPT will shape both the nature of work and employment and social conditions in the future.

A continuation of poor working and living conditions led to the establishment of unions throughout the course of the first and second industrial revolutions. One of the early works into trade unions was led by S. Webb and Webb (1902) who defines a trade union as “a continuous association of wage-earners for the purpose of maintaining or improving the conditions of their employment” (p. 1). Prior to the establishment of labor unions, corporations held large influence over political parties, in which workers rights were marginalized to enable rapid industrial growth (Commons et al., 1918). According to Commons et al. (1918), the rise of labour union movements arose from particular conditioning of economic, industrial, and political conditions which placed workers in a wage earnings.

The notion of trade unions became more prominent throughout the second industrial revolution when the balance between wages, workload, and cost of living became disproportionate to each other (Quinlan, 2018). The initial union was defined more as an ‘association’ of trades workers from the same particular trade (Commons et al., 1918), which later morphed into ‘trades union’, ‘national unions’, ‘international unions’, and ‘labor unions’ which was a combination of multiple trades represented under one union (Commons et al., 1918). While the notion of labor union is familiar in modern society, the establishment of the trade union was by far from an spontaneous process (Thompson, 1963), with factory owners punishing workers striking and aligning with unions through hiring workers to replace people on strike. Due to the demand for work at the time workers were easily replaced (Outman & Outman, 2003). This introduced the notion that the demand for work leads workers to accept poorer working conditions in order to secure work. In 1827 the Mechanics’ Union of Trade Associations was formed, which welcomed all trades to join the union, and ultimately to “represent the interest of the working class” Commons et al. (1918, p. 191). This came amidst

other trades starting to have concerns for each other as the issues facing the workforce were no longer confined to an individual trade, with the introduction of the ten hour movement (Commons et al., 1918)

One of the major breakthroughs while the establishment of trade unions were in a constant state of turbulence throughout the early 1800's (Quinlan, 2018), the establishment of labor unions solidified throughout the period of 1888 to 1891 through recurring the eight-hour working day movement (Fine, 1953). By May 15, 1886 the impact of the eight-hour working day was already in action, with 192,000 workers reporting to have gained shorter working hours (Fine, 1953). The National Labor Union, American Federation of Labor, Federation of Organized Trades, and Labor Unions secured workers rights to the eight-hour working day in the United States, throughout the period between 1888 to 1891 (Fine, 1953). One of the key arguments behind the eight-hour working day was it would lead to a reduction in unemployment, whereby cutting the working hours from ten to eight hours a day would leave 20 percent more workers to fill the gap, thus reducing unemployment (Fine, 1953). Employers indicated that if workers hours were reduced, a reduction in wages would also be incurred on the employee (Fine, 1953) from the notion of employers paying ten hours pay for only eight hours of work. However, one of the vocal supporters for the eight-hour movement was Gunton (1889), who argued that the introduction of the eight-hour working day had no disruptive correlation to existing economic and social relations. Gunton (1889) argued that more leisure time for workers equates to an increase in productive power. Gunton (1889) goes as far to state that economists and employers are uniformly opposed to shortening the working day, and are largely unsympathetic towards the welfare of society.

The notion of the eight-hour working day holds significant relevance to modern society, with the emergence of ATPT leading to emerging suggestions around the potential of a 4 day work

week. This raises the further question as to whether a four-day working day would reduce the likelihood of technological redundancy.

Although the corporation and labor unions as by large completely different entities, they by large originate from the same function of people grouping together, in which Gunton (1889) outlines “industrial reform is an inseparable part of social evolution” (p.4). This has significant implications of the future of work, and whether the emergence of the fourth industrial revolution will be associated with a significant social change. It remains to be seen how the COVID-19 outbreak will contribute the start of the fourth industrial revolution with the potential for social distancing requirements to place greater reliance for organisations to turn to ATPT capabilities.

### **2.3.4 Summary**

The previous industrial revolutions introduced a wave of industrial changes across the globe which was a shift from farm to factory and presently the service sector. These industry changes came with reoccurring trends with a new energy source, transportation, and communication suggests that society is on track to enter the fourth industrial with the emergence of ATPT capabilities. While an industrial revolution cannot occur without technology, the literature suggests industrial revolutions are deeply engrained with social change, which has enabled each industrial revolution to prosper. Understanding the drivers behind an industrial revolution goes beyond just technology as scholars including Mantoux (1961) and Toynbee (1986) suggest that it is a deep sociological issue consisting of technology, employment, society, and government policy. This has explicit implications for the context of this research in relation to registering the significance behind who stands to benefit from the adoption of ATPT from a social economic standpoint and the taxonomy behind upholding social values.

The implications from the literature suggests that concepts such as ATPT alone will not be sufficient enough to drive the fourth industrial revolution. Instead, there is likely to be a direct relationship between how ATPT is used in relation to the needs and requirements of society. Although the impact of COVID-19 was not a focus of this research, there remains the underlying potential as to whether the pandemic will accelerate the adoption of ATPT due to the ongoing social distancing requirements. The following sections in this chapter take a step away from the historical impact of the industrial revolution and shifts the attention towards the impact of ATPT on the future of work which will be covered in section 2.4.



## **2.4. ATPT and the Future of Work**

The notion of technology impacting employment has been a reoccurring phenomenon dating back to the first industrial revolution (Toynbee, 1969), and the emergence of ATPT is predicted to be no different. Although there are a number of future of work predictions which have been made since 2015, there remains a lack of acknowledgement throughout the literature regarding the role organisational DMP has when it comes to rationalising the ‘how’ the future of work will be impacted. Insight into organisational theory demonstrates how each organisation is situated within their own complex environment, which entails different requirements, challenges, and outcomes behind adopting ATPT. Nonetheless, this section of the literature review chapter is divided into four key areas covering predictions of ATPT on the future of work, organisational decision-making processes, the technology diffusion process, and education and skill complementary.

### **2.4.1. Prediction of ATPT on the future of work**

Despite the expected arrival of AI to still be decades away, we are already seeing less advanced technology have an impact on the workforce with the likes of chat bots, automated customer service lines, accountancy software, employee recruitment, and automation. This is amidst research estimating up to 45% of job tasks already have the potential to be automated with currently demonstrated technology (Chui et al., 2016; Manyika, 2017). This is consistent with Frey and Osborne’s (2017) occupational-based approach which estimates up to 47% of jobs will be automated in the US. While Frey and Osborne’s (2017) research estimates susceptibility of automation in the US, their research has been repeated in other countries where Bowles (2014) estimates as high as 60% of jobs in Europe will be impacted as a result of automation. Further research was adopted in Singapore and Australia using the method from Frey and Osborne’s (2017) original study, where Fuei (2017) estimates up to 20% of jobs in Singapore are at risk of automation within the next ten to fifteen years, while research

conducted in Australia predict up to 40% of jobs are at risk of automation (Durrant-Whyte, McCalman, O'Callaghan, Reid, & Steinberg, 2015). However, Arntz et al. (2016) addresses one of the major limitations of Frey and Osborne (2017) study, which is conducted through an occupation-based approach, in which not all job tasks that make up a job are susceptible to automation thus resulting in an overestimation. However, research conducted using a task-based approach by Arntz et al. (2016) estimated that jobs at risk of automation is only 9% in comparison to the 47% occupational-based approach by Frey and Osborne (2017). Arntz et al. (2016) used the PIACC database to estimate the impact of automation on the future of work through a task-based approach. The viability of measuring through a task-based approach, thus indicating the discrepancies between Arntz et al. (2016) and Frey and Osborne (2017) which the authors of the research also note.

In a comparative analysis between the finding presented by Frey and Osborne (2017) and Arntz et al. (2016) a broad understanding can be reached that job tasks have a greater susceptibility to automation than entire jobs. This is supported by Manyika (2017) who outlines that currently available technological capabilities have the potential to where just over half of all occupations could have 30% of tasks automated and only 5% of all occupations could be completely automated with currently demonstrated technologies. However, this raises one of the limitations presented in the study by Arntz et al. (2016) due to the results being presented as the percentage of jobs impacted as opposed to the percentage of job tasks that would be more reflective through a task-based approach. The second limitation across both studies by Arntz et al. (2016) and Frey and Osborne (2017) is the research is based off technological capability as opposed to the actual utilization of the technologies throughout organisational operations. Although technological capabilities of ATPT may increase, there remains no guarantee that businesses will choose to fully or partially incorporate such technology into organisational operations (Acemoglu & Restrepo, 2019c). Taking this into consideration, there remains

further uncertainty as to the relationship between ATPT and employees within the context of STS theory (Trist, 1981). Arntz et al. (2016) further iterates the likelihood of results differing from country to country due to differences in workplace organisation, investment into technology, social expectations, and level of education among workers. Determining the level in which employment will be impacted as a result of ATPT becomes increasingly difficult, which Makridakis (2017) attributes to the inability to accurately predict the speed of ATPT capabilities successfully automating repetitive and non-repetitive tasks currently performed by humans.

Brynjolfsson et al. (2018) conducted research using the O\*NET database, which consisted of 964 occupations with the primary objective to understand the “suitability for machine learning” (p.44) on current occupational tasks. The findings of the research predict that the concept of ATPT replacing humans as not necessarily the case, with findings indicating it will consist more of how ATPT capabilities are used to redesign tasks and the subsequent relationships with employees within an organisation. These findings highlight the importance understanding the impact of ATPT on the future of work from the perspective of organisations which are in most ways the end users of the technology.

With mounting predictions on the impact of ATPT on the future of work, governments, businesses, and unions across the globe have established forums to develop collaborative solutions to understand the impact of ATPT. In August 2018, the Future Work Forum Tripartite Forum was established to co-ordinate decision-making across Business NZ, the Council of Trade Unions, and government (Ministry of Business Innovation and Employment, 2019). The purpose of the forum has been designed to develop better solutions for the future of work with emerging technology. There have also been notable developments in other parts of the world regarding tripartite forums into the future of work including Denmark with the establishment of the Danish Disruption Council (The Danish Government, 2019), and development of the

Nordic model on the future of work including Denmark, Finland, Norway, and Sweden (Dolvik & Steen, 2018). Although tripartite forums on ATPT and the future of work, it remains a positive direction to develop an open dialogue and establish good practice moving forward.

While there are increasing discussions around organisational adoption of ATPT, it remains an ongoing issue throughout the literature to understand the organisational DMP and what this means for the future of work. Decision-making theory provides some insight into the complexity of understanding the organisational DMP.

### **2.4.2 Organisational Decision-Making Processes**

As the predictions on the impact of ATPT on the future of work continue to emerge, there is constant need to understand the DMP behind organisational adoption of such technology. The requirement to understand organisational DMP is primarily down to the complex nature in which organisations are situated, with numerous elements to take into consideration including cost, stakeholders, employees, and the viability of ATPT itself. The adoption of ATPT has seen a number of strategic benefits for organisations including lower development and maintenance costs (Schuler & Gehring, 2018), increase business value (Coombs, Hislop, Taneva & Barnard, 2020) and operational efficiency and productivity (Margherita & Braccini, 2022; Pramod, 2021). This is further emphasised by Mohamed et al., (2022) in the context of Human Resources (HR), who recognise the benefit of ATPT to support compliance requirements, reduce time, and save costs. However there remains little insight into how the organisational benefits of adopting ATPT impact employees. Although strategic benefits of ATPT adoption have been identified, there is no correlating evidence to suggest that ATPT and the identified benefits including operational efficiency and productivity are a sufficient means to replace employees. This has further contributed to recent research conducted by Siderska (2021) on impacts of COVID-19 suggests there has been a change in the way organisations perceive the benefits of ATPT with almost 60% of respondents

identifying ATPT capabilities as responsible for enabling business continuity during the pandemic. However, one of the primary challenges summarised by Wewerka and Reichert (2020) in the literature draws on the lack of empirical research into the how organisations adopt ATPT. This has resulted in research into the future of work being conducted without reflecting on factors including organisational DMP, stakeholder influence, and change management frameworks necessary to understand how ATPT is applied in practice (Junteen, 2018; Mrowinski, Tappin & Brougham 2021; Wallace, 2020; Wewerka & Reichert, 2020). To summarise the standpoint of this thesis, research in ATPT capabilities requires insight into organisational DMP to understand the wide variables behind what influences organisations to adopt and the potential impacts on employment.

Organisational DMP largely consists of numerous interlaying levels of decision-making which Shrestha, Ben-Menahem, and von Krogh (2019) recognise as a network of decisions which are made across all levels of an organisation, which are required to factor in the organisational environment. Hatch (2018) illustrates the complexity of organisational DMP through the complex network and environments in which organisations are situated, which include unions, regulatory agencies, customers, suppliers, partners, competitors, and special interests. While organisations can adopt ATPT, there are a number of factors which can influence to be taken into consideration including competitors, customers, unions and employees, regulators and more.

Hatch (2018) establishes the level of an organisation into three levels of decision making across the organisational hierarchy: Top management (responsible for institutional decisions, strategy, and organisation environment), Middle management (responsible for organisational decisions, differentiation and integration), and Lower-level management (responsible for operational decisions and daily activities). In essence, the dynamics of decision-making theory is recognised as the process of “how individuals and groups make or

should make decisions” (Resnik, 1987, p. 3). This is largely translated into two domains of decision-making theory: normative decision-making theory and descriptive decision-making theory.

Normative decision-making theory is largely concerned with the rationale of the decision-making process i.e. how decisions ought to be made, while descriptive decision theory is recognised as the process to uncover how decisions are made (Resnik, 1987). It is important to distinguish the fine line between how decisions are made and how decisions ought to be made. One of the current gaps throughout the literature is the need to establish what good practice behind ATPT adoption looks like, which can support normative and descriptive DMP.

Herbert (1979) summarises decision-making theory as the way decisions are made in addition to the outcome of the decisions. Simon (1977) categorises the ‘decision-making process’ into three principal phases: finding occasions for making decisions (intelligence activity); finding possible courses of action (design activity); and choosing among courses of action (choice activity). Although the three phases are broken down, it is an extremely interwoven and complex processes consisting of decisions based on the wider environment considerations which is currently heavily limited throughout the literature. The decision-making process outlined by Simon (1977) suggests that the adoption of ATPT is not likely to be a straightforward process. Reflecting back on the diffusion process, while a form of ATPT may become available for adoption, this still requires a form of organisational DMP to first find an occasion for making the decision, followed by potential courses of action. While literature on predicting ATPT and the future of work is highly valuable, there remains ongoing limitations pertaining to the organisational DMP, and whether ATPT is a viable option for every organisation.

While organisations are faced with the three phases of the DMP, Thomas (1955) adds an additional layer of complexity, through recognising the sociological component to the DMP. In which managers have an objective when making a decision and how DMP is socially determined. According to Thomas (1955), a sociological approach to the DMP establishes both the economic responsibilities of managers in addition to the social responsibilities which have had an increasing importance in recent years with Corporate Social Responsibility on the uptake. The environment where the organisations is situated is important to recognise, as the normative and descriptive decision theories are likely to differ substantially depending on social and ethical norms which are views typically represented by stakeholders within the environment. This being said, while certain practices of replacing the employees with technology in previous industrial revolutions may not be as accepted in modern society with ATPT and more established labour movements. This raises the relationship with stakeholder theory and ATPT, and whether it is socially acceptable for ATPT to result in mass unemployment as predicted in the literature.

Stakeholder theory holds distinct relevance to understand the impact of ATPT on the future of work, as it introduces the notion of ‘accountability and ethical norms behind the organisation decision-making process (Wright & Schultz, 2018). Freeman (2010) defines a stakeholder as an individual or group that can affect or be effected by the direction of the firm through setting organisational objectives including “laborers, firms, society, governments, and consumers” (p.824). This view is reflected throughout the literature including Reed (1983) who ultimately defines stakeholders as “any group or individual who can affect or is affected by the achievement of the organisation’s objectives” (p. 46). Clarkson (1994) combines stakeholder theory with Marx notion of capital, where a stakeholder bears some “form of risk as a result of having invested some form of capital, human or financial, something of value, in a firm” (p.5). The relevance of stakeholder theory raises further questions as to what is socially acceptable

for how ATPT is incorporated into organisational operations and whether establishing social expectations can lead to positive outcomes on employment such as meaningful work and business good practice. Nonetheless, with stakeholders remaining only one aspect of an organisations environment further highlights the complex network organisations are faced with when making decisions to adopt ATPT.

### **2.4.3. Technology and the Diffusion Process**

While ATPT is likely to impact all domains of the workplace to a certain degree, it remains unlikely that entire occupations will become inexistent within the next ten years (Chui et al., 2016). Research conducted by McKinsey Global Institute estimate it will most likely be a mixture of job tasks within an occupation being automated that will have the largest impact, where up to 45% of job activities already have the potential to be automated with currently demonstrated technology (Chui et al., 2016; Manyika, 2017). Hall and Khan (2003) further elaborate on the delay to incorporate ATPT into business operations is a result of the diffusion process being one of the slowest out of the three phases throughout the innovation process. Hall and Khan (2003) refer to this as a process in which businesses take to understand the market conditions, especially with new technology businesses tend to defer the decision to adopt technology to a later date to better understand the impact of such technology on the market and whether it is a viable solution or not. This raises an important question as to why businesses and organizations are potentially delaying incorporating ATPT if forms of it already exist. This question is best represented in the literature through the three phases of technological development in which Jaffe et al. (2003) categories as invention to innovation to diffusion, which can be seen in Figure 5 below.

According to the New Zealand Productivity Commission (2019) only a small proportion of businesses in New Zealand will be involved in the invention and innovation phases of ATPT, with the majority of businesses involvement peaking at the diffusion phase



of ATPT. This may rise a sense of unfamiliarity amongst New Zealand businesses who have had little insight throughout the invention and innovation phases (Rosenberg, 1972) resulting in postponed adoption.

Rosenberg (1972) details the determinant factor for diffusion needs three determining factors: technology availability, financially beneficial, and employee skills to operate the technology, without which is not commercially viable (Hall & Khan, 2003). Technological capabilities alone are not enough to guarantee automation within particular occupational activities (Chui et al., 2016) with the cost and benefits of adopting such technology playing a crucial role in the DMP. This is further fueled by uncertainty around financial gains especially with ATPT being under constant development there is greater expectancy for continuous improvement leading



*Figure 5 Stages of technological development: Invention, Innovation and Diffusion*

*Source: Jaffe et al. (2003, p. 4)*

to greater susceptibility of sunken costs through immediate investment (Dixit & Pindyck, 1994). One of the contributing factors leading to a slow diffusion process is what Rosenberg (1972) acknowledges as the lack of necessary skilled workers to operate such technology. If it is required for workers to update their skill sets to use new incoming technology, there is a

greater expectancy for the diffusion period to take longer for some businesses to incorporate. This has been consistent throughout history, where younger generation can easily adapt to technology they are born with, where it becomes increasingly difficult for people who are well into the workforce may find it difficult to re-skill. Take computers for example, when they were first introduced not everyone knew how to operate them, it was a skill that had to be developed. Additionally, it was not immediately financially profitable to buy a computer for each employee to operate, where initially it would have been one computer per 100 employees (Borodin & Gotlieb, 1972). Now in the service sector, it is almost expected an employee has their own computer or laptop to work from. Through the introduction of new technology, older technology becomes devalued along with the skill sets workers use to operate the technology.

One of the determining factors for incorporating technology is regulation. Timothy and John (1984) identify regulation as one of the deterring factors for incorporating such technology which ultimately slows the diffusion process down. This is what separated the first industrial revolution from modern society, which had little regulation enabling businesses to act freely to speed up industrial development but had unwelcoming employment and social impact (Outman & Outman, 2003). While there remains limited insight into the organisational DMP behind the adoption of ATPT, the diffusion process suggests unless organisations are involved in the invention or innovation phase, it would not be until the diffusion phase when organisations begin to adopt ATPT. One of the deeper questions behind the adoption of ATPT remains how organisations make decisions to adopt ATPT and the relationship between organisations, employees, and ATPT which the significance of this can be understood through STS theory.

### *Sociotechnical systems theory*

While techno-economic paradigm as outlined earlier focuses on the relationship between technology and organisational adoption, sociotechnical systems theory expands on this by

recognizing the employee, and the relationship between the organisation, technology, and employees. In the context of future of work, Fornino and Manera (2022) stresses the extreme position literature has taken to date with the assumption that robots are a perfect substitute for employees. This extreme position has largely been based on the assumption of ATPT substituting employees without the perspectives of organisations, which this thesis draws upon STS theory to help breakdown the complex relationships necessary to understand the adoption of ATPT and the impact on the future of work.

STS theory is conceptualised as the way in which work is conducted and designed through the integration of new technology such as ATPT (Eason, 2014). The application of STS theory further recognises the constantly evolving and changing the nature of work from the way organisational decisions are made in relation to stakeholder requirements (Eason, Harker, & Olphert, 1996) and how this shapes the design of work. Sociotechnical systems theory is closely interlinked the organisational DMP through how the relationship between ATPT and employees will be designed (Eason, 2014), i.e. whether employees will be the users of ATPT, or ATPT will replace employees as current research suggests.

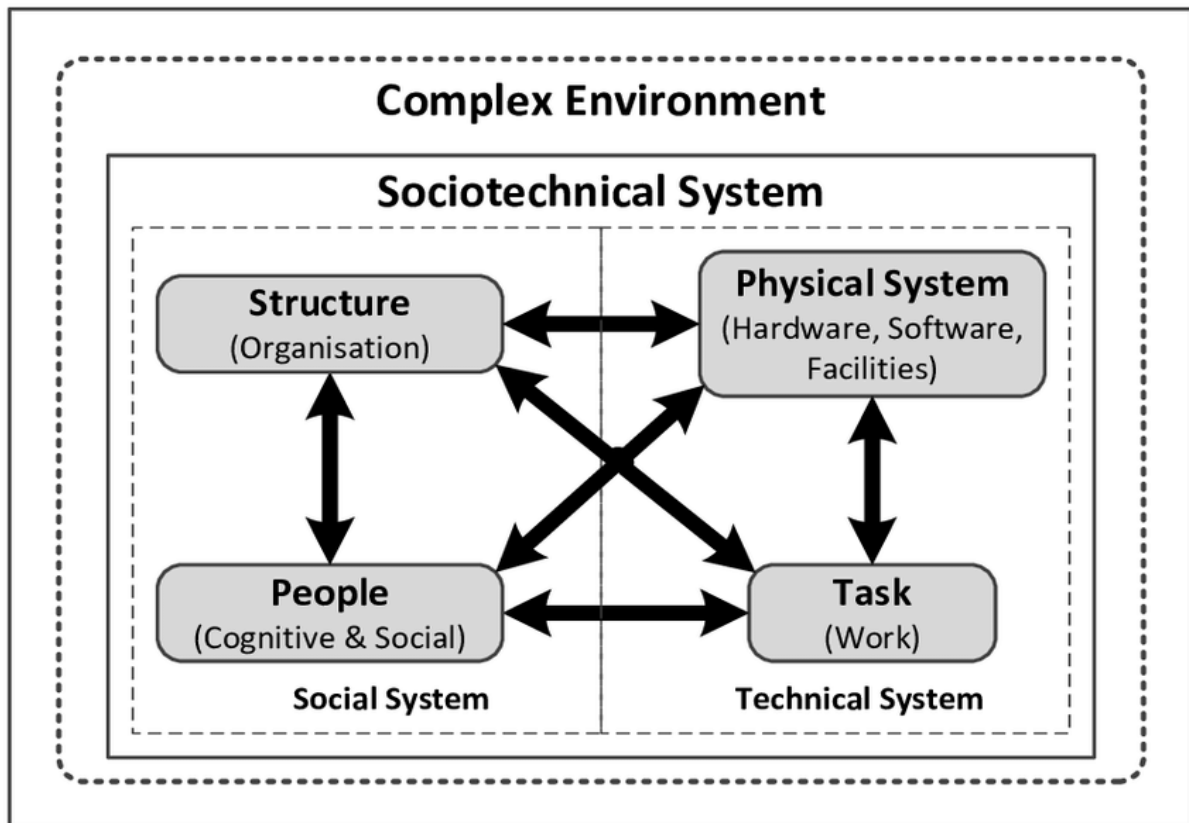


Figure 6: Sociotechnical system. Source: Oosthuizen and Pretorius, 2016, p.17)

As outlined in Figure 6 above, STS theory holds distinct relevance towards understanding the impact of ATPT on the future of work for two primary reasons. Firstly, there is a need to understand whether job tasks or entire jobs will be impacted by ATPT. This will help shape understanding around the design of work and whether ATPT is job replacing technology or assisting employees with their work. Second, it relates to the complex environment in which organisations operate with the potential to use ATPT in a number of different scenarios. This suggests that while ATPT may exist, there is no guarantee as to what the nature of work will look like in the future. Furthermore, if a relationship between ATPT and employees does emerge, current literature suggests this is likely to come with the requirement to upskill employees which will be covered in section 2.4.4.

#### **2.4.4. Education and skill complimentary**

One of the key themes throughout the literature is the relationship between ATPT and employee skill sets. With ATPT likely to initially impact lower skilled jobs associated with routine and repetitive jobs raises further speculation around what skill sets workers might require in the future. Goldin and Katz (1998) summarize that technological development and skill-sets are a complementation of each other, therefore, to avoid inequality that emerges through technological development, education must also become a focus to develop the necessary skills. Bresnahan et al. (2002) attribute developing skillsets towards providing workers with the opportunity to work in more rewarding jobs that utilize the skillsets. Bresnahan et al. (2002) introduce the concept of skill-based technical change (SBTC), which ultimately shifts the demand of work towards skilled workers as opposed to the less-skilled workers. What this means when in the context of ATPT, the less skilled jobs have the tendency to be more routine-based, which research shows have a greater susceptibility of being automated (Frey & Osborne, 2017). Hypothetically speaking, if new jobs are created, SBTC will dictate the higher-skilled workers have the chance of finding work, establishing a larger gap of inequality between the skilled and unskilled workers. Mantoux (1961) compares a worker's capital to the technical skill sets they have where new innovations or technological change thus devalues the employee's skill set if new ways of working are introduced. Recent findings conducted by Holm and Lorenz (2022) suggest that ATPT is likely to have a varied impact on skills, with the potential to either enhance or augment employee skill sets. Enhancement of employee skill sets was identified through increasing high-performance work practices which result in an uplift in new skills required, or augment skills through constraints in the level of autonomy employees require to perform the work (Holm & Lorenz, 2022). These findings tie back into the importance of understanding the organisational DMP to identify how organisations are using ATPT to either enhance or augment employee skill sets.

The continuation and value of higher education is a trend since the 1970's where college education started being favored for jobs requiring cognitive tasks (Autor, Levy, & Murnane, 2003). Autor and Dorn (2013) further elaborated on the complementary between technology and education, with new technology likely to increase demand for higher education. The recognized susceptibility of routine and repetitive jobs as highly automatable, which Green (2012) emphasizes complements the notion of an increased demand for higher education to develop the skill set of performing non-routine tasks.

While new jobs may emerge as a result of ATPT, it is still relatively unknown what skills employees will require to perform such jobs. If the skill requirements drastically change and require a long duration of reskilling raises the potential of a significant social disruption (Makridakis, 2017). The introduces the notion around skill-sets as to what is socially acceptable, and how potential work redesign will impact the relationship between ATPT and employees and the subsequent skill sets required in the future.

### **2.4.5. Summary**

This section of the literature review had ongoing challenges with identifying credible literature around the organisational DMP behind adopting ATPT. Despite this, the literature presented alarm around the potential impact of ATPT, with the potential for over half of the workforce to be impacted by 2030. Organisational insight is highly relevant as it will shape understanding and insight into whether job tasks or entire jobs will be impacted by ATPT. STS theory goes some way towards understanding the significance of the relationship between organisations, employees, and ATPT as any form of relationship has the potential to require new skills in order for employees to use ATPT. Beyond the focus of this research, there remains a significant need for further research into this field to continue exploring the impact of ATPT on the future of work from the perspective of organisations.

With the introduction of ATPT, there is increasing speculation with predictions ranging as low as 9% (Arntz et al., 2016) and as high as 47% (Frey & Osborne, 2017). This has the potential to have a dramatic impact on the future of work depending on how organisations intend to use ATPT and the impact such decisions will have on employees. While the literature has the tendency to focus on the negative impact of ATPT (Stewart et al., 2015), it also has the potential to introduce better employment practices such as introducing meaningful work and decent work (Wynne & Lyons, 2018). Despite this, there remains a limited perspective of organisations throughout the literature and the decision-making processes behind how organisations intend to incorporate ATPT and the impact it will have on the future of work. This is an important perspective as Arntz et al. (2016) recognises how the impact of ATPT on the future of work will vary between country to country depending on the ethical norms and expectations. Stakeholder theory is recognised to understand the ethical norms of the organisational DMP while maintaining the notion of accountability behind the outcome of organisation decisions behind incorporating ATPT. There is a significant need for insight from organisations to understand the DMP, and how ethical norms and STS theory might shape the relationship between employees and ATPT.

## CHAPTER 3: RESEARCH FRAMEWORK

The previous chapter in this thesis presented the current literature on the historical impact of technology on the workforce and current research on the impact of ATPT on the future of work through a social economy perspective. The literature highlighted the need to understand organisational DMP behind incorporating ATPT. Taking into consideration the limitations identified in the literature, the research has been designed to address the research question as discussed in section 1.5 of this thesis: what are the organisational decision-making processes behind incorporating ATPT and the subsequent impact on the future of work?

This chapter of the thesis outlines the dynamics of this research from a methodological standpoint including philosophical and theoretical underpinnings of the research in addition to the research paradigm, research design, research method, and ethical considerations for this research. The structure of this chapter will begin with the underlying research paradigms which is foundational towards understanding how this research is approached and the relevance between my research paradigm and the research being conducted. Later components of this section explore the research methods including identification of participants, sampling, and data collection methodologies. All aspects of this research framework have gone through extensive consideration under the Massey University Human Ethics Committee guidelines

### 3.1. Research Paradigm

The notion of a 'paradigm' has largely been afloat since Kuhn (1970) first introduced the concept, who recognised paradigms as the shift away from understanding science to the actual practice of science. While understanding the entirety of a paradigm is relatively complex in nature, Denzin and Lincoln (2013) and Guba (1990) recognise the key elements of a paradigm as; epistemology, ontology, and methodology. Lincoln, and Guba (1985) further refine the notion of paradigms down to the notion of how 'truth' is recognised within research. While it



is easy to brush over the research paradigm I align with as a researcher, it has significant implications for how the research is constructed from the initial point of research enquiry to the presentation of results. In recognition of this, this section has been divided into two critical sub-sections consisting of ontological considerations (section 3.1.1) and Epistemology (sub-section 3.1.2).

### **3.1.1. Ontological considerations**

Ontology is portrayed by Guba (1990) as the nature of how knowledge is interpreted through discovering and understanding ‘reality’ in the context of a particular research phenomenon. Guba and Lincoln (2004) presents four avenues of competing ontological considerations which attempt to establish the nature of reality: positivist, post-positivist, critical theory, and constructivist.

Critical theory is commonly referred to as an ontological paradigm with critical realism, which define as a critique and endeavor for social justice (Denzin & Lincoln, 2018). While elements of social justice have its merits in this research, and by no means be excluded, the relevance of this paradigm remains more well positioned for research where the impact of ATPT is already prominent throughout society. However, as ATPT is still largely in the developmental/implementation phase, there is little justification for the use of this paradigm, where it is more central at this moment in time to understand and reconstruct the current landscape (Lincoln, Lynham, & Guba, 2018). This led to exploring other paradigms including positivist and post-positivist paradigms.

Both positivist and post-positivist paradigms were given early consideration at the beginning of this research due to the intriguing notion that a ‘true’ reality exists (Guba, 1990). A positivist paradigm is typically more restricted towards a realist perspective through the way things truly work while exhibiting research as the truth (Guba, 1990) which according to

Bryman and Bell (2015) is more aligned with a quantitative methodology. A post-positivist paradigm on the other hand is recognised by Cook and Campbell (1979) as the expansion of the positivist notion of ‘truth’, but with a more critical realist perspective as the notion of a ‘true’ reality exists regardless of whether or not it was uncovered throughout the research process.

While it is convenient from a positivist or post-positivist ontological viewpoint to state that a true reality exists somewhere (regardless on whether or not it was identified), unboxing reality within the social sciences is more complex than recognising a single point of truth. This recognition comes from acknowledging the social sciences as a complex mechanism which represents a constantly changing and complex environment with a multitude of different social actors and influencing variables which shape reality. This led to deeper questioning behind what constitutes reality, and more specifically: ‘if reality was uncovered, what would truth look like?’ Addressing this question formulated a barrier away from aligning with either a positivist or post-positivist ontology and opened the door to a constructivist perspective.

This thesis recognises knowledge and truth as an ever-changing phenomenon which social actors obtain through experience. Guba (1990) defines knowledge as a human construction that is “never certifiable as ultimately true but problematic and ever changing” (p.26). This research is approached from the recognition that there is no singular truth to the organisational DMP behind implementing ATPT, but rather decisions are made on the basis of experience of individual social actors. Hence, an ontological paradigm of constructivist through the position of relativism is taken in this research.

Guba (1990) defines the objective of constructivist research as “neither to predict and control the “real” world nor transform it but to reconstruct the “world” at the only point at which it exists: in the minds of constructors. In the context of this research, the nature of ATPT

is a constantly changing phenomenon, in which the strong argument can be established that there is no ‘real’ world that can be captured, but rather a reconstruction of the experience which exist from socially and lived experienced of social actors (Lincoln et al., 2018) using or adopting ATPT. While a component of this thesis seeks to identify good practice around the adoption of ATPT, it is important to reflect on good practice not as a form of explicit truth, but rather a process shaped over time through experience and knowledge of people within the field of practice.

On the basis that reality exists through the mental constructions of individuals who experience it, the following section (section 3.1.2.) on epistemology presents the strategy used to grasp and understand the particular context used in this research.

### **3.1.2. Epistemology**

This section focuses on epistemological considerations which Bryman and Bell (2015, p. 26) frame as how the “social world can and should be studied”. Hesse-Biber and Leavy (2004) and Willis (2007) further assert epistemology enquiry as concerns into nature into which the nature of the social world is represented in research to portray a form of reality. Hence, by aligning with a constructivist paradigm, an epistemological stance needs to be considered to understand who the best exhibitors of knowledge are to understand how organisational decision-making processes are made. Orlikowski and Baroudi (1991) categorise epistemology into three main perspectives: Critical Studies, Interpretivist, and Positivist.

To signify the ever-changing knowledge of the social world in relation to our understanding of ATPT, the only way of accessing the construction of knowledge and experience of the human mind is through an interpretive subjective epistemology (Guba, 1990). Bryman and Bell (2015) recognize the use of interpretivism in research as the method which enables the elicitation of participants world views in the field of research. From this

perspective, an interpretivist paradigm presents value towards gaining insight while also giving a voice and opening a social dialogue which can be used of to understand the perspective of organisations and how ATPT will impact the future of work.

The justification for identifying my epistemological stance as interpretivist is through recognizing the valuable source of experience and knowledge exhibited by social actors who work in an organisation (Bryman & Bell, 2015). Top management within organisations have experience and insight into how decisions are made around incorporating ATPT.

Willis (2007) conveys the meaning of interpretivist research as “not the discovery of universal laws but rather the understanding of a particular situation” (Willis, 2007, p.111). Linking back the ontological paradigm of constructivist, the interpretivist approach is further ingrained into the ontological paradigm of constructivist (as discussed above) through the way interpretivist attempts to understand a particular situation that has ultimately been experienced by individuals involved. This process is typically referred to by Guba and Lincoln (1989) and Lincoln, and Guba (1985) as the merging of constructivist and interpretivist paradigms due to the interrelation both paradigms have.

Although an interpretivist approach has been identified, it is important to recognize the limitations of such an approach. Willis (2007) concludes one of the fundamental limitations of interpretivist approach is the extent in which subjectivity dominates research findings due to the general nature of inconclusiveness of the research. According to Flick (2004a), a constructivist epistemology of an interpretivist is based on the construction and interpretation of knowledge within a particular social setting. In recognition of this an Anglo-Saxon model will be reflected on within the social environment of New Zealand. To identify the relevant social actors who hold the relevant knowledge to address this research, top managers have been identified as holding the relevant knowledge into the organisational DMP.

With a defined ontological stance of constructivist focusing on understanding how reality is an ever changing, and an interpretivist perspective to understand the social actors in which reality is recognised, the following section (section 3.2) focuses towards recognising this approach in reflection of the relationship between research and theory.

### **3.2 Relationship between research and theory**

Kennedy (2018) raises the importance for research to consider the relationship between theory and data as it lays the foundation to how research is approached and the significance this has towards developing new knowledge and building on existing knowledge. Typically, research is presented from the perspective of either inductive, deductive or abductive approach (Reichertz, 2004).

Deduction or deductive theory commonly defines the relationship between research and theory as the process of using theory to test a hypothesis in research through research findings (Bryman & Bell, 2015). Peirce (1878a) aligns a deductive approach with the form of testing a hypothesis or probability through the use of quantitative reasoning. Hypothesis is typically developed through reasoning with what is known vs what is unknown, and establishing the probability in which the hypothesis can be tested (Peirce, 1878a). In this sense, a hypothesis can be recognized as the process of drawing upon existing theory to explain a phenomenon. However, this raises questions around whether or not a hypothesis can and should be formed within the context of an interpretive subjective social world that has little to no preexisting knowledge on the organisational DMP behind adopting ATPT. Furthermore, what theory can support the construct of knowledge and our understanding of the social world.

In consideration of a constructivist ontological paradigm, a hypothesis is by large built around the construct of truth (which is largely associated with a positivist or post-positivist paradigm), and if there is no explicit truth, due to the nature in which reality is a construction

of knowledge based on experience, the forming of a hypothesis cannot be justified for the purpose of this research. Although this research draws upon organisation theory, stakeholder theory, and STS theory, they are by no means of a suitable method alone to test a hypothesis as they have predominantly been used as theories to support the approach for this research to understand the complexity of organisational DMP.

With what is commonly recognised as the opposite of deduction, an inductive approach approaches research from the opposite direction where the data collection and findings of the research can lead to the development of theory (Bryman & Bell, 2015). While theory development is a potential outcome of an inductive approach, Flick (2004b) recognises that this is not necessarily a requirement of inductive research, as research can be focused predominantly on addressing gaps within the literature. This is further reiterated by Fisher (2018) who argues that an inductive approach should not be conformed to the universal approach such as theory development.

Norton (2010) distinguishes one of the key differences between deductive and inductive reasoning as deductive being conformed to universally applicable schemas, while inductive is largely warranted by facts. Norton (2003) construes the notion that inductive reasoning has been regularly misled in an attempted to conform to a universal schema, similar to which deductive based reasoning is conformed to. One clear example of this is the way in which inductive reasoning commonly characterized as the process for developing theory, which is what Norton (2003) advocates as restricting the scope of an inductive approach. However, this plays on the common critiques of inductive research with a subjectivist approach can be too subjective. However, the underwriting of this suggests that to understand the viability of an inductive approach research should be evaluated on a case by case basis based on facts (Norton, 2010).

Ketokivi and Mantere (2010) recognize several shortcomings of an inductive approach, mainly in relation to the generalizability of findings using such an approach. This concern is mainly in relation to an inductive approach does not guarantee the development of theory, especially in research that is primarily exploratory. However, Jebb, Parrigon, and Woo (2017) identify ‘phenomenon detection’ or exploratory research as the fundamental phase before theory development, which remains a viable element of inductive research.

Upon taking both inductive and deductive approaches into perspective an inductive approach was initially selected. This was primarily due to the limited nature of literature and pre-existing theories which relate to the organisational decision-making processes behind incorporating ATPT. While a capitalist stance could be approached to argue that ATPT will be introduced to reduce employee numbers while boosting productivity, there is no indication this is necessarily the case, especially with developments into corporate social responsibility and good practice. However, upon reflection of an inductive approach it became apparent that it failed to both acknowledge and do justice the use of the three theories incorporated into this thesis: organisation theory, stakeholder theory, and STS theory. It is important to iterate, the recognition of these three theories are not to determine a hypothesis, but rather help support the approach to understand this phenomenon, which is especially critical with the limitations of the literature. Subsequently, an abductive approach has been used in this research due to the ability to maintain the exploratory nature of this thesis while also acknowledging the influential theories which helped construct the approach taken in this thesis.

Abduction is defined as a bridge between a deductive and inductive approach, which maintains the ability to draw upon influential existing theories while at the same time. Although both a deductive and inductive reasonings are common practice in post research, Niiniluoto (1999) and Peirce (1878b) observe there to be a large class of reasonings which cannot be confined to either a deductive or inductive reasoning. Early developments into an abductive

approach by Peirce (1878b) remained fixated on the notion of using a hypothesis to explain a phenomenon, in other words, abduction was originally a form of induction with the inclusion of a hypothesis. However, this once again entered the philosophical discourse around the use of a hypothesis in relation to ontological and epistemological paradigms. Ketokivi and Mantere (2010) interpret deductive reasoning as the use of hypothesis derived from theory. However, the advancement of an abductive approach provide strategies which recognizes that the use or of theory does not need to be presented in the form of a hypothesis, but rather as an acknowledgment to existing knowledge as a method of understanding the reality of a little known field (Ketokivi & Mantere, 2010; Niiniluoto, 1999). Hence, why an inductive approach could have been used in this research, this would have failed to acknowledge the influence existing theories of organisation theory, stakeholder theory, and STS theory had on the design of this research. It is important to clarify, these three theories were not used to structure the research, but rather acted as a guideline to breakdown the complexity of the organisation. Furthermore, the use of these three theories do not assert an explicit truth, but rather the nature of how decision makers, stakeholders and employees experience the social world in relation to developing technologies of ATPT.

Having established this research being conducted with a constructivist and interpretivist paradigm in addition to an abductive approach, the following section (section 3.3) introduces the research method taken for this research using a qualitative framework.



### 3.3 Establishing Qualitative Research Inquiry

Remaining closely within the pedagogy of the constructivist and interpretivist research paradigm recognised in this thesis, the research method section reflects on the use of a qualitative framework. However, this section will also provide a short overview of the additional considerations that were given between quantitative, qualitative, and mixed methods approaches. While there are some arguments that a research method does not necessarily need to be explicitly outlined (Flick, 2018), this thesis recognises the importance of reflecting on the research method to ensure the appropriate research practices are followed.

Quantitative research is defined by Bryman and Bell (2015) as the collection of numerical data which exhibits the relationship between research and theory as a deductive process that can include but not confined the use of a hypothesis and is widely based around the reliability and validity of data in which a form of reality or truth from an ontological perspective is accurately represented. Ultimately what validity represents is that research measures what was intended to be measured, while reliability is concerned with the reliability of the procedures and instruments used to measure the research (Bryman & Bell, 2015; McGregor, 2018). From this definition, quantitative research fits more closely with an positivist paradigm due to the attempt to present the truth through numerical analysis of validity and reliability.

From a qualitative perspective, not all data can and should be collected with numbers, especially a phenomenon that has little pre-existing knowledge such as the impact of ATPT on the future of work. Furthermore, due to the current limitations of the literature, it is important to collect a rich data set to establish themes throughout the literature, which is not possible through a quantitative framework.

In contrast to quantitative methods, qualitative research is more concerned with the use of understanding reality through the use of text as opposed to numbers (Matt, 2004). Methods of qualitative data collection can include interviews (i.e. structured or semi-structured), visual images, written texts and documents, observations and case studies (Remler & Van Ryzin, 2014). Remler and Van Ryzin (2014) outline the method of data analysis in qualitative research as the process which involves interpreting meaning from the data which is highly beneficial when there is little pre-existing knowledge within a particular field of research.

According to Kardoff (2004) The use and benefits of qualitative research is largely attributed to the knowledge generated from an open research enquiry which enables a greater freedom to explore the social world. Due to the more subjective nature that constitutes qualitative research, the standard rules of reliability and validity in quantitative research are unable to be applied. Janesick (2000) raises the issue of appropriating a quantitative framework of credibility, validity, reliability, and generalizability within a qualitative paradigm. Largely, this is due to the nature in which quantitative researchers discredit qualitative research due to not having these four components. However, because qualitative research aligns with research paradigms that are not designed to establish absolute truth, a qualitative framework cannot conform to concepts used for quantitative research which attempts to measure truth through validity and reliability. Instead, Lincoln and Guba (1985) suggest two different criteria to evaluate research using trustworthiness and authenticity frameworks.

Qualitative method aligns more closely with a constructivist paradigm due to the nature in which truth does not exist, but rather knowledge and experience in which the individuals who experience it through an interpretivist subjectivist perspective. While one of the benefits of qualitative research is the ability to collect a rich data set, Kardoff (2004) recognises this as one of the main limitations to the approach at the same time due to the data being too subjective in which the findings are unable to relate to a specific context. However, in support of a

qualitative framework from a constructivist and interpretivist perspective, subjectivity is required to breakthrough the levels of knowledge which is contained within the social setting.

The final approach that was considered was mixed methods framework which incorporates both quantitative and qualitative research methods (McGregor, 2018). Teddlie and Tashakkori (2010) recognize mixed methods research as the rejection of selecting an either-or approach to qualitative or quantitative methods. Ultimately, mixed methods uses both confirmatory methods from quantitative data and exploratory methods from qualitative data to develop a variety of research designs. It is important to note that there is no general guidelines for mixed methods research, as it is highly dependent on what is being mixed within the context of research (Cameron, 2011).

Bryman and Bell (2015) and McGregor (2018) presents three basic research designs in which mixed methods could be used: (1) using qualitative data to create a theoretical framework followed by quantitative data to test the theory, (2), quantitative methods to statistically analyse data followed by qualitative to analyse any anomalies in the data, and (3), collect both quantitative and qualitative data at the same time and analyse the commonalities or contradictions in the findings of the data. However, combining both quantitative and qualitative data have significant limitations, especially where ontology and epistemology are concerned due to the incompatibility of opposing paradigms (Bryman & Bell, 2015; Cameron, 2011; Guba, 1990). Further along this line, the research design may suffer due to the attempt to find a research design to suit both quantitative and qualitative data as opposed to a best-fit approach.

After an in-depth review of quantitative, qualitative, and mixed methods approaches in addition to the limitations in the literature and the constructivist and interpretivist paradigms

used for this research, a qualitative research design was identified as the most suitable approach for this research.

### **3.3 1 Qualitative Method Trustworthiness and Authenticity**

Although qualitative research was briefly discussed above among quantitative and mixed methods research designs, this aims to present how the use of a qualitative research design will be considered and applied within the context of this research. While it may appear obvious, a qualitative framework has been selected for this research not only due to the nature of holding a constructivist and interpretivist paradigms, but also due to the requirement to construct reality which cannot be achieved through the likes of quantitative research due to what I would argue as the subjective nature of quantitative research having predefined fields and the inability to explore further into themes as they emerge. The purpose of this section is designed to introduce the trustworthiness and authenticity principles which were followed throughout this research.

As outlined earlier, alternatives to the use of reliability and validity in qualitative research is trustworthiness and authenticity. Lincoln, and Guba (1985) break down the assessment criteria for operationalising trustworthiness into four key components consisting of credibility, transferability, dependability, and confirmability. To explore this further, Table 3 provides an overview how each of the trustworthiness elements have been operationalized.

Table 3: Underlying components of trustworthiness

Trustworthiness	Recognised Techniques	Research Approach
Credibility	<p>There are a number of techniques which have been identified in the literature to enhance the credibility of constructivist/interpretivist research including; member checking (also known as respondent validation), Triangulation, audit trails, and prolonged engagement (Guba &amp; Lincoln, 1995; Lincoln &amp; Guba, 1985; Nowell, Norris, White, &amp; Moules, 2017).</p>	<p>To ensure the credibility of this research, a number of the recognised techniques have been adopted including triangulation, respondent validation, and prolonged engagement.</p> <p><u>Triangulation:</u> Triangulation was achieved through triangulating the data between top managers and union representatives</p> <p><u>Respondent validation:</u> Respondent validation consisted of providing participants in this research with the opportunity to review the transcripts from the interviews and to make any changes if required.</p> <p><u>Prolonged engagement:</u> Prolonged engagement was an important aspect of this research, where due to the triangulation of data between top managers and union representatives – when new themes emerged it was important to use follow up interviews with participants to reflect on the emerging themes.</p>

Transferability	Transferability is recognised by Lincoln and Guba (1985) as the qualitative comparison to external validity, where a ‘proper’ representation of the social actors through the use of thick descriptions.	Thick descriptions of the data from both top managers and union representatives was used in the form of vignettes to provide a detailed description from the interviews to ensure that the participants meaning remains visible in the presentation of data
Dependability	Dependability is recognised as through the documentation of the logical and traceability of the research (Schwandt, 2014). This is recognised by Lincoln and Guba (1985) as an overlap with credibility, where both triangulation and audit logs are a recommended approach	Due to the independently led nature of this research and available funding, an audit approach was not used – which consisted having a third party review the transcripts and code the data. However, this thesis incorporates detailed documentation of the data, methods, and decisions which Tobin and Begley (2004) recognise as key components of audit logs. Furthermore, this research uses triangulation which Lincoln and Guba (1985) recognise as the authentication of the two data sets.
Confirmability	Confirmability is recognised by Tobin and	Key components of audit logs included in this research consists of raw data, data

	<p>Begley (2004) and Lincoln and Guba (1985) as the subset of dependability with the use of audit trails/logs.</p>	<p>reduction, data reconstruction, process notes materials relating to intentions, and instrument development information (Halpern, 1983)</p>
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The first column in Table 3 represents the four key areas which determines how trustworthiness is operationalized. The middle column presents the recognised techniques achieving the component for operationalising trustworthiness, with the third column outlining the approach taken in this research to operationalize the respective trustworthiness component. The research approach outlined in Table 4 only provides an indicative guideline for the approach taken for this research, and will go into thorough detail throughout the relevant sections of both this chapter and the following chapter on data analysis.

The final unique feature to qualitative research recognised by Schwandt (2014) is authenticity. Authenticity consists of fairness, ontological authenticity, educative authenticity, catalytic authenticity, and tactical authenticity which Bryman and Bell (2015) outline as elements which address the wider political impact of this research. The recognition of authenticity hold significant relevance in this research as it places emphasis on the construction of the phenomenon being studied (Tobin & Begley, 2004) which strongly aligns with the research paradigm identified earlier in this chapter of constructivist and interpretivist.

Fairness:

Bryman and Bell (2015) recognise fairness as the representation of different viewpoints within the social setting of the research. Fairness of this research has been reinforced through the transferability component of this research through the use of triangulation. While it is easy for this research to only focus on top managers as participants, this may not represent a fair

description of events on the future of work as organisations may have the tendency to approach the adoption of ATPT from a positive perspective. Hence, it is vital that union representatives are also recognised in this research to understand the impact from both organisations and employees and additionally reinforced by STS theory through understanding the relationship between organisations, ATPT, and employees.

### *Ontological authenticity:*

Manning (1997) establishes the significance behind ontological authenticity as the support of constructivist and interpretivist enquiry through addressing whether the research experience and process improved the participants conscious experience of the world. The significance behind this research relates directly to ontological authenticity, where outlined in section 1.4 in Chapter 1 of this thesis, this research is designed to create a social dialogue between organisations, unions, researchers, and policymakers to collaboratively manage the impact of ATPT on the future of work and to establish a form of good practice as ATPT becomes more prominent throughout the fourth industrial revolution.

### *Educative authenticity:*

Educative authenticity builds on ontological authenticity in the context where Manning (1997) stresses the importance to question whether the research not only improved the participants understanding of the world, but the awareness of other people who may benefit from the research. Addressing educative authenticity reflect back on social economy, where the impact of ATPT is not only the responsibility of organisations, but all members of society with a particular focus on Anglo-Saxon economies. The outcome of this research is intended to support and foster good practice to ensure that society is able to prepare for the impact ATPT may have on the workforce.



Catalytic authenticity:

Catalytic authenticity further recognises how society will benefit from this research through the process of how the research promotes practice and action (Manning, 1997). Understanding this was particularly important as initially this research was designed to be submitted to academic journals. However, it is important to acknowledge that academic journals do not cater for all audiences which can benefit from this research including employees and governments. Taking this into consideration, in addition to submitting the results to relevant academic journals, the results from this research will also be submitted to the relevant entities including the 'Future of Work Tripartite Forum' in New Zealand (Ministry of Business Innovation and Employment, 2021) and the New Zealand Productivity Commission's enquiry into technological change and the future of work (New Zealand Productivity Commission, 2019) to begin with.

Tactical Authenticity:

The final criteria for authenticity is recognised as tactical authenticity which Manning (1997) as the process of empowering subjects to take relevant action on the outcome of the research. Continuing on from catalytic authenticity on ensuring the benefit of this research is available to the relevant audiences, tactical authenticity is inspired by the empowerment of the research on the subjects (Freire, 1996). Manning (1997) further acknowledges "respondent's testimony, consent forms, dialogical conversation, member checking, and inquiry product accessibility" (p.111) as vital components of tactical authenticity. In wider recognition of this and in accordance with an interpretivist stance, participants in this research are recognised as making an equal contribution to this research as the researcher due to the significant role they had in the recognising their experiences to construct reality.

One of the common themes throughout understanding authenticity is the deep interrelation each of the five criteria have with each other. Furthermore, this significance holds strong similarities to the universal ethical principles and the Treaty of Waitangi Obligations and Principles which was given significant consideration for this research, including preliminary consultations with members of the community to understand the impact of this research on the community.

The next section (section 3.4) in this chapter brings together the previous three sections of this chapter consisting of constructivist and interpretivist paradigms, abductive approach, and qualitative into the research design which marks into the application of research practices while maintaining the philosophical outlook as previously discussed in this chapter.

### **3.4 Research Design**

Research design is considered by Flick (2018) as the link between “theoretical frameworks, questions, research, generalization, and presentational goals with the methods used and the resources available” (p. 102). Due to the vast elements which are comprised within a research design, there is a heightened tendency for elements of alternative research designs to overlap or build off of each other, creating the possibility of overlooking potential alternatives. Hence, a thorough review of research designs is important. While this thesis could easily go into detail about several research designs that were considered, it has been reduced to the most relevant which align with the scope of this research, particularly from the standpoint of constructivist, interpretivist, and qualitative research method which was discussed in the previous sections of this chapter. Hence, Case Study, Comparative Studies, Longitudinal study, and Snapshot sights were the key research designs considered for this research. This will further contribute towards illustrating the process of thought behind how the research design was selected.

Early consideration was given around the potential use of case studies for this research which McGregor (2018) describes as an in-depth exploration of a particular phenomenon or situation. Ragin and Becker (1992) expands on this through pinpointing the main focus of case studies as the provision of an accurate description of into a phenomenon through a case or case studies. Most importantly, a case study is not limited to one particular case, but can be a comparison between multiple cases (Remler & Van Ryzin, 2014) including a comparison between organisations. While the use of case studies does have its merits in this research, one of the limitations with the use of case study in this research is the need for an exploratory nature towards understanding organisational decision-making processes through a range of different industries and sectors. The primary reason for this is variables impacting a particular case might be completely different between industries, thus limiting the findings of this research. This recognition is primarily due to the impact a constructivist and interpretivist viewpoint has on research. This is not to say case studies were completely ruled out, but rather led towards a shift in research design towards the use of snapshot research design.

Snapshot research design is defined as the collection of data from experts within a particular field and compare between each other (Flick, 2018). The identification of experts is holds particular significance to the research paradigm of interpretivist, where it is important to understand how decisions are made behind incorporating ATPT from the perspective of top managers. This is further cemented within understanding a particular phenomenon within a given point in time which aligns with the constructivist paradigm identified earlier in this chapter due to the notion that reality is constantly changing and the research design needs to align with this recognition. Flick (2018) presents one of the key contributions of a snapshot research design as focusing the research towards understanding or describing a phenomenon within a particular field to analyse current practices. This is a critical element for this research,

as the outcome of the research is to identify current practices of the adoption of ATPT and to outline potential solutions to minimise the impact on employment.

The research design used in this thesis involved data collection from two participatory groups: top management and union representatives. Although top management alone could have been sufficient to address the research questions outlined in chapter 1, there remains a need to understand the impact of ATPT from both the organisational and employee standpoint. On this basis, the use of snapshot design was used for this research.

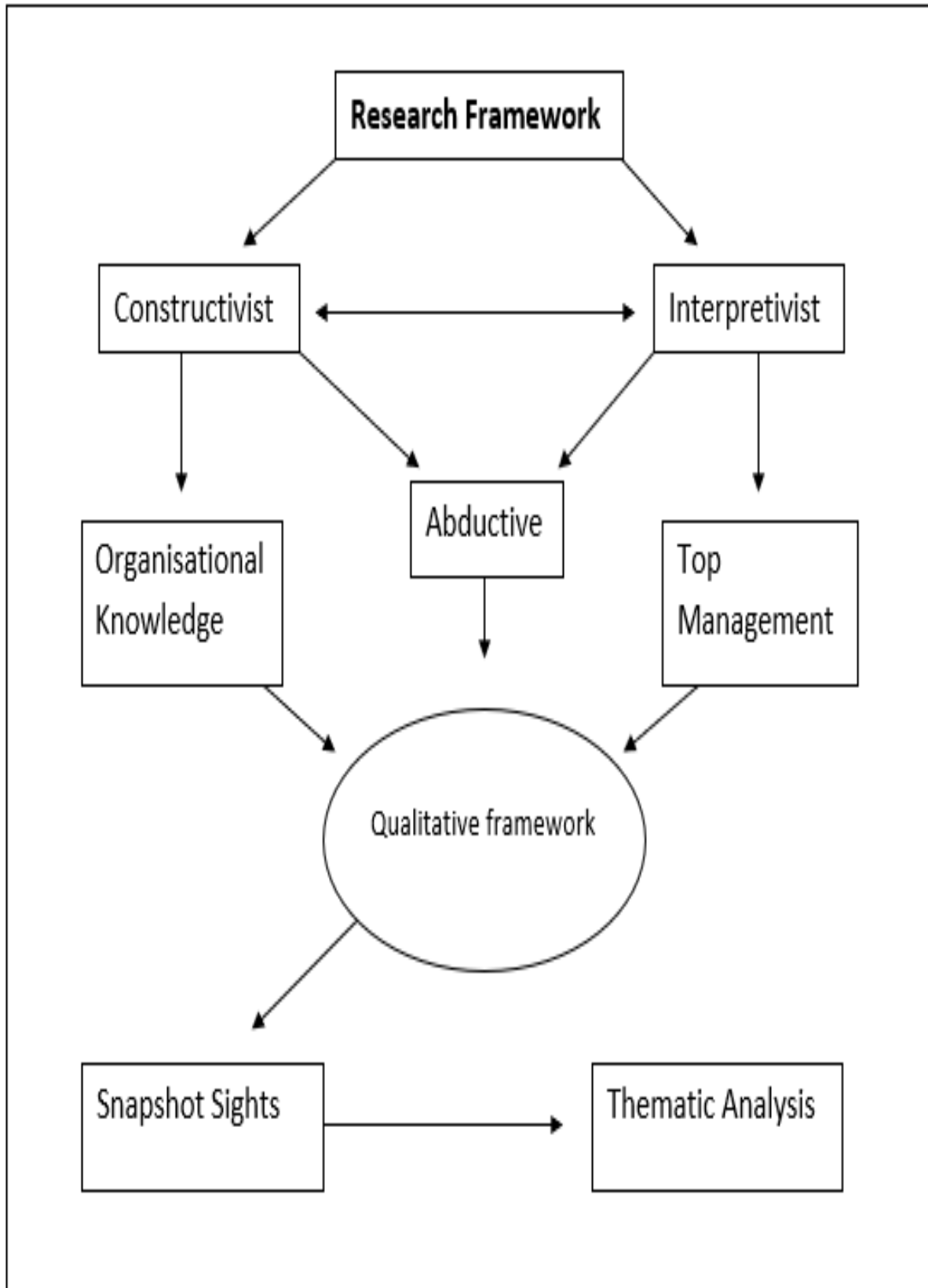


Figure 7: Representation of research framework

The method of data analysis used in this research consists of thematic analysis with an abductive approach which is presented in chapter 4 of this thesis. While the interview questions were designed around an inductive approach, it remains important to give recognition to the theories which helped shape the understanding of organisations. On this basis, Figure 7 details the overview of the research design that was used for this research.

Earlier in this chapter, this thesis demonstrated the significance of constructivist and interpretivist research paradigms due to the nature in which they are both deeply embedded within this research through the qualitative framework including trustworthiness and authenticity criteria. The following section marks a transition away from the philosophical underpinnings of this research onto the research methodology (section 3.5). The research methodology includes identifying the participants, sampling method, data collection, and data analysis process.

### **3.5 Methodology**

As outlined in chapter 1, the research questions of this thesis are to understand the organisational DMP behind adopting ATPT and the subsequent impact on employment. To translate this objective into the form of a methodological perspective, the process of constant reflection between my research paradigms from an ontological, epistemological, and abductive approach outlined earlier in this chapter were put into consideration when developing the methodology to ensure the relevant data sets were being collected. The research methodology focuses on outlining the process of research including the research design and participants, sampling method, and data collection (O'Dwyer & Bernauer, 2014). To address the research questions, two primary participatory groups were included/targeted in this research: Top managers (section 3.5.1) and union representatives (section 3.5.2). The two groups of participatory have been divided into two sections to maintain cohesive clarity when presenting the methods used due to the variance in methods and techniques adopted with the two groups

of participants. The structure of each section presents the participants, sampling method, data collection, and data analysis. To bring the importance of both top managers and union representatives together, section 3.5.3 introduces the use of triangulation as the approach used to understand this research from the multiple perspectives of top managers and union representatives.

### **3.5.1 Top Managers**

#### *Participants*

One of the early challenges encountered in this thesis was the identification of the appropriate social group with the relevant knowledge and experience to provide insight into this research. Although managers were identified as holding the relevant knowledge necessary to understand the organisational decision-making processes behind incorporating ATPT, the title of ‘manager’ does not guarantee a person to be responsible for the organisational DMP behind adopting ATPT due to the organisation hierarchy which is embedded throughout society. The decision to identify the appropriate group with insight into the organisational DMP came down to Hatch’s (2018) organisational hierarchy pyramid which consists of three levels: Lower level management, Middle management, and Top management.

Lower management consists of operational decisions in which daily tasks are performed. While this level of insight could be beneficial in terms of the implementation of ATPT, there remains a lack of insight into the actual DMP behind incorporating the technology while middle management is responsible for institutional and organisational decisions (Hatch, 2018). Hatch (2018) defines top management within the organisation hierarchy as people who are responsible for institutional decisions and strategy of the organisation. Participants within top management positions have been identified as having the relevant insight into this phenomenon from a social context and are situated towards establishing organisational

practices and required to identify organisational practices behind incorporating ATPT. Top management participants will consist of both public and private sectors.

The justification for identifying top management is due to the knowledge and experience in which that level of top management is likely to hold when it comes to the organisational DMP behind the adoption of ATPT. Furthermore, while lower level management could have been included, it is important to note that lower management are not always involved in the DMP, but rather the implementation of such decisions. While prior knowledge of ATPT is not essential for this research, participants were required to have some knowledge around ATPT in relation to the participants organisational context. Participation in this research was voluntary, and all participants were offered the option to receive a copy of the results once available.

A total of 34 top management participants were included in the final report of this research. The breakdown of this consists of 17 top managers from the private sector and 17 top managers from the public sector. The initial proposed sample size was a total of 40, with 20 from the public sector and 20 from the private sector. However, this was only used as an indicative guideline and following the integrated practices between data collection and data analysis, data saturation was recognised to have occurred at approximately the 22<sup>nd</sup> interview with top managers.

### Sampling method

Sampling is generally described as the process in which participants are selected from a wider population to produce statements which can be applied to people outside of the participatory groups (Flick, 2018). This has created issues around sampling decisions to ensure that sampling can adequately present findings relevant to target groups beyond those who participated. One of the common distinctions around sampling is through how quantitative and qualitative



research typically differ in the generalizability of results. Quantitative research generally resolves around probability sampling while qualitative research is more commonly associated with theoretical sampling and purposive sampling (Bryman & Bell, 2015). Maxwell (1997) urges the importance of making decisions around sampling with constant considerations for the research design, conceptual framework, participants, and the feasibility of data collection and analysis. In other words, the sampling method adopted act as a bridge between the research paradigm and collection of data through the way the data is collected to understand the reality of the social world.

Although the research in this thesis has already outlined a qualitative approach, it remains relevant to present the comparison between probability sampling and purposive sampling to reinforce the decision-making involved in conducting this research. Probability sampling is defined as the technique which is orientated towards developing a substantial populational representation or specific subgroups in which the probability of inclusion of groups and subgroups in the population are able to be determined (Charles Teddlie & Yu, 2007). Although probability sampling is typically concerned with quantitative research, Bryman and Bell (2015) recognize the merits of probability sampling in qualitative research under two circumstances: first when qualitative research requires the ability to generalize, and second if the research is not designed towards a particular category of people. Both circumstances presented by Bryman and Bell (2015) failed to meet the requirements for this research. The first condition of generalizability might be relevant if this research focused on the percentage of employees impacted by organisational adoption of ATPT. However, the direction and purpose of this research is to understand organisational decision-making processes where it remains more critical to gain insight into a range of perspectives than to present a generalization of results. This builds into the second condition, where to it remains impractical to gain insight into organisational decision-making processes through the use of

probability sampling due to the accessibility to the relevant participatory group of ‘top managers’ required in addition to the length of time it would take to establish an adequate sample for this research.

Theoretical sampling is largely considered as the sampling process for the generation of theory which is designed to collect, code, and analyse data to decide “what data to collect next and where to find them in order to develop his theory as it emerges.” (Glaser & Strauss, 2017, p. 45). By this definition, Bryman and Bell (2015) categorise theoretical sampling as a form of purposive sampling due to the approach used to specifically target groups of participants relevant to the development of theory. One of the limitations of theoretical sampling is the potential to overlook certain themes that might not align with the developing theory. While this is not to discredit the use of theoretical sampling, upon making decisions around the relevance of theoretical sampling in this research imposes restrictions around the freedom to thoroughly explore organisational decision-making processes without the need to conform to theory.

For this specific research, it is more feasible to approach from purposive sampling due to the specific requirement of participants required to hold a position within top management responsible for organisational decision-making processes. Purposive sampling is defined in the literature as the unique selection of participants based on the relevant information and experience of participants to answer the research question (Bryman & Bell, 2015; McGregor, 2018; Remler & Van Ryzin, 2014). In the case of this research with participants required to be responsible for organisational decision-making processes within a top management level, it was necessary to identify participants through purposive sampling to ensure the relevant target group was identified. Sources used to identify top managers through purposive sampling included company searches, LinkedIn, company webpages and my personal network. The justification for selecting purposive sampling is due to the specific requirement for participants

to hold a position within top management responsible for the decision-making processes behind incorporating ATPT. This sampling method ensured that participants had the relevant knowledge and experience to participate in this research, which also takes into consideration my interpretivist paradigm (outlined in section 7.1) which acknowledges the importance of top managers experience and knowledge into the decision-making processes behind incorporating ATPT. With top managers the primary focus of this research made it not feasible or practical to approach this research using form of probability sampling approach. One of the benefits of purposive sampling as the process of developing in depth information which can be extremely beneficial when specific information or insight is needed to address a particular phenomenon (Patton, 2002). Identifying top managers had added difficulties as it were due to gaining access to the organisation and finding the appropriate top manager to contact within an organisation. In comparison to theoretical sampling, the focus of purposive sampling is not to develop theory per say but focus on gaining and developing insights and contribution of knowledge into a particular phenomenon with the potential to develop theory (Flick, 2018) which builds upon the constructivist and interpretivist research paradigms.

However, the use of purposive sampling can be considered as a relatively broad term due to the vast range of different strategies and procedures used to conduct purposive sampling. One of the strategies presented by Teddlie and Yu (2007) is the notion of sequential and non-sequential sampling, also referred to as priori and contingent sampling by Hood (2007). Priori sampling is defined as outlining the sampling criteria at the start of the research and maintaining that criteria until the end of the research project, while contingent sampling is more adaptive towards including additional sample groups if the research identifies potential new groups worth including in the research (Hood, 2007). The most common characteristic of purposive sampling is the requirement of pre-determined characteristics of participants (Patton, 2002). In the case of this research, a contingent sampling method was initially adopted to maintain an

open mind around identifying any potential participants that were not initially identified. However, upon the completion of the data collection and subsequent sampling, the analysis of results suggested an adequate sample was reached and no additional sample groups were required, hence upon completion of data collection changing purposive sampling with contingent sampling to purposive sampling with priori sampling.

To support the use of purposive sampling, snowball sampling method was also adopted. Snowball sampling is defined in the literature as using proposed sampled participants identified through other sampling methods (in this case purposive sampling) to propose potential participants who have the “experience or characteristics relevant to the research” (Bryman and Bell, 2015, p. 435). Bryman and Bell (2015) recommend the use of snowball sampling in situations where it is important to gain access to a particular network such as top management. Further to this, the use of snowball sampling added an additional layer of support to the use of purposive sampling methods, where it was important to identify potential participants responsible for decision-making processes. Snowball sampling proved valuable in instances where potential participants were identified as they met the criteria of ‘top management’, but were not directly involved in decision-making processes, hence snowball sampling provided the ability to identify more relevant participants either within the organisation or externally. Other situations where this technique was used was at the end of interviews where participants were asked if they had anyone within their networks who would be relevant and interested in this research. The use of snowball sampling identified 23 potential participants in total in which 9 went on and agreed to participate in the research with the remainder of the coming from the initial purposive sampling method.

Participants identified through both purposive sampling and snowball sampling were provided with the research information sheet found in appendix section of this thesis.

The process of contacting the participants consisted of an initial inquiry to outline the purpose of the research. Once interest was registered, the participant information sheet was sent out for the potential participants to review. The consent form was not sent out at the same time as the information sheet to allow time for the potential participants to review the purpose of the research without experiencing pressure to sign the participant consent form. This process enabled participants to ask any questions in relation to participating. Upon the participants reading the information sheet and agreeing to participate in this research, the participants were then provided with the participant consent form to fill out and sign prior to commencing the interview (which can be found in appendix section of this thesis). No potential participants were rushed into participating in this research, where sufficient time (a minimum of two days) was allocated and participant led in terms of responding to agree to participate.

The decision around identifying the sample size was determined by two points of consideration: minimum number of interviews required and data saturation. Warren (2002) raises the notion around the minimum number of interviews acceptable for areas such as publishing. Guest, Bunce, and Johnson (2006) conducted a study using data collected from perceptions around social desirability bias within reproductive health research to understand when data saturation is achieved. Similar conditions were used in this research as the approach used by Guest et al. (2006) with the use of purposive sampling, semi-structured interviews, and thematic analysis. Findings from Guest et al. (2006) suggest that data saturation had mostly occurred by the time twelve out of thirty six interviews were completed. The following section presents the data collection approach with top managers.

### Data Collection

In the proposal phase of this research there were two methods of data collection that were being explored within qualitative research: unstructured and semi-structured interviews. While structured interviews were considered into how they could contribute towards this

research, the decision was made early on that it would impose too many restrictions on especially with this research being approached from an exploratory perspective.

Burgess (1984) considers unstructured interviews as a form of interview which is focuses on establishing a conversation as opposed to structuring around a particular set of questions which can disrupt the flow of discussion. According to Bryman and Bell (2015) unstructured interviews can be centered around as little as one introduction question. Although unstructured interviews have the potential to raise issues that might not have been raised through a series of interview questions and probing questions, it also can have the opposite effect by failing to address any issues relevant to the research (Flick, 2018).

Semi-structured interviews on the other hand consists of an interview guideline which is more flexible by nature. This flexibility enables the participants to respond in such a way that is not restrictive in following an explicit guideline but can answer the interview questions as they arise at different points of an interview (Roulston & Choi, 2018). Bryman and Bell (2015) iterates that semi-structured interviews are not a method which allows questions to be skipped, but rather allows participants to lead how the interviews will be formatted. Semi-structured interviews enables a greater flow towards utilising the interview guideline as a guide rather than a series of questions that have to be asked in order. Due to the ability to provide greater flexibility while also maintaining a interview guideline to ensure that the research questions are addressed, semi-structured interviews were used for the data collection from top managers.

The semi-structured interviews were conducted using Zoom (online video calling). The interview guideline used for this research can be found in Appendix E section of this research. Initially, there was an option for face to face interviews however, after the disruption of COVID-19 this was no longer a suitable approach. However, it is worth noting that there were

seven instances where the participants provided the link to their own internal video calling system due to company policy and security reasons. All the interviews were audio recorded and later marked for transcription where all of the participants agreed to be audio recorded which was in detailed in the information sheet and participant consent form. Participants were provided the opportunity at the start of the interview and at the end to raise any concerns around audio recordings or general purpose of the research. No concerns were raised by participants throughout this process.

Ethics for this research was obtained on the 17<sup>th</sup> of August 2020, followed by the commencement of sampling on the 18<sup>th</sup> of August 2020 and the data collection phase of this research was completed on the 28<sup>th</sup> of January 2021 with a total data collection duration of five months and one day. Upon completing the data collection phase of this research a total of 34 top management participants were included in the final report which can be seen in Table 4 below. Of the 34 top manager, participants were made up of 17 top managers from the public sector and 17 top managers from the private sector representing twenty-two different industries/ line of work across telecommunications, agriculture, finance, healthcare, business, education, transportation, technology, architecture, energy, technical services, engineering, retail, produce, manufacturing, finance, social services, marketing, research, legal, environment, and emergency services. The shortest time for the interviews was marked at 44 minutes and 38 seconds, while the longest time was recorded at 1 hour and 9 minutes. Each interview was scheduled for 1 hour on the exception of the 44 minute and 38 seconds interview, where the interview time of 45 minutes was prearranged due to the available time of the participant. The average time for the interviews was 1 hour and 1 minute, with a total of 34 hours and 2 minutes of interview recordings, with further detail on the transcription process covered in Chapter 4.

All interviews were conducted, audio recorded, transcribed and coded independently by the researcher. Initially, the use of transcription services was considered due to the large sample size included in this research. However, after further consideration it was decided to independently and manually transcribe the interviews due to the added benefit of establishing greater familiarity of the data set required for analysing and coding the data, in addition to the available time which allowed for the manual process. Although there was available time to transcribe manually, it was critical to still use research techniques to maximise the efficiency of this process.

To maximise time efficiency, the transcription process commenced immediately after each interview was conducted. This ensured that time in between interviews was maximized to ensure that sampling, data collection, transcribing, and coding of data was an ongoing integrated process. While it may appear irrelevant as to how this process is conducted, it is important to show the consistency and thought processes that occurred at every phase of this research. This was primarily to reduce waiting times between interviews and allow for greater familiarity when transcribing. This process also became more manageable due to transcribing the gradual flow of participants rather than all at one time. Furthermore, the interrelationship between this process helped evaluate in clearer detail to determine whether the research question was being answered with the interview guideline used, while also adapting to ensure the relevant participatory groups were identified. This process also had the added benefit of identifying emerging questions throughout the data collection process which were able to be used through the form of follow up questions.

All participants were provided the opportunity to review the transcript for the data once available. In total, 19 of the 34 participants requested a copy of the transcript which was provided for review. While further details on this will be presented in Chapter 4, it is important to reflect on the credibility of the process which was followed. Of the 19 participants who



CHAPTER 3: RESEARCH FRAMEWORK

<b>Participant Code</b>	<b>Industry</b>	<b>Sector</b>
TM01	Telecommunications	Private
TM02	Agriculture	Private
TM03	Finance	Private
TM04	Healthcare	Public
TM05	Business	Public
TM06	Finance	Private
TM07	Education	Public
TM08	Transportation	Public
TM09	Technology	Private
TM10	Architecture	Private
TM11	Energy	Private
TM12	Business	Public
TM13	Technical Services	Public
TM14	Business	Public
TM15	Engineering	Private
TM16	Retail	Private
TM17	Telecommunications	Private
TM18	Produce	Private
TM19	Manufacturing	Private
TM20	Finance	Public
TM21	Telecommunication	Public
TM22	Social Services	Public
TM23	Research	Private

TM24	Technology	Private
TM25	Education	Public
TM26	Legal	Public
TM27	Finance	Private
TM28	Energy	Public
TM29	Marketing	Private
TM30	Environment	Public
TM31	Business	Public
TM32	Technology	Public
TM33	Emergency	Public
TM34	Technology	Private
Total:		Private: 17 Public: 17

Table 4: Top Manager Participants

requested a copy of the transcript, only 6 came back with requested additions to include in the transcript which revolved around including explicit detail on a process, and general information behind their organisational DMP. None of the participants who received a copy of the transcript returned with issues or request to omit data. Upon confirming the transcript participants were requested to sign and return the 'authority for the release of transcripts' document (which is located in the appendix section of this thesis) One of the issues encountered with this process was the expected delay for top managers to review and return the release of transcript authority. This included five of the top managers away on leave during this time which took (at longest) a five week period for the signed authority to be returned.

A total of three pilot interviews were conducted with top managers. This involved minor amendments to the semi-structured interview guidelines which included; In the introduction to the interview, clarifying with participants the form of emerging technologies they prefer to use (i.e., automation, AI, algorithms) as there was no consistent terminology used by participants; expanding on questions to include short-term and long-term goals to implement ATPT; and, adding questions around how COVID-19 has impacted the organisational DMP to adopt ATPT. All three pilot interviews were included in the final results as only minor changes (which had no impact on the analysis process) were made to the original interview.

In addition to the initial phase of data collection, follow up interviews were also used to clarify any additional questions which emerged throughout the research process. The inclusion of follow up interviews was particularly important for this research due to the requirement to clarify information between the two participant groups of top managers and union representatives.

### *Follow up interviews*

At the end of each interview, participants were asked if they would be happy to take part in follow-up interviews to clarify any additional questions that might emerge throughout the research process. The follow up interviews were non-obligatory and were only used as a supporting framework for this research.

In total, eight of the 34 top manager participants agreed to take part in follow up interviews. The reason for a significantly reduced number from the original data collection phase was due to top managers recognising the available time commitments following the COVID-19 disruption. In recognition of the extensive time participants had already committed

to this research, follow-up interviews were kept short and direct ranging from three to seven minutes in time to address specific questions which emerged during the data analysis process.

Table 5 outlines the participants who agreed to follow-up interviews.

*Table 5 Follow-up interview participants*

<b>Participant Code</b>	<b>Industry</b>	<b>Sector</b>
TM05	Business	Public
TM06	Financial	Private
TM14	Business	Public
TM22	Social Services	Public
TM24	Technology	Private
TM25	Education	Public
TM27	Finance	Private
TM32	Technology	Public
Total:		Private: 3 Public: 5

#### Data Analysis

While the data analysis section is covered more in depth in chapter 8 of this thesis, it is important to briefly introduce it in this chapter due to the significant relationship it has with the data collection process.

The method of data analysis used with top managers was thematic analysis with the framework method (Gale et al., 2013). The framework method was conducted using an abductive approach, where findings were used to code and develop new themes while systematically comparing to other parts of the data set and existing literature (Gale, Heath, Cameron, Rashid, & Redwood, 2013). This research adopted the use of thematic analysis with an abductive approach which contributed to how decisions were made around developing the

semi-structured interviews to ensure that participants were able to identify themes without being led to them while at the same time paying tribute to the relevant theories which contributed towards breaking down the complexity of this phenomenon.

### **3.5.2 Union Representatives**

Union representatives were identified early on as a critical component to this research project due to the valuable insight into their experiences with organisations adopting ATPT. One of the early justifications for the inclusion of union representatives was due to the potential positive outlook top managers might have when it comes to the impact of ATPT on employment. Union representatives provided the ability to understand this phenomenon from the employment relations perspective, creating a greater cohesive analytical ability of results. The identification of union representative participants provides much needed insight to understand the impact of organisational DMP behind adopting ATPT from the employment perspective.

While similar procedures were used with top managers, there are several differences which the method used to collect the data differ, hence the importance to clearly clarify these differences. Similar to the research framework used for top management, this section outlines the participants, data collection, and sampling method used throughout this process.

#### *Participants*

Although it may appear obvious, the participants for union representatives required a union worker who had experience of representing employees in a event or incident where an organisation looked to adopt a form of ATPT. Due to varying job titles with union representatives at different unions, the general term of ‘union representative’ has been used for this research.

The inclusion of union representatives in this research project was put to question during the proposal phase of this research due to the focus of this research on organisational DMP behind incorporating ATPT. Because of this, consideration was given to focus only on top managers as participants. However, it became apparent early on during the interviews with top managers that the impact of ATPT on employment required insight from both top managers and union representatives to construct knowledge from both perspectives to support the open dialogue between organisations and employees and better understand how organisational decisions impact employees from the employment relations standpoint. It is important to note, that the purpose of including union representatives is not to establish an argument of differences, but rather understand the issue from different perspectives to better understand the nature of this research.

### Sampling method

Similar to the approach used by top managers, purposive sampling with a snowball sampling approach was used to identify union representatives. This method consisted of identifying union representatives through the New Zealand Council of Trade Unions. Due to the union representatives required to have experience with organisations adopting ATPT, an integrated process of snowballing was constantly used to ensure the relevant participants were identified.. Through the use of snowball sampling, the sample concluded with a wide range of union representatives from different unions covering different sectors.

One of the difficulties with this was the requirement to identify union representatives who had experience working with organisations adopting ATPT. Hence, while the snowball sampling method for top managers was not the primary method which participants were identified, snowball sampling for union representatives ended up being the primary method

used. While there was no shortage of unions representatives willingness to participate, there were two key challenges. The first related to the available time, where at the time of data collection for this research union representatives were deeply engaged in work due to the off-set impact from COVID-19. The second challenge was the requirement for union representatives to have experience with the adoption of ATPT due to the structure of the interviews using the critical incident technique.

### Data Collection

One of the common approaches to qualitative data collection include methods such as unstructured and semi-structured interviews. However, with the case of union representatives, the focus was to understand incidents where the union representative participant was involved with organisational DMP and the adoption of ATPT. The use of critical incident technique (FitzGerald, Seale, Kerins, & McElvaney, 2008) was required to establish union representatives observations of organisational adoption of ATPT and the impact on the future of work to understand from their perspective how organisational DMP actually impacts employment. The interview guideline used with union representative can be found in Appendix F section of this research.

Flanagan (1954) defines critical incident technique as a “set of procedures for collecting direct observations of human behavior in such a way as to facilitate their potential usefulness in solving practical problems” (p. 327). The applicability of critical incident technique in this research was established through union representatives observations of organisational DMP, which links in with the stakeholder theory component of the proposed research, where unions are situated within the stakeholder relationships of organisations. Due to the nature of participants required to reflect on experience, the interview guideline was emailed to participants two days prior to the interview to allow for time to prepare their response.

The process for the interviews was consistent with the approach taken for top managers, where once a potential union representative participant was identified, they were contacted directly outlining the purpose of the research. Once initial interest was registered, the information sheet was sent to the union representative detailing the purpose of the research. Once the participant reviewed the information sheet and decided they would like to participate, the participant consent form was sent for them to sign and return. From this point, a suitable interview time was arranged between the participant and the interviewer (researcher) and scheduled.

In total, ten union representatives were identified who meet this criteria were identified and agreed to participate in this research which are all included in the final report of this thesis which can be seen in Table 6 below. An initial pilot interview was conducted with one union representative. As no changes were made to the interview guideline, the pilot interview was included in the final results of this research (which had no impact on the analysis process).



<b>Industry</b>	<b>Sector</b>
Case 1 – Finance	Private
Case 2 – Education	Public
Case 3 - Business	Public
Case 4 - Retail	Private
Case 5 – Transportation	Private
Case 6 – Healthcare	Public
Case 7 – Business	Public
Case 8 – Finance	Private
Case 9 – Business	Private
Case 10 – Retail	Private

Table 6: Union Representative Participants

All interviews were conducted, and transcribed by the researcher. All participants agreed to be audio recorded which was a requirement on the participant consent form (refer to appendix). Similar to the approach taken for top managers, union representatives were provided the opportunity to review the transcript. Out of the ten participants, eight requested to review the transcript, where several changes were made by the participants with minor additions being made to expand on earlier detail discussed in the interview. This was a relevant component of the critical incident technique which provided the opportunity for participants to reflect on additional detail they may have overlooked in the original interview. Upon reviewing the transcript, the eight participants were required to sign and return the ‘authority for the release of transcripts’ document (which is located in the appendix section of this thesis).

The high response for reviewing the transcript between top managers and union representatives can potentially be linked to the duration of the interview, where the average time between the ten union representatives was 25 minutes and 8 seconds. This is in comparison to the average time with top managers which was 1 hour and 1 minute. The justification for the shorter time with union representatives was due to specifically focusing on certain scenarios in addition to providing the interview guideline to the participants two days prior to the interview which contributed towards participants establishing familiarity with the questions. This is important to note as the interview structure used for union representatives was considerably longer than the interview structure used for top managers (which both are located in the appendix section of this thesis). The interview questions consisted of a total of 15 open ended questions which were divided across three phases: Identifying the incident, Specific actions taken, and future impact on employment. The interview guide consisted of seven open ended sub questions to probe further questions around the incident if required in the interview.

Union representatives were also provided the option for follow up interviews. However, the participants preferred to review the transcript as opposed to a follow up interview due to the limited time available when scheduling an interview. While COVID-19 has been widely recognised as a contributing factor to available time, the period the interviews were conducted with Union Representatives was the end of year period between November to December 2020.

The findings were compared and contrasted against the Framework matrix for analysis of top management DMP behind incorporating ATPT and the impact on the future of work. To explore the process of analysis further, section 3.5.3 presents the triangulation approach used in this research.

### 3.5.3 Triangulation approach for Top Managers and Union Representatives

The research framework will consist of using triangulation, which Bryman and Bell (2015) define as an approach which uses multiple theoretical perspectives, sources of data and methodologies into different levels of social reality. Miles and Huberman (1994) stresses one of the fundamental reasons for triangulation is to develop a greater understanding and explanation of a phenomenon. The use and design of triangulation for this research placed an emphasis on understanding the impact of ATPT on the future of work from two key justifiable sources of information: top managers and union representatives.

Denzin (1970) identifies four forms of triangulation: data triangulation, investigator triangulation, methodological triangulation, theoretical triangulation. The approach taken in this research uses a combination of both data triangulation and methodological triangulation. Data triangulation is recognised through recognising the multiple perspectives of both top managers and union representatives.

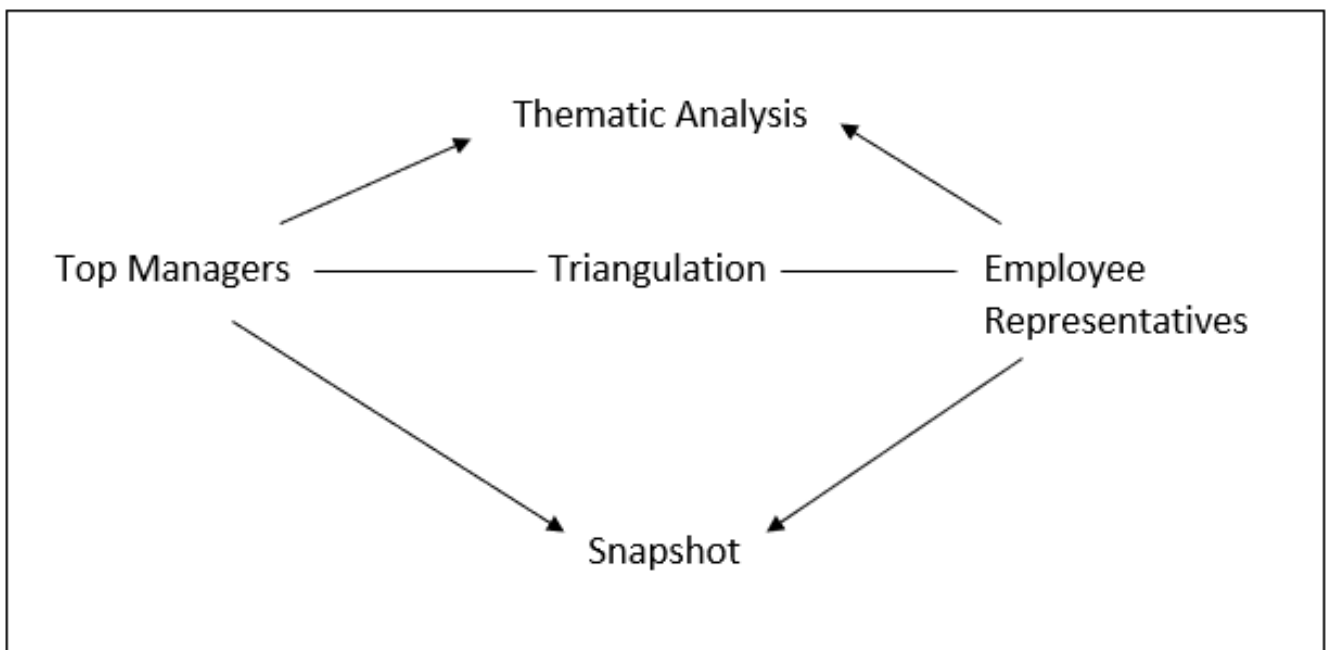


Figure 8: Levels of triangulation in data collection (adopted from Flick, 2018, p.539).

This approach reinforces the research paradigm of constructivist and interpretivist due to the ability to construct reality from multiple perspectives of social actors who hold the relevant information into the impact of ATPT on the future of work. Methodological triangulation on the other hand is recognised through the use of critical incident technique to understand how organisational adoption of ATPT has impacted employment from the experience of union representatives. An overview of the triangulation approach can be seen in Figure 8 above. Further detail on the triangulation process will be presented in chapter 4 on data analysis.

The following section (section 3.6) raises the ethical considerations for this research which due to the nature of research focusing on organisational DMP and union representatives experience, in-depth ethical considerations were required.

### **3.6 Ethical considerations**

This section of the thesis presents the ethical considerations used throughout this research project, which is divided into three sub sections. Section 3.6.1 outlines the universal ethical principles taken into consideration throughout the entirety of this research, followed by Treaty of Waitangi Obligations and Principles (section 3.6.2) and section 3.6.3 on the full ethical approval obtained for this research project.

#### **3.6.1 Universal ethical principles**

Early guidelines for ethical practice involving human subjects were introduced through The Belmont Report (1979), which presented three 'basic ethical principles' involving human participants: Respect for Persons, Beneficence, and Justice. Murphy and Dingwall (2001) has since expanded on these three principles through what has been more widely recognized as universal principles: Autonomy, Non-maleficence, Beneficence, and Justice which have all been given serious consideration through this thesis.

### Autonomy

Autonomy was considered and integrated throughout this research through recognising the importance of avoidance of harm through establishing high integrity and autonomy through maintaining privacy and confidentiality. This required careful consideration due to the nature of research focusing on highly sensitive information on the impact of ATPT on the future of work from both top manager and union representative perspectives. One of the measures taken to maintain autonomy was to provide participants with the opportunity to review the transcript.

All the interviews were audio recorded for later transcription, which participants agreed to as per the participant consent form found in the appendix section of this paper. As the data collected consisted of sensitive information, the data was stored on a secure password protected computer. Once the interviews were transcribed, participants who agreed to reviewed the transcript were sent a copy in addition to a copy of the transcript release authority document for participants to sign upon returning the transcript which can be found in the appendix section of this thesis. This was an important phase of this research to ensure that all identifiable information was removed from the transcript and to ensure participants accounts of events were accurate. Once all identifiable information was removed from the transcript and validated by the participants the audio recordings were permanently deleted.

This research project also recognized the importance of providing participants with time to decide whether to participate in the research. Silverman (2011) defines informed consent as a means that research participants “have the right to know that they are being researched, the right to be informed about the nature of the research and the right to withdraw at any time” (p.418). After initial contact was made and interest in the research was registered, potential participants were provided with the information sheet (which can be found in the appendix action) which explains the purpose of the research and their rights as participants. These rights included the right to skip any question, anonymising data, ask any questions, and be provided

with a summary of the results with participation in this research being voluntary. After participants agreed to participation they were provided with the consent form. On no instance throughout this research were participants provided with the consent form at the same time as the information sheet. This method was adopted to ensure participants do not feel obliged to participate in the research while also providing efficient time to ask any questions in relation to the research.

### *Beneficence and non-maleficence*

According to Murphy and Dingwall (2001) beneficence and non-maleficence is commonly used to evaluate whether the benefits of both conducting and participating in the research outweighs the potential harm. Careful consideration was given both prior and during the research phase to identify potential harm and methods to minimize harm.

The potential benefits of this research is to understand the impact of ATPT on employment through organisational decision-making processes. This has significant relevance on government, businesses, academia, unions, stakeholders, and employees within New Zealand and internationally to foster open discussions on how to promote good practice for preparing for the future of work. Understanding the beneficence links back to the earlier discussion in this chapter through authenticity to ensure that both participants and the wider community receive the benefit of this research.

The outcome of this research is intended to benefit employees to prepare for any potential impact automation might have on the future of work. For instance, identifying what strategies organisations have in place to prepare employees to obtain the relevant skill sets to operate incoming technology. Further benefits extend to identifying good practice behind incorporating automation through identifying what is socially acceptable.

Potential discomfort identified in the ethics application for this research included discomfort around particular questions. One example of this is how managers identify employees as likely to be impacted by automation. In the current climate of COVID-19, it was identified as potentially causing discomfort for participants with social expectations around organisations reducing employee numbers. Participants were advised that all identifiable information would be removed from the final transcript while also additionally providing the opportunity for participants to validate the transcript to ensure they are comfortable with their responses.

Strategies used throughout this research to minimize harm included preparing union representatives and top managers with the questions prior to the interview to familiarise themselves with the questions they will be asked. Additionally, prior to conducting the interview, participants were advised of their right not to answer any particular question they are uncomfortable with.

### *Justice*

Justice was an important component of this research which received significant attention due to the potential conflicting participatory groups between top managers and union representatives. In recognition of this ethical consideration, the results of this research was shaped away from an argument of differences between top managers and union representatives and focused more on practice and establishing experience of ATPT adoption to foster good practice. Further to this, participants were provided the opportunity for follow up interviews to clarify any emerging themes.

In addition to the universal ethical principles recognised in this section, the Treaty of Waitangi Obligations and Principles were also recognised due to the unique location of research being within the distinct cultural environment of New Zealand.

### 3.6.2 Treaty of Waitangi Obligations and Principles

Due to the nature of this research taking place in the distinct cultural environment of New Zealand, important consideration has been given to the relevance of this research in relation to the Treaty of Waitangi Obligations and Principles of partnership, participation, and protection.

Upon reviewing the Te Ara Tika guidelines for Maori Research Ethics, it was deemed appropriate to consult a representative within the community to understand the implications of this research in relation to the Treaty of Waitangi and Maori communities. This consultation phase of the research involved understanding the implications and relevance of this research to Maori, and to identify relevant Maori communities such as Te Awe and Te Puni Kōkiri if findings relevant to Maori communities emerged throughout the course of the findings of this research.

Through recognition of the Treaty of Waitangi principles, constant consideration is given at each phase of the research to understand and interpretation of ethical principles in relation to the treaty of Waitangi. It is important to note that a universalist approach has been used in this research as a guide towards establishing ethical considerations. One of the limitations of a universalist approach is the idea that ethical issues can be addressed at the start of a research project. One of the important aspects to consider is constantly taking into consideration ethical issues at all phases of the research (not only at the application phase). Such instances this was used throughout this research project was through the recognition of the treaty of Waitangi Obligations and Principles throughout this research. Both the universal ethical principles and the Treaty of Waitangi Obligations and Principles were taken into consideration when completing the ethical application for this research. Upon reflecting both principles in relation to this research, a full Massey University Human Ethics Committee (MUHEC) application was submitted.



### **3.6.3. Full Massey University Human Ethics Committee Application**

Upon reviewing the code of ethical conduct involving human participants and the ethical considerations, a full Massey University Human Ethics Committee (MUHEC) application was submitted. Confirmation of ethical approval from MUHEC was received on the 17<sup>th</sup> of August 2020 which can be found in Appendix D section of this thesis. Sampling began the following day on the 18<sup>th</sup> of August 2020 with the first interview on the 25<sup>th</sup> of August 2020 and concluded the data collection phase on the 28<sup>th</sup> of January 2021.

## **3.7. Summary**

The purpose of this chapter was to present the research framework used to conduct this research. This consisted of aligning with a constructivist and interpretivist research paradigm while focusing on an abductive approach through qualitative inquiry. To address the research question on ‘what are organisational decision-making processes behind adopting ATPT and the subsequent impact on the future of work’, two key participatory groups (with the use of triangulation) were identified to understand the organisational DMP behind incorporating ATPT: Top Managers, Union Representatives. The final section of this chapter introduced the ethical component of this research as part of the robust design process that went into this research

To understand the relationship between the theory and data, and abductive approach was identified to approach research from typically an inductive approach while also acknowledging the three key theories: organisation theory, STS theory, and stakeholder theory used in this research. While each section of this chapter was presented in individual components, there is a deep interrelationship throughout the research framework. For instance, while ethical principles can easily be overlooked in the significance of research, the qualitative design of authenticity has an entwined relationship to ensure that participants in this research

receive the benefit. Further to this, the underlying principle of constructivist and interpretivist has been integrated throughout this chapter through recognising the significance of multiple perspectives of reality. The following chapter (chapter 4) in this thesis presents the data analysis phase of this research.

## CHAPTER 4: DATA ANALYSIS

Although this chapter on data analysis marks the beginning of a new section in this thesis, it is important to recognise that this by no means should be segregated from the previous chapter on the research framework. Both the research framework and data analysis are fundamental elements which contribute towards addressing the research question and the conclusion of results. Constant revision and reflection was required throughout this research to ensure both the research framework and the data analysis were addressing the research question in order to make the relevant conclusion. While it is easy to state that revision and reflection was done throughout this research, the actual process is relatively complex due to the multitude of layers and variables. This chapter has been presented across five sections consisting of data analysis process (section 4.1), transcription of audio recordings (section 4.2), thematic coding of data using NVivo (section 4.3), and casual networks between themes (section 4.4).

### 4.1. Data analysis process

As outlined in the introduction section of this chapter, the data analysis component of this research has been deeply interwoven with the research framework and data collection process as covered in Chapter 3. The decision to adopt an interwoven approach to this research can be attributed to the literature where Miles and Huberman (1994) present data analysis as an interactive process across data collection, data reduction, data display, and conclusions: drawing/verifying which can be seen in Figure 9 below.

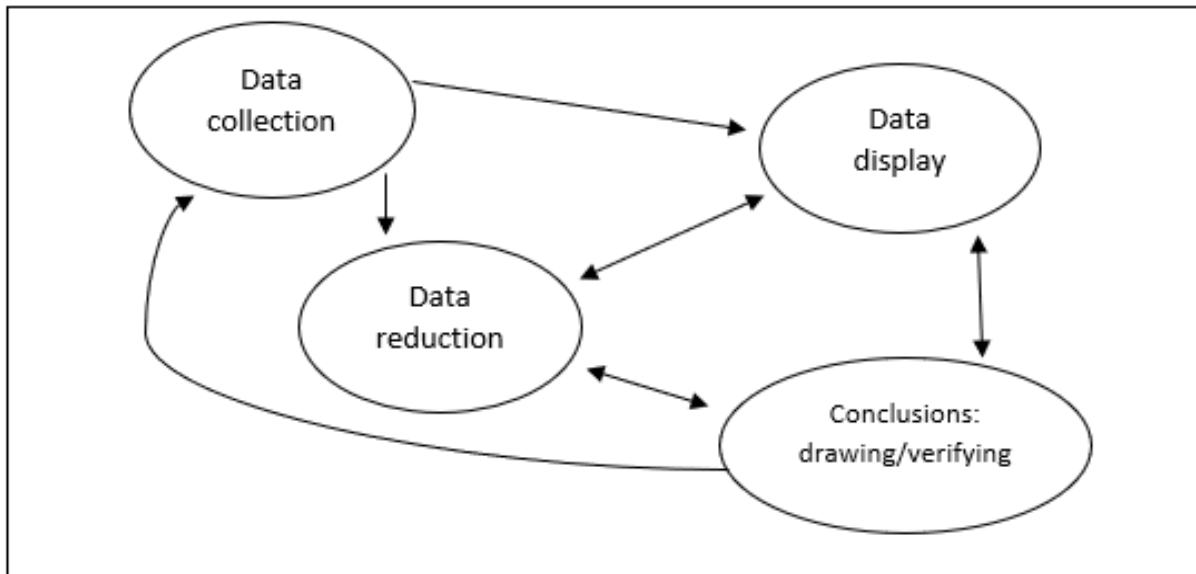


Figure 9: Components of data analysis (sourced from Miles & Huberman, 1994, p.12)

Identifying and using a suitable method to balance between data collection and data analysis was of paramount importance in this research due to the large sample size and data involved in this research project. One of the leading attributes which made this process more interactive was the timing throughout the four different components. Due to the large number of participants included in this research, it was not practical to wait until all interviews were completed to start data analysis. In addition to this, there were days when no interviews took place, hence to maximise time efficiency, data analysis began at the same time as data collection. Conducting the research this way had the major benefit of providing greater familiarity around the data from an early point in the research. This enabled the ability to understand whether the interview structure was adequately addressing the research questions outlined in this thesis, while constantly reviewing whether additional participatory groups were required to support the confirmability of the findings. To summarise the interactive process, Miles and Huberman (1994) outline that the “coding of data, for example (data reduction), leads to new ideas on what should go into a matrix (data display). Entering the data required further data reduction.

Presenting the process of data management and data analysis holds a significant place in this thesis due to the contribution it holds towards developing the authenticity and trustworthiness of the research. One of the complications behind this is identifying a suitable framework to follow that takes into consideration the interwoven aspect and actually putting the method into practice.

One of the common complications of qualitative research is the large amounts of data and information that comes with it. Presenting large portions of qualitative data to an audience requires careful consideration to ensure the data has been analysed and accurately displayed to represent the data.

This research conducted early analysis on the basis of what Miles and Huberman (1994) recommend through the ability for early analysis to aid the researcher in thinking about existing data while also developing new strategies for collecting new data that to fill in certain weak spots. This was particularly important as this research also applied the use of follow up interviews which reviewing the data allowed to fill any gaps or develop new insights that emerged through analysing existing data. Bazeley (2013) and Miles and Huberman (1994) provides insight into the process of data analysis which consists of Read and Reflect, Explore, Code, and Review and Refine. This process was followed throughout the data analysis phase of this research which can be seen in Figure 10 below.



Figure 10: Layered Data Analysis Process

While this section could be placed at the end of the chapter summarising the analysis completed, it holds more significance at the beginning, as both Figure 9 and Figure 10 were used to assist in the planning of data analysis process to ensure the most effective approaches were being used. Multiple sections of this chapter will refer back to this figure to outline the layered process which takes place at every phase of data analysis.

One of the major components of the layered analysis was the process of transcribing the audio recordings. Due to the large scale of this research consisting of 44 participants in total, the transcription of data required an in-depth process to ensure consistency throughout the transcriptions.

## **4.2. Transcription of audio recordings**

Although transcribing qualitative data is often considered a mundane process across the literature (McLellan-Lemal, 2008), it remains one of the most important aspects of qualitative research and of this thesis as it forms a vital bridge between data collection and data analysis. This bridge can be comprehended through Poland's (2002) classification of transcription as a "method for making data available in textual form for subsequent coding and analysis" (p. 629). Essentially, this is the process of listening to the audio recordings collected from the interviews with participants and putting it into written text for coding and analysis. Although this is getting more into the pragmatic side of transcription, the 'subsequent' coding and analysis referred to by Poland (2002) does not necessarily indicate that data analysis begins upon completion of transcription. Instead, there remains a certain degree of decision making/analysis involved when transcribing data (Bucholtz, 2000). Although decisions around the transcription of data is common in qualitative research, Bucholtz (2000) issues a word of caution when making any changes to the transcription due to the potential to inaccurately represent what is being said. Initially, this resulted in hesitation from my part to make any changes to the transcript due to the potential implications of doing so. However, after taking

into consideration and applying certain recommendations throughout the literature (McLellan-Lemal, 2008; Miles & Huberman, 1994; Poland, 2002) it became apparent that amending the transcript was necessary to not only enhance the readability but also maintain anonymity within the transcript for coding and data presentation purposes.

Due to the importance of transcribing, there have been calls for greater reflective practices into presenting the transcription method in research (Nascimento & Steinbruch, 2019) which this thesis aims to address while also contribute towards transparency in the research. As outlined in Table 11 earlier in this chapter, the transcription process was conducted two times with an initial transcription of the data including removing all of the identifiable information. This was followed by a second review of the transcript a few days later to ensure it was accurate to the recording. To maintain this reflective practice and transparency of the research process, section 4.2.1 presents the process in which transcription was conducted for this research.

#### **4.2.1. Transcription guidelines**

Prior to beginning transcribing, a large amount of time went in to identifying the best approached for the transcription process which was an important step to maintain consistency, faithfulness, and transparency throughout the transcription process in this research (D. Cameron, 2012). In qualitative research, there are two common approaches to transcribing data: a denaturalised transcription and a naturalised transcription (Oliver, Serovich, & Mason, 2005).

A denaturalised transcript approach has been used for this research, which is recognised as an approach to transcribing that is more focused on the substance of the interview including meanings and perceptions developed during the interview as opposed to a more pedantic approach of naturalized transcription which focuses on including the depicting accents, repeated words, vocalization and interjections (Oliver et al., 2005). Strauss (1987) also



advocates for transcribing “only as much as is needed.” (p. 266). However, this does not give the freedom to be selective when transcribing as it adds a large amount of interpretation to the transcript which is not ethically appropriate especially in the case of this research project. When used both sparingly and controlled with justification for any changes to the transcript then a denaturalized approach can be beneficial to both the researcher and audience (McLellan-Lemal, 2008).

Using a denaturalised transcript in this research has several distinct. Firstly, it enables the transcript to be cleaner without the inclusion of unnecessary inclusion of interjections such as ‘um, ah, erm, etc) which has the potential to lose the meaning of what is being said in the transcript. Considering the participants in this research are top managers and union representatives, and are likely to have a similar audience upon completion, the inclusion of interjections would do no justice to the participants who partook in this research. Secondly, the use of a denaturalised transcript contributed to a clearer interpretation process when interpreting the data for coding and analysis which has a wider benefit for the audience when viewing the findings through vignette. Finally, although this does not necessarily fall under the scope of a denaturalised transcript, but changes were also made to the transcript to maintain anonymity of the participants. When making any change to the transcript, a set of rules were developed and the justification of the rules to both maintain transparency, reflective practice, and consistency across the transcribing which can be seen in Table 5 below.

The left-hand column of Table 7 represents a total of five different rules which were developed and used when making any changes to the transcript. On the far-right column of the table is the justification for the changes or rules, with the example of the original audio recording and the amended transcript in the two centre columns. The examples used in the table are from the data collected in this research with participant code TM representing Top Managers.

Table 7: Rules and Justification examples for amending Transcription data.

Rules	Original Audio Recording	Recorded in Transcript	Justification for change
Replace Organisation/Person name	“ <u>“...”</u> has been doing this for years.” – TM03	“[Organisation name] has been doing this for years.” – TM03	To maintain anonymity the organisation name or person name has been replaced in the transcript
Replace Place name	“which expanded our operations in <u>“...”</u> significantly” – TM18	“which expanded our operations in [Place name] significantly” – TM18	To maintain anonymity place names have been replaced in the transcript
Replace Technology/Service name	“We have been slower in adopting any automation as we focus too much on developing <u>“...”</u> for our customers.” – TM09	“We have been slower in adopting any automation as we focus too much on developing [Technology name] for our customers.” – TM09	Certain technology developed inhouse or services have the risk of identifying participants. This was discussed with participants on case-by-case basis and replaced to maintain anonymity.
Remove word duplication	“We need people who are experts <u>at using at using</u> these tools” – TM28	“We need people who are experts at using these tools” – TM28	To enhance readability when coding and displaying results in forms such as vignette.
Removal of interjections (like um, huh, erm, ah, oh)	“There have been <u>like um</u> new ways of processing” – TM17	“There have been new ways of processing” – TM17	To enhance readability when coding and displaying results in forms such as vignette.

The denaturalised transcript approach followed the rules outlined in this research, however, Table 7 also applies ethical obligations and requirements to participants to ensure anonymity is maintained. This is approached by removing all identifiable information from the transcript. The use of “...” has been used in the audio recording in replacement of a potential identifier as information that was replaced in the transcript for anonymity purposes which covered organisation or person name, place name, or technology or services name.

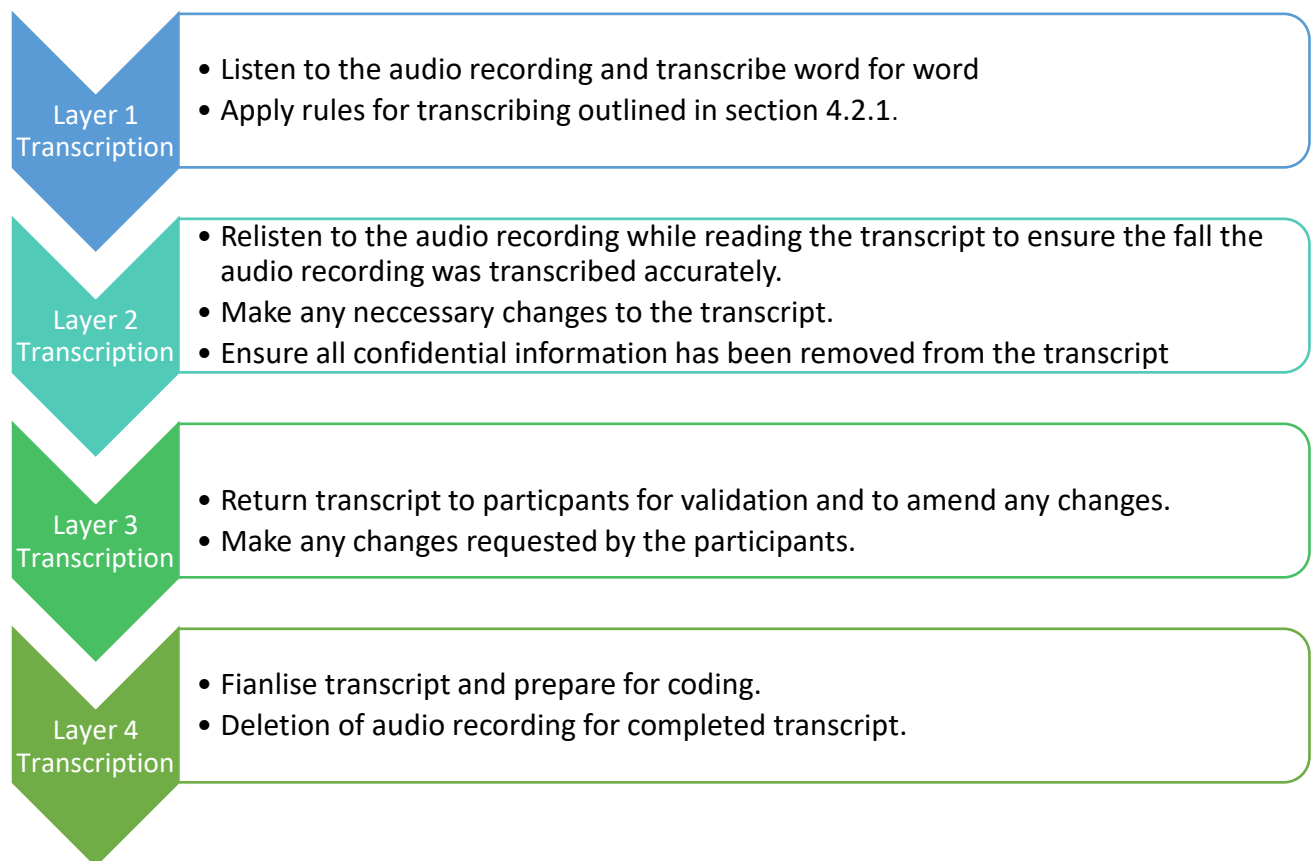
Outside of these rules, no other changes were made, or information excluded from the transcripts. One of the primary reasons a denaturalised transcript approach was used to a minimal extent was the use of thematic analysis in this research with an abductive approach. This meant I did not want to restrict my data set by potentially excluding data that would be beneficial later in the data analysis. Hence, a denaturalised transcript approach was used to refine the data to a more readable and interpretable both as a researcher and the audience of this research.

Although rules and justification for change was in place at the beginning of transcription, the actual process of transcribing consisted of a layered process (section 4.2.2.) to ensure utmost accuracy of the transcript in preparation for interpretation through coding and data analysis.

#### **4.2.2. Layered Transcription Process**

According to Oachs (1979) the way a transcript is written shapes the way a transcript is interpreted by the researcher and subsequent audience in the presentation of results. Hence, it was of paramount importance to ensure that the transcript reflected an accurate representation of the participants intentions prior to beginning coding. To maintain the accuracy and transparency of the process taken when transcribing, Psathas and Anderson's (1990) recommendation was adopted by listening to the audio recording while transcribing multiple

times in a layered approach which can be seen in Figure 11 below. Due to the large data set included in this research, the layered approach supported the capability to follow a methodical process towards transcribing the data without being overwhelmed by the task at hand.



*Figure 11: Layered Transcription Process*

While the first two interviews used Zoom to assist with the transcribing of recordings, however my experience using Zoom for transcription added additional burden and complexities when transcribing due to inaccuracies in the recordings. From the third interview onwards, no transcription services were used as all transcriptions were independently transcribed the researcher. Independently transcribing the audio recordings had added benefits including what Bazeley (2013) states as producing greater familiarity into the data set which has the added benefit to enhance the coding and analysis phase and the ability to transcribe according to the

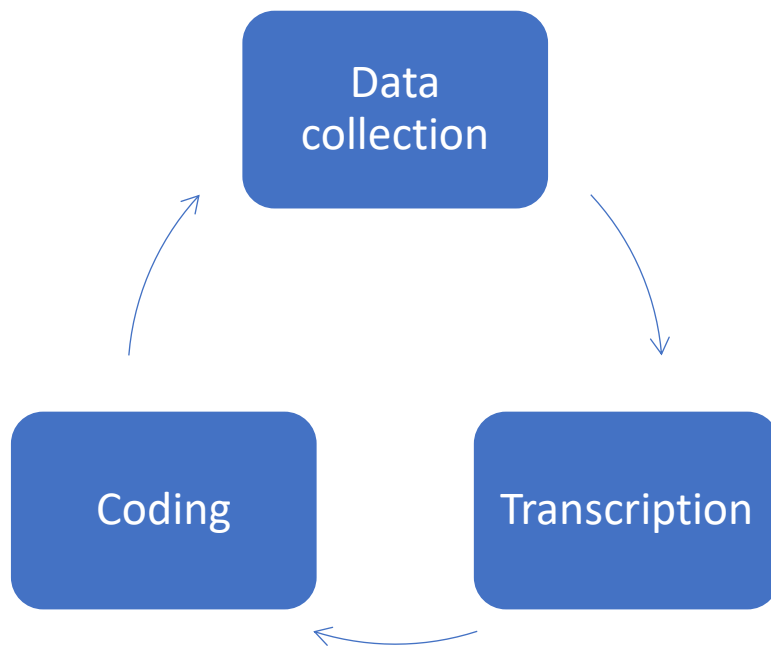
rules set in section 4.2.1. While transcribing independently increased the time dramatically spent coding, it also enabled me to ensure the transcript was to a high standard of accuracy to remain faithful to the participants involved in this research. Furthermore, to ensure trustworthiness and authenticity is maintained participants were provided with the option to review the transcript which can be seen under the participant consent form in the appendix section of this thesis.

Participants were given the option to review the transcript, where in total 27 participants (19 top managers and 8 union representatives) requested to have the transcript returned to them for review. While this is an important phase in the research for validation and verification of the transcript, it was not ethical or practical to force participants to review it. The authority of transcript return can be found in appendix section of this thesis. The 27 participants who agreed to review the transcript also took a total of seven weeks for all transcripts to be returned, with time constraints sighted from top managers and union representatives for the delay.

In relation to the final layer (Layer 4 Transcription) in Figure 11, the deletion of audio recording was an ethical requirement in this research which was also included in the original full MUHEC ethics application. The decision to delete the audio recording is for the purpose of anonymity of participants to ensure there is no data which can potentially identify participants included in this research, particularly as the research is built on a high trust model with participants disclosing sensitive information around organisational decision-making processes. The digital storage of the transcripts were saved in the order of the participation and the participant code (i.e., the first top manager was coded as TM01 and the first union representative UR01).

Although the transcription process followed a layered approach, it was not an instantaneous process. For instance, Layer 2 Transcription was typically conducted at a

minimum the day after Layer 1 Transcription was completed to ensure that each layer was conducted with a fresh mindset. This period of the research project required being highly methodical in arranging my available time, where in between interviews I was able to transcribe data. Likewise, once the transcription was completed, the process of coding the data commenced. This ties strongly back to the introduction of this chapter, which presented the interconnectedness across each phase of data analysis as in Figure 12 below.



*Figure 12: Interrelation between data collection*

It was an ongoing process, where data was collected and transcribed and coded to ensure the relevant questions were being asked. There was consistent work between data collection, transcribing, and coding which were all occurring simultaneously. It would have been highly ineffective to begin transcribing only once all the data was completed and then wait to do coding once all the transcriptions were completed. One of the main reasons this approach was done simultaneously was to constantly monitor data saturation while developing insight into whether additional participatory groups were required for this research. This

interconnectedness leads into the next section in this chapter on data coding (section 4.3.) which presents the method for coding and analysing the data.

### **4.3 Thematic Coding of Data using NVivo**

NVivo was used to code all the data collected in this research using thematic analysis with the framework method. The process of coding the data consisted of importing the transcripts in to NVivo and creating two primary nodes, one for top managers and one for union representatives.

Although data coding is a process should be familiar to most qualitative researchers, this term could easily be misinterpreted or not familiar to the wider audience of this research. The particular reason for this is the definition of what constitutes a code and also the differentiation between a code and a theme. Saldana (2013) considers coding as an essential element of qualitative research through the importance it holds towards capturing the essence of a particular phenomenon. While standalone codes are important to the backbone of this research, it is the process of identifying similarities and patterns between the codes which generate the ability to analyse and present the connections or themes which is the core objective of qualitative research (Miles, Huberman, & Saldaña, 2020). As outlined earlier in this chapter, this research applied a layered approach to data analysis where the data was reviewed in a cycle process to enable Saldana (2013) defines as the ability to establish deeper connections throughout the data.

To support the data analysis process, three key factors were taken into consideration: data saturation, developing a list of codes, and developing a definition of codes.

### 4.3.1 Data Saturation

While the notion of data saturation may appear more clearly linked with the data collection process, it has clear significance in the data analysis component of this research. This process was particularly important when it came to knowing when to transition fully from data collection to data analysis. Due to the nature in which the data was collected, with top managers followed by union representatives simplified the process to present the data saturation for both participant groups.

#### Top Manager Data Saturation

The process of monitoring data saturation mirrored the approach taken by Guest et al. (2006), where the analysis of data was grouped in phases of six interviews to actively monitor new codes that were being identified through the new data collected. A breakdown of this can be seen in Table 8 below.

*Table 8: Top Managers Data Saturation Monitoring*

<b>Top Manager - Interviews</b>	<b>Number of new codes</b>
<b>1-6</b>	<b>67</b>
<b>7-12</b>	<b>18</b>
<b>13-18</b>	<b>7</b>
<b>19-24</b>	<b>3</b>
<b>25-30</b>	<b>3</b>
<b>31-34</b>	<b>1</b>



Each of the first 12 interviews generated at least one new code each. However the emergence of new codes rapidly declined with the 13-18 top manager interview bracket in Table 8 where only 7 new codes were generated which was for interview 15 and interview 17. This decline in codes was similar with interviews 19-24 where only three new codes emerged with interview 20, 22, and 24. It was felt at this point that data saturation had been achieved due to what Guest et al. (2006) categorises as the repetition of themes that were emerging after interview 12. At this point the decision was made to complete another ten interviews which only identified four new codes between interview 25-34. At this point, the decision was made that the data sample was sufficient enough to complete the data collection phase with Top Managers with a total of 94 codes that were developed as a result of the interviews. These codes were then segregated to identify themes throughout the data. The following section presents the data saturation component for union representatives.

*Union Representatives Data Saturation*

Due to the smaller sample size of union representatives, the measurement of data saturation was conducted in groups of three as seen in Table 9 below. This was also due to the wide gap in time between each interview due to the availability of union representatives.

*Table 9: Union Representatives Data Saturation*

<b>Union Representatives</b>	<b>Number of new codes</b>	<b>Cross reference top manager</b>	<b>Unique new codes</b>
<b>35-38</b>	<b>43</b>	<b>11</b>	<b>32</b>
<b>39-41</b>	<b>12</b>	<b>2</b>	<b>10</b>
<b>42-45</b>	<b>2</b>	<b>2</b>	<b>0</b>

The first three interviews for union representatives (35-38 in total) generated 43 new codes, however in cross reference with 11 which were consistent with the codes from top managers, this consisted of 32 unique new codes. Similar to top managers, this saw a significant drop with the following three interviews (39-41) in the number of new codes developed with only ten unique new codes identified. The final four union representative interviews (42-45) saw two new codes developed but zero unique codes due to having been cross referenced with the codes identified with top managers.

The commonalities of data codes between top managers and union representatives included organisations reskilling employees in new areas of the organisation, burden reduction, and stakeholder requirements which will be presented in depth in Chapter 5 in the results.

### **4.3.2 Development of Codes**

Developing the list of codes with definitions is extremely vital to this research as contributed to the process in segregating the codes in the research. While a term such as 'efficiency' which emerged in the results may be valuable, it fell under multiple categories such as process efficiency, customer efficiency, employee efficiency. Thus, presenting the codes in a visual representation generated greater insight into this and additionally contributed towards the Framework method which will be covered in the next section.

While Miles and Huberman (1994) recommend the use of a start list of codes prior to field work to establish any potential hypothesis, this has not been done in this research. The primary reason for this is due to the nature of an abductive approach being used, the focus still remains more lenient towards an inductive approach where themes which emerge through the course of thematic analysis are identified inductively. This is important for this particular research as there remains little insight into organisational adoption of ATPT in the literature, therefore no prior stance of hypothesis could be placed. The use of a master code was not necessarily

designed to identify the themes, but support in how and where to place a particular code. While the code of efficiencies were used, this could refer to a wide range of master codes including employees, customers, or process, hence the use of a master code helped arrange the codes in a more meaningful and systematic arrangement that more accurately represented the interpreted meaning of the code.

The list of codes is important to differentiate. For instance, re-skilling was a common issue that arose during the interviews with both top managers and union representatives. However, re-skilling constituted of more than just re-skilling, but re-skilling initiated by the organisation, re-skilling initiated by the employee and so on.

A Definition of Codes index was created at the beginning of coding this research. As presented in the previous section, the code index was developed in NVivo to systematically categories segments to enable the ability to rapidly find specific data, which has gone a long way towards making later analysis more efficient with the development of the Framework method covered in the next section. Similarly to a phrase of words, a single code name can be interpreted differently. One of the important aspects of a code raised by Miles and Huberman (1994) is the fact that it is the meaning behind the codes which matters and not the individual words themselves. Each time a new code emerged, the definition of that code was recorded. While this created increased the time of coding, it also increased the efficiency of each code, which enabled greater clarity through distinguishing similar code pairs.

Definition Examples - Customer Related Theme	
CODE	DEFINITION
<b>CD-CUSEXPCT</b>	Customers requiring/demanding improved ATPT. The standard is set from customer expectation through sources such as business feedback.
<b>CD-CUSEXP</b>	The use of ATPT to enhance customer experience. The standard is set from internal organisation.
<b>CD-SERVCLI</b>	Using ATPT to improve services to clients.

Table 10: Customer Related Theme Definition Examples

The definition is important as the comparison on face value between CD-CUSTEXP and CD-SERVCLI could be integrated into the same code, the definition presented by TM's. Applying a layered process to coding the data enabled a reduction in codes where there were similarities between codes. The use of the code list alongside the definition of codes enabled the ability to make decisions around which codes overlapped. There were a few discrepancies in the coding that were identified. This included the impact on employees and customers which had two separate codes. There were instances where participants mentioned this together which generated a new code of employees and customers. Another example was around efficiencies and cost savings. While efficiencies can fit into the cost savings code, separate codes were used to greater reflect on what participants identified.

### 4.3.3. The Framework Method

To support the process of coding and managing the data, the Framework method was used in NVivo. The use of the Framework method in NVivo supported the layered analysis approach used in this thesis as it enabled the ability to review the themes and remove repeated themes. Further to this, the Framework method provided a valuable visual tool to see the overview of each theme which contributed to the ability to clearly define the parameters of the themes. The Framework method has been used in this research to develop a systematic way of both managing and analysing a large qualitative data set. This was particularly beneficial in managing the large data set that was included with this research.

Due to the Framework method being used as a systematic method for categorising and managing data, there is no explicit research paradigm that is aligned with this approach (Gale et al., 2013). However, in saying this, the Framework method is commonly used with thematic analysis using semi-structured interviews. The Framework method is designed to manage large data sets that enable greater clarity during the coding phase of the research to identify the commonalities and differences across the data. While the use of the Framework method is more time consuming from inputting the codes developed in NVivo into the Framework method stored in Excel, This enabled greater insights into the data set when developing themes as it provided short insights into data fragments that formulate any given code. Although the Framework method created an additional task to input the codes into the Framework method required in the analysis phase, it acted as an invaluable assistant in the later phase of this research when developing themes through understanding and visualising greater cohesion of relationships across the data set. This process further contributed towards greater clarity around each individual code due to more in-depth thinking about each section. This further built into the layered analysis outlined earlier in this chapter to ensure the data analysis is being conducted at multiple levels of thinking and analysis.

Miles and Huberman (1994) recommends the use of the Framework method for cross-case analysis which was highly beneficial to compare the findings. One example of this is how both top managers and union representatives recognised ATPT can benefit employees as seen in table between union representatives and top managers through having a visual display of data. While the example used was filtered down, it provides an indication of the process used to support the management of data and build relationships across the numerous data sets. The final section in this chapter presents the development of casual networks between the themes which ultimately have been used throughout the results and discussion chapter of this thesis.

#### **4.4. Casual Networks between themes**

This section of the chapter presents the casual networks that were established throughout the data analysis process. According to Miles and Huberman (1994) this is a critical component of qualitative research, and more specifically thematic analysis to understand the relationship between the different themes. This was particularly important when it came to providing valuable insight into the numerous variables that factor into organisations DMP. The establishment of the casual networks greatly contributed towards the results and discussion section of this chapter (Chapter 5) as it provided clear indications and connections across the themes, suggesting the deep complexity behind the organisational DMP, where multiple themes are required to understand the impact of ATPT on the future of work.

To explore the relationships between data, an initial high-level approach was used as seen in Figure 13 below. The theme overview between top managers and union representatives is designed to provide an indication of the need to establish casual networks throughout the themes. One of the earlier approaches in the first phase of analysis consisted of developing an initial mind map of the key themes which emerged. One of the first steps in analysing the data

consisted of clustering word similarities between the themes to establish any potential relationships as seen in Figure 14. This helped transfer the themes displayed in Figure 13 to a series of related themes displayed in Figure 15. Although Figure 15 provided more in-depth representation of the connections between themes, there was still the requirement to develop the casual networks using NVivo to understand the thorough relationship between organisational DMP and union representatives experience of ATPT adoption. This consisted of identifying all the key themes across both top managers and union representatives and building casual networks using NVivo as seen in Figure 16. Understanding the vast network of interrelated connections helped shape a deeper understanding of the organisational DMP and the complex considerations that are required when adopting ATPT. One approach used to filter through the complex network of casual relationships was through clustering data by word similarity.

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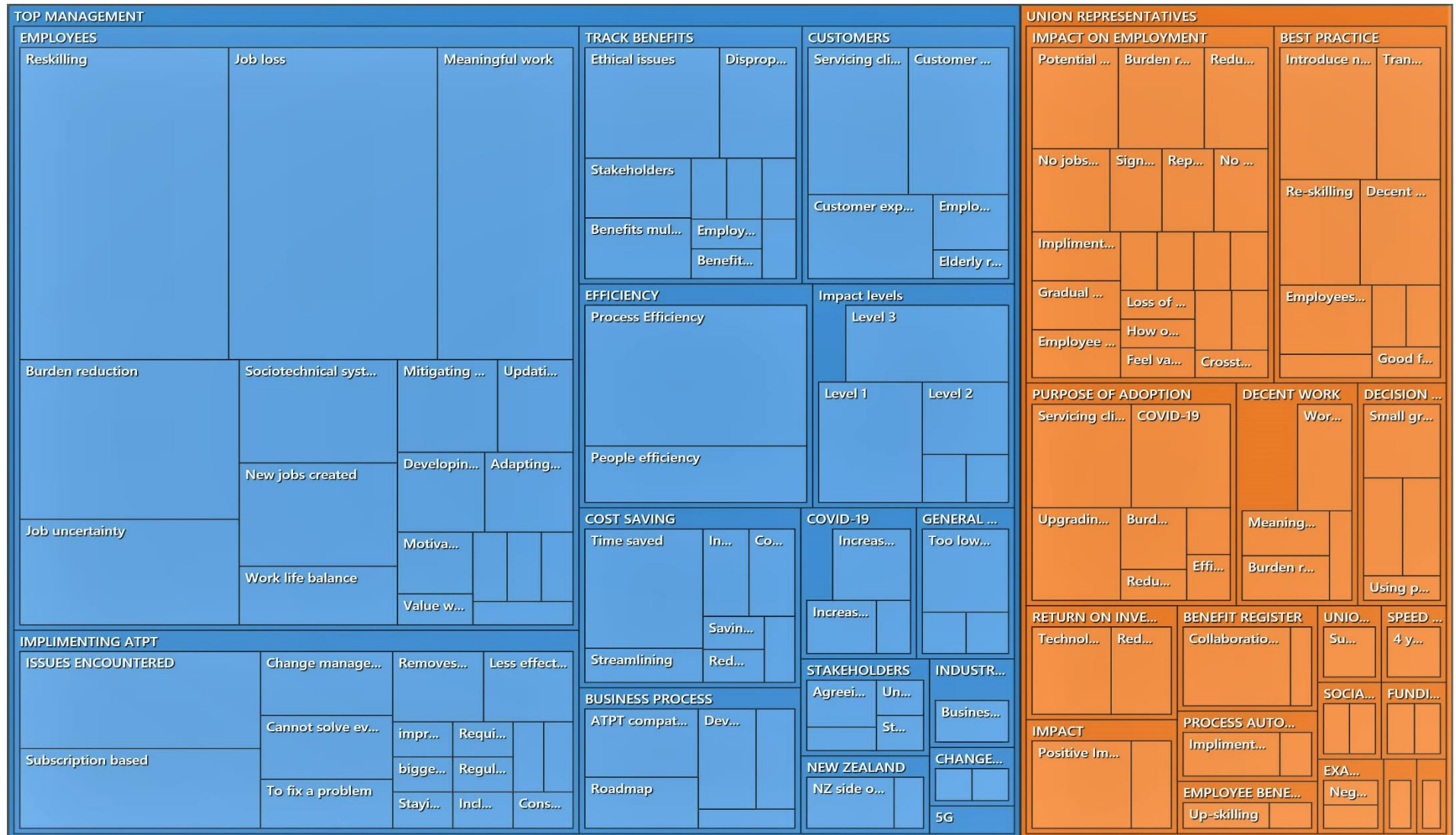


Figure 13: Theme overview for top managers and union representatives



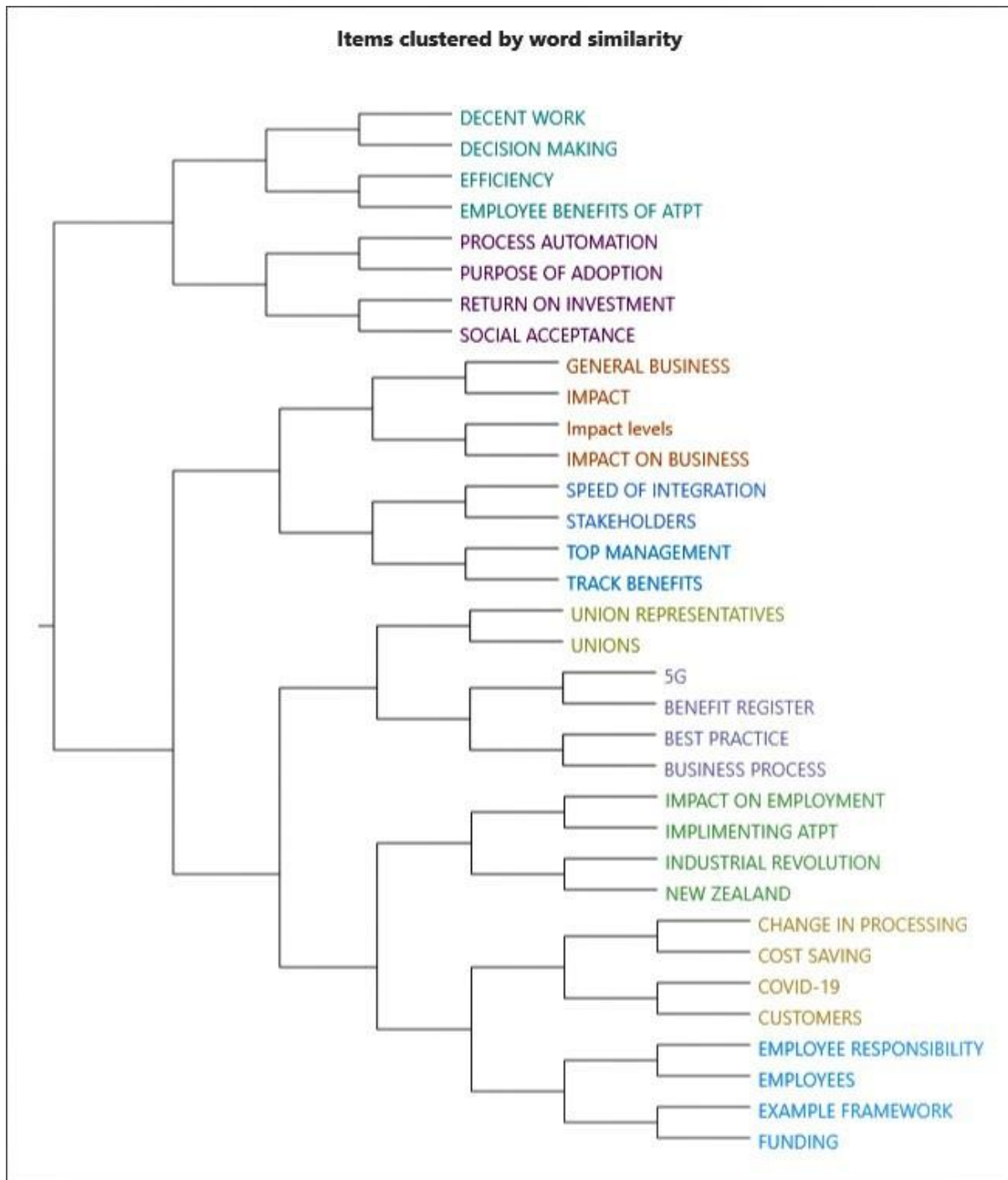


Figure 14: Theme similarity between top managers and union representatives

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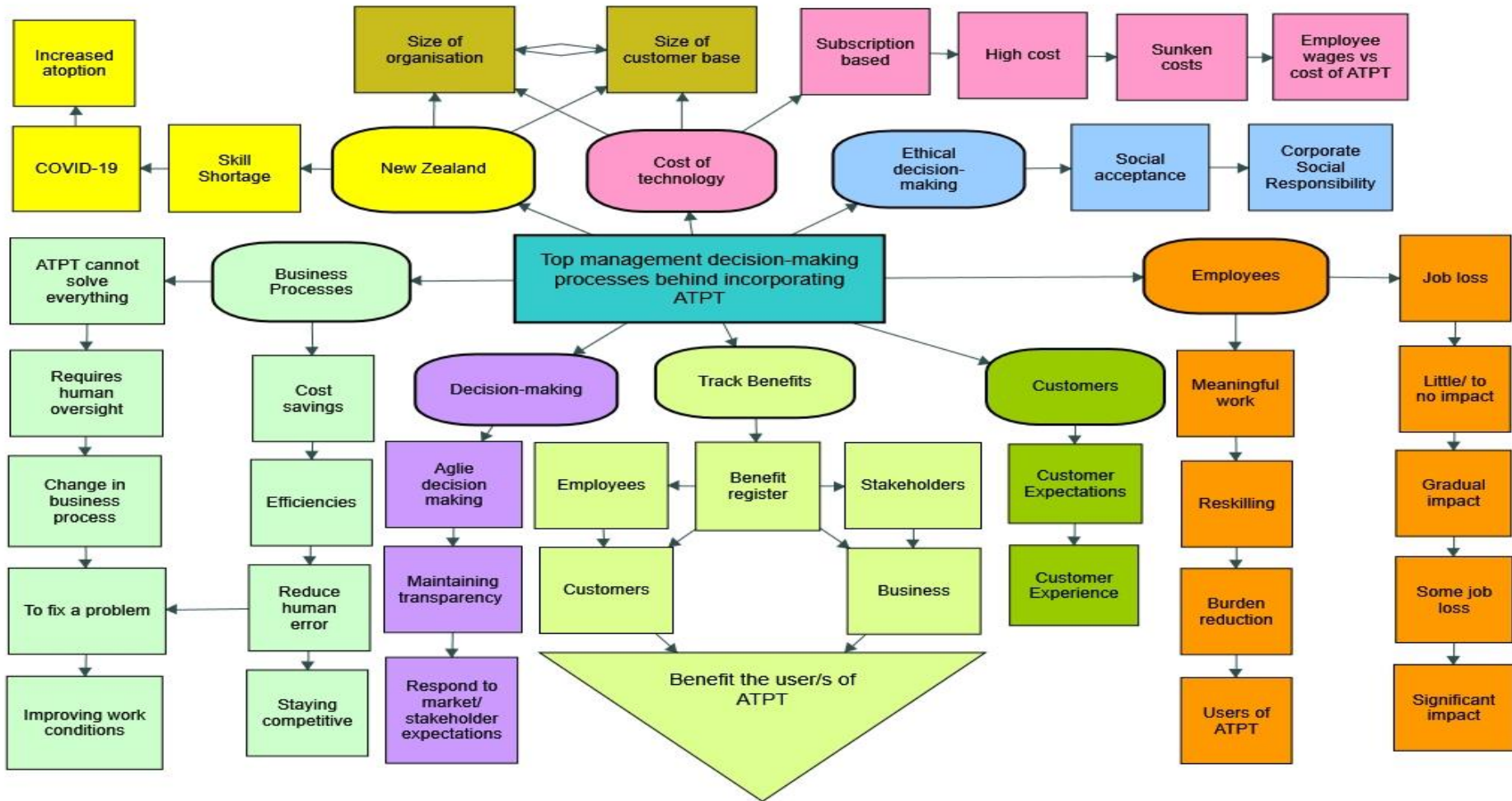


Figure 15: Thematic analysis preliminary mind map



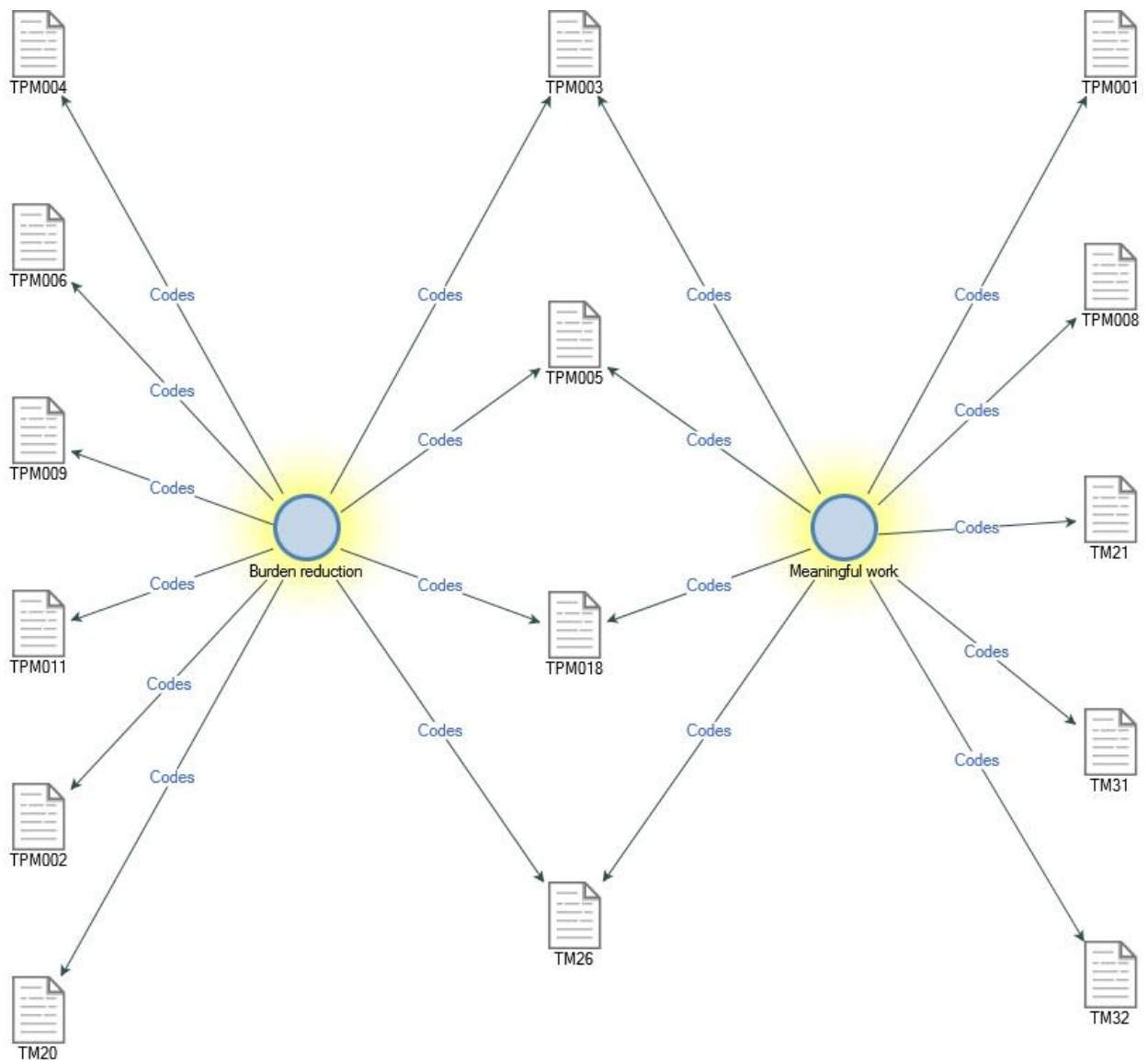


Figure 17: Relationship between Burden Reduction and Meaningful work

One of the other approaches used to analyse the data consisted of using comparisons between two themes. This approach helped establish the similarities between themes to understand potential deeper relationships. While there were several cases between top managers that differed between burden reduction and meaningful work, there were four clear instances where top managers identified ATPT as having the potential to reduce burden on employees which ultimately led to more meaningful work.

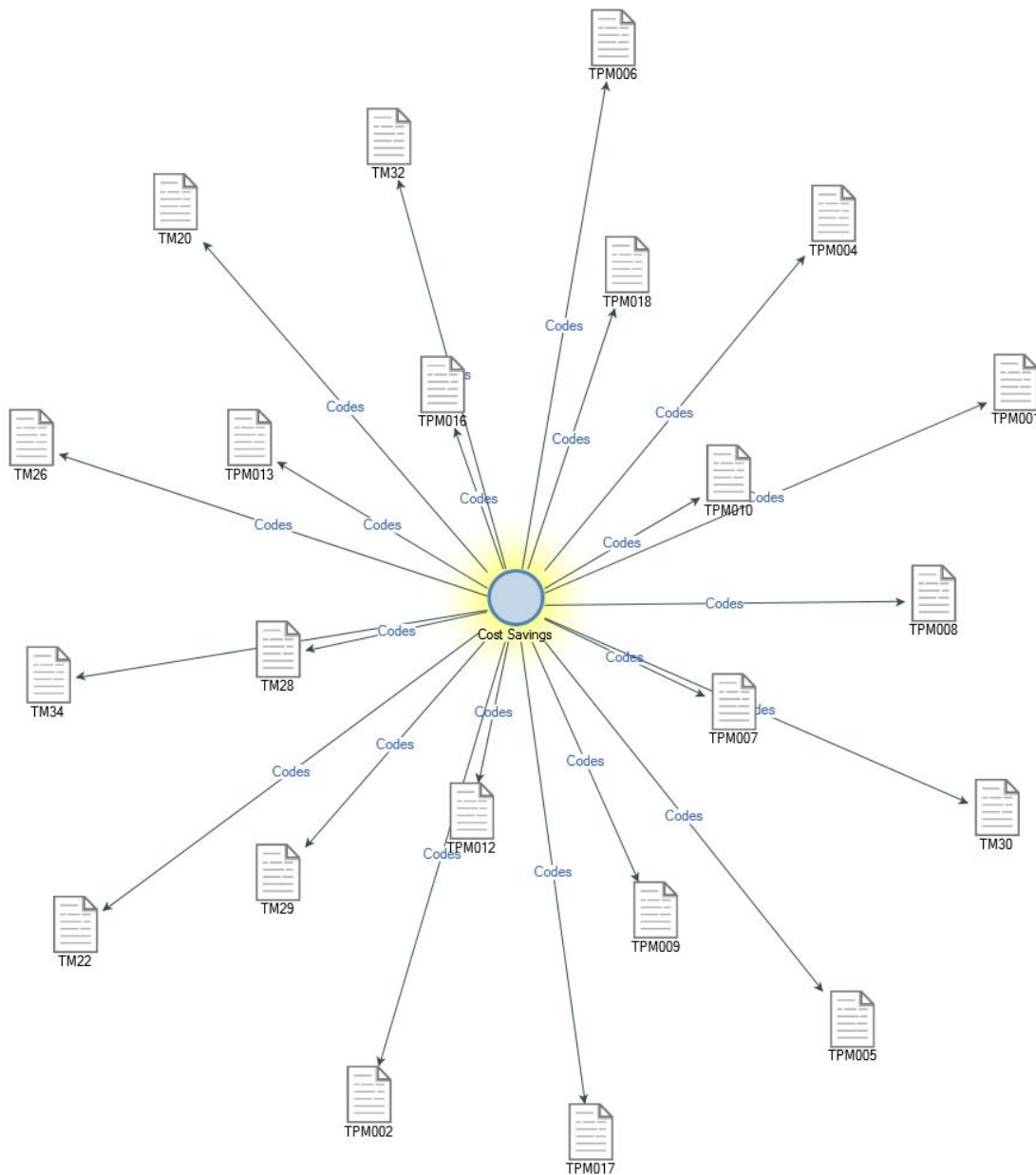


Figure 18: Cost saving theme identification



One of the important aspects behind comparing and contrasting data can be seen in Figure 18. Although top managers widely recognised cost savings as one of the key drivers behind adopting ATPT, Figure 18 provides little insight into how cost savings relates to other areas of organisational operations. To illustrate this further, cost saving is compared against other emerging themes, including ATPT to support employees (Figure 19), to enhance organisational efficiencies (Figure 20), to meet stakeholder expectations (Figure 21), and to fix a problem (Figure 22). One of the finding from the research also suggest that while cost savings can commonly be associated with the reduction in employees, there was a distinct correlation between top managers who identified cost savings as one of the key drivers behind adopting ATPT, while also at the same time using ATPT to support employees including reduce burden.

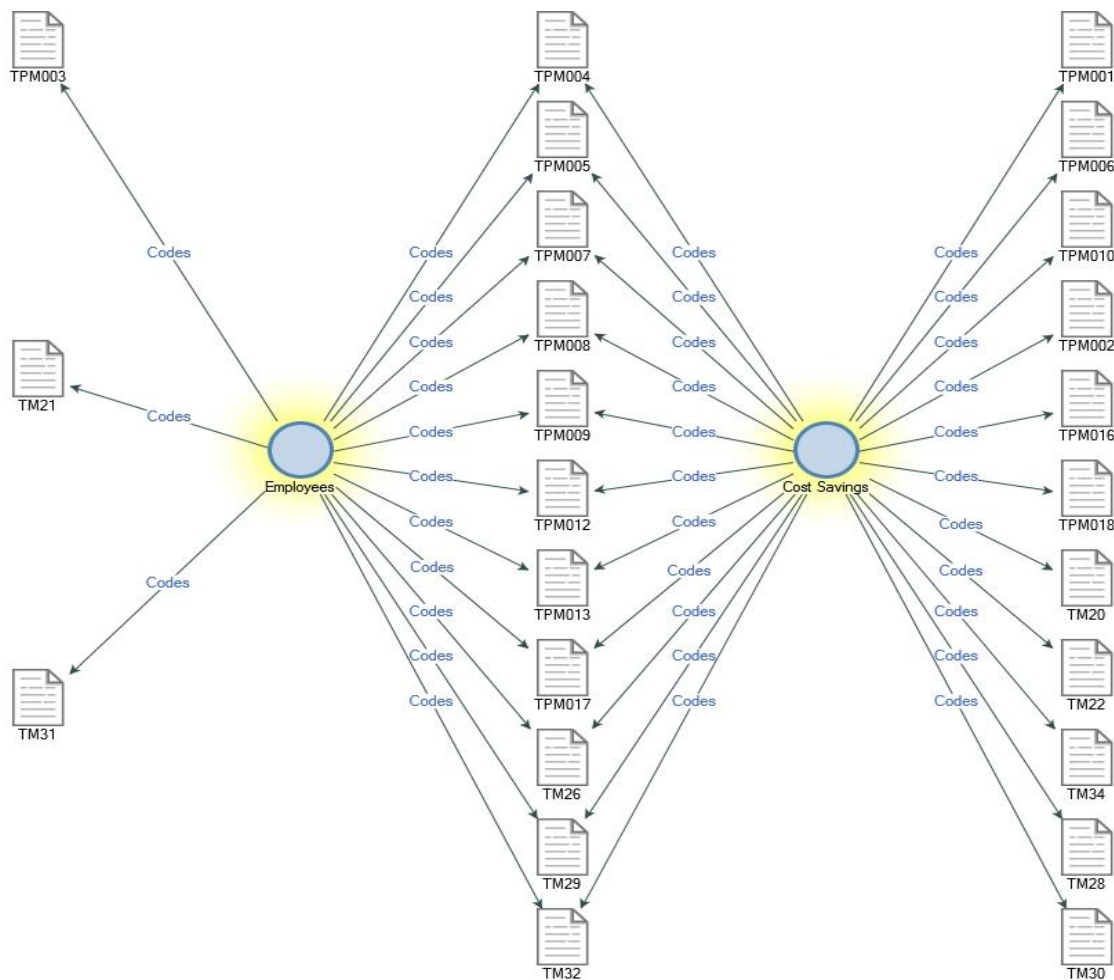


Figure 19: Key theme on the relationship of organisational drivers behind ATPT adoption between employee benefits and cost savings.

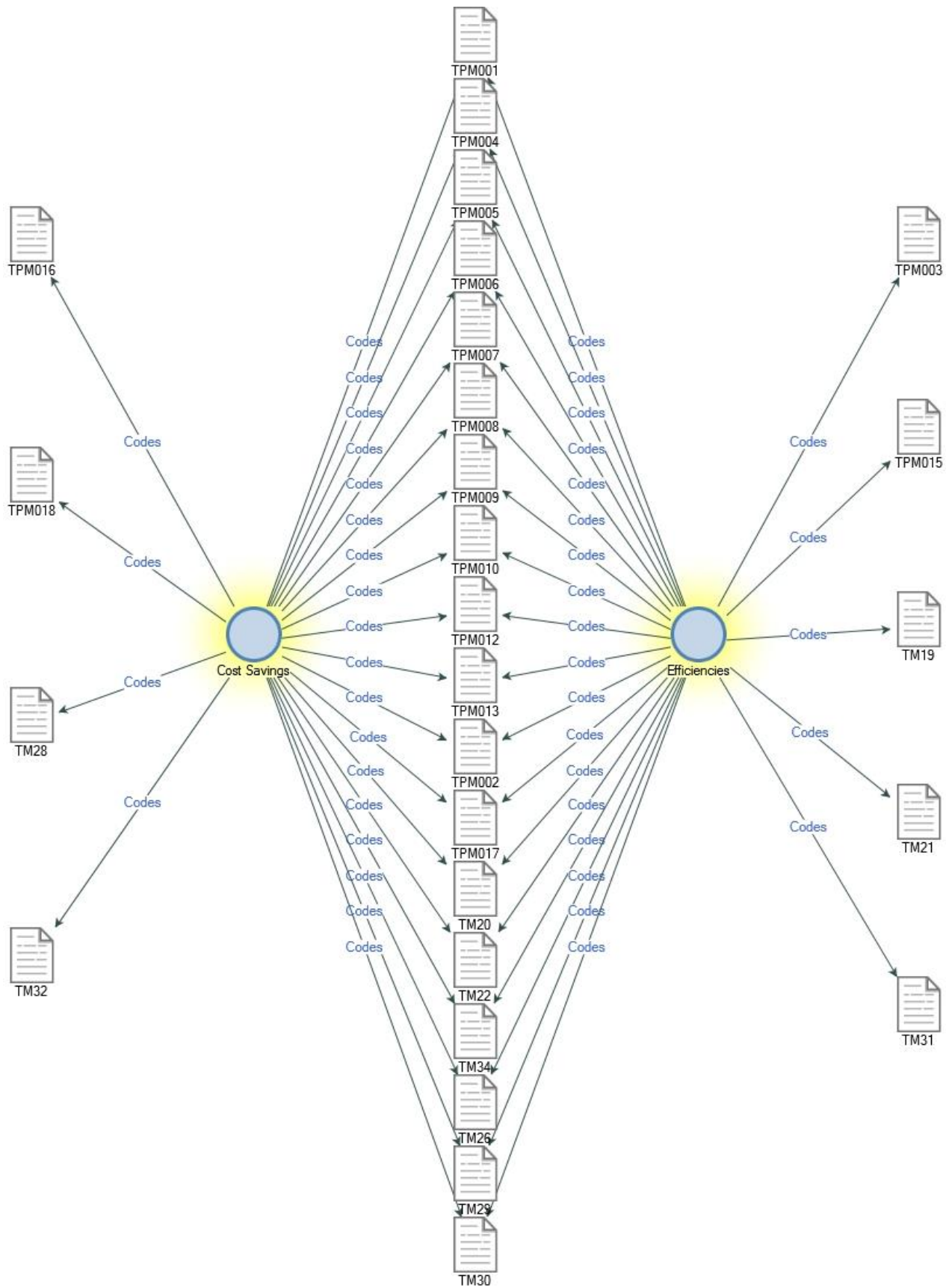


Figure 20: Key theme on the relationship between cost savings and efficiencies as driver behind ATPT adoption

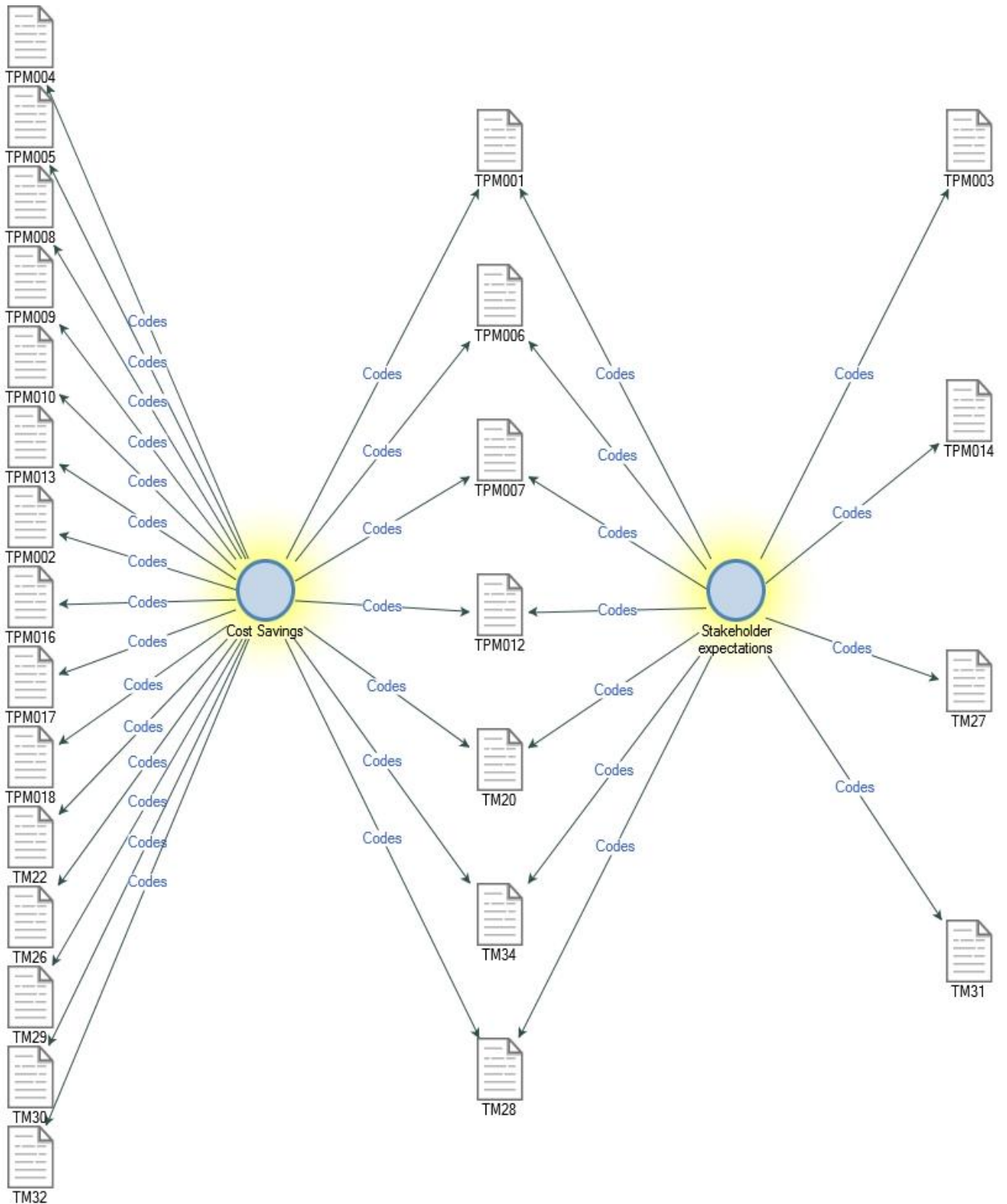


Figure 21: Key theme on the relationship of organisational drivers behind ATPT adoption between stakeholder expectations and cost savings.



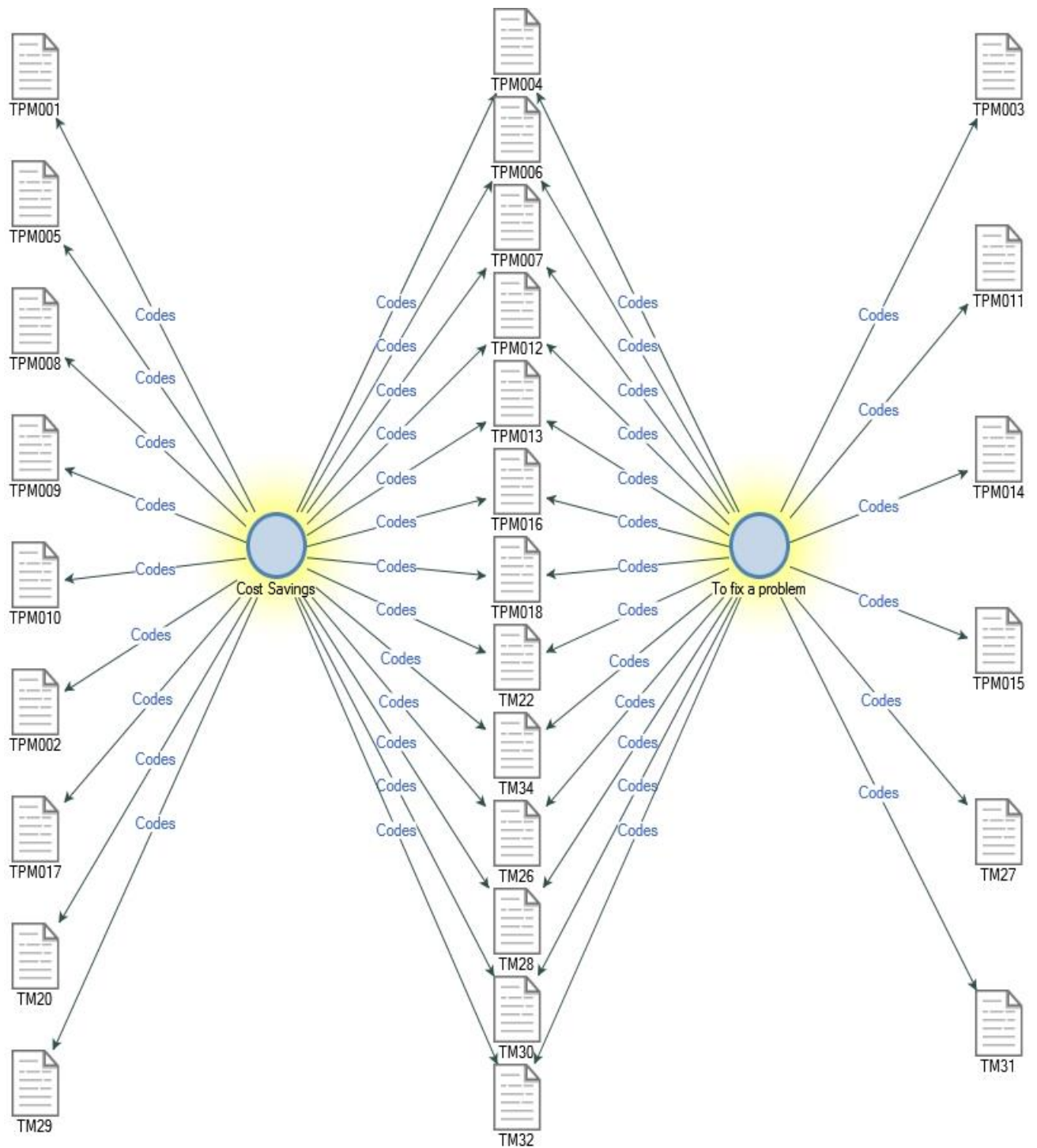


Figure 22: Key theme on the relationship of organisational drivers behind ATPT adoption between the requirement to fix a problem and cost savings.

The significance behind understanding the relationship between cost savings and other variables including stakeholder expectations, to fix a problem, support employees, and organisational efficiencies suggests that organisational adoption of ATPT is more complex than just one requirement, but rather a wide range of variables that are taken into consideration.

One of the vital contributions of understanding the individual relationship between two themes is through the capability to translate this and break down the data between all themes which emerged. While earlier conceptualisations of the themes in this research consisted of a highly structured mind map as displayed in Figure 14, the end analysis suggests that the organisational DMP is less restrained taking into consideration numerous elements and considerations when adopting ATPT. Hence, the final outcome of the results conceptualises the data as a highly interrelated and interconnected themes which can be seen in Figure 23 below.



## 4.5. Chapter Summary

This chapter presented the process that was used to collect, transcribe, code, and analyse the data using NVivo. One of the challenges with this research was the large data set which consisted of a total of 44 participants. However, one of the methods to analyse and manage the data was through thematic analysis with the Framework method. The use of NVivo contributed to the capability to understand the deep relationships between themes to help address the research question in this thesis. The outcome of the data analysis identified the emergence of three key areas consisting of organisational drivers behind ATPT adoption, the variable nature in which organisations adopt ATPT, and the impact of ATPT on the future of work. One of the underlying themes identified in the data analysis process is the interrelationship between each theme where both top managers and union representatives alluded to multiple contributing factors behind the impact of ATPT on the future of work. The findings will be presented in Chapter 5 on the results and discussion.

## CHAPTER 5: RESULTS AND DISCUSSION

The transition from data analysis to the presentation of results marks one the most delicate transitions in this thesis. While the data analysis phase consisted of utilising thematic analysis with the Framework method to code and identify themes, the results section required careful consideration to ensure the makeup of each theme was not lost which required an accurate representation of the original data to be maintained across the 44 participants.

### 5.1. Vignette

Due to the nature of qualitative research, the presentation of the research findings need to be presented in such a way that accurately represent the participants without overburdening the audience through large amounts of a transcript to read through. One solution to this is the use of vignette's which Miles and Huberman (1994) define as a "focused description of a series of events taken to be representative, typical, or emblematic in the case" (p.81).

Due to the focused nature of vignette, there remains a risk that the audience will misunderstand the case if the vignette is not compelling or persuasive enough. Miles and Huberman (1994) recommend one way to combat this is through producing multiple vignette on the same topic, especially where certain participants might. Erickson (1986) notes the use of a vignette is a reduced account or abstraction of an event due to the impracticality for the audience to read entire accounts of an event. With this being said, the vignette remains a selective process of interpretation as an analyst, therefore to accurately represent the confirmability and transferability of results, multiple vignettes are recommended (Erickson, 1986).

While richness of data is important within a vignette, it is not the only importance, with Erickson (1986) labelling the interpretation equally as important. A little detail can hold equal significance to a whole paragraph if the interpretation can be justified and or accompanied by richness of data. Further to this, Erickson (986) recommends the importance of narrating the vignette either at the beginning or end to illustrate how the vignette is interpreted. To use this method to present the results, a small introduction and discussion will be presented alongside the vignettes.

To present the results and discussion section, the findings have been collated into three core sections. The first section (section 5.2) presents the findings on organisational drivers behind ATPT adoption where top managers identified the five key drivers organisational efficiencies, cost savings, customer expectations, supporting employees, and to fix a problem. The next section of this chapter (section 5.3) presents the variable nature in which organisations adopt ATPT through four scenarios ranging between no ATPT adoption to major ATPT adoption. The final section of this chapter (section 5.4) presents the findings from top managers and union representatives on the impact of ATPT on the future of work. The findings from these three core sections evolve into the one of the key contributions of this research through the ATPT Impact Framework which is presented in Chapter 6.

## 5.2 Organisational drivers and end user requirements behind ATPT adoption

One of the most prominent themes which emerged throughout this research was the recognition of the organisational drivers or purpose behind the adoption of ATPT. Identifying the organisational drivers behind adopting ATPT was common practice across all top management participants through the documentation of business requirements to evaluate the suitability of ATPT and its expected impact:

*“If you are to talk about the decision-making process our business goes when adopting automation, then firstly, we would always require clearly documented business requirements outlining the purpose of any tech changes, which is what we base our approval off.”*

TM08

*“First and foremost, I expect to see the business requirements to support my decision. This is typically written by our BA [Business Analyst] to summarise the purpose, benefits, and the implications of the changes on our business and stakeholders. This is the number one priority which I use to support my decision.”*

TM15

*“Anything purpose-related is encapsulated in the form of our business requirements for the relevant senior executive team for sign-off. This is really critical where tech changes can lead to unintended consequences if they are not thoroughly thought through.”*

TM17

Business requirements are also well established throughout the literature, where Erder and Pureur (2004), Fish (2012) and Hastig and Sodhi (2020) recognise the micro-decisions involved to understand how technology projects such as the adoption of ATPT can support business activities and the end users through identifying the benefits behind adopting ATPT,

and more importantly, the success criteria for adopting ATPT. The recognition of end users in association with the organisational drivers is of high importance to this research. The reason is that top managers' recognition of the end users helps provide context for the organisational drivers, i.e., who is intended to benefit from ATPT. The end users were widely recognised as those who stand to benefit from the adoption of ATPT. This draws upon the significance of stakeholder theory and organisation theory in this research through understanding 'who' within the business environment is intended to benefit from the adoption of ATPT, i.e., the end users (Mishra & Mishra, 2013).

As part of the business requirements identified by top managers, there were five key drivers which top managers widely recognised would impact their DMP, which included efficiencies, cost savings, stakeholder expectations, employees, and the requirement to fix a problem. To understand the purpose behind organisational adoption of ATPT, top managers were asked in the interview: "What would you say are the main reasons for adopting technology such as automation and artificial intelligence?" One of the common trends between these five themes was that top managers rarely recognised only one singular purpose behind adopting ATPT but rather a combination of different criteria across the five themes. For instance, while cost savings was identified as a key driver, cost savings alone was not often recognised as the only purpose behind adopting ATPT. Table 11 below provides a clear overview of the multiple interconnected themes identified by top managers.

The two most prominent themes that emerged throughout this research was top managers' recognition of efficiencies and cost savings as the key purpose behind adopting ATPT, with a total of 25 top managers recognising efficiencies and 22 top managers recognising cost savings as one of the key purposes behind adopting ATPT. Further to this, 12 top managers also recognised stakeholder expectations as one of the key drivers behind



adopting ATPT, with 14 top managers also recognising employees as one of the primary purposes behind adopting ATPT. The most prominent theme which emerged was a total of

<b>Top Managers (TM)</b>	<b>Efficiencies</b>	<b>Cost Savings</b>	<b>Stakeholder expectations</b>	<b>Employees</b>	<b>To Fix a Problem</b>
TM01					
TM02					
TM03					
TM04					
TM05					
TM06					
TM07					
TM08					
TM09					
TM10					
TM11					
TM12					
TM13					
TM14					
TM15					
TM16					
TM17					
TM18					
TM19					
TM20					
TM21					
TM22					
TM23					
TM24					
TM25					
TM26					
TM27					
TM28					
TM29					
TM30					
TM31					
TM32					
TM33					
TM34					
<b>Total</b>	<b>25</b>	<b>22</b>	<b>12</b>	<b>14</b>	<b>20</b>

Table 11: Interrelationship of key organisational drivers behind adopting ATPT

20 top managers recognised the need to adopt ATPT to fix a problem. As outlined in Table 11 above, there were several instances where top managers identified multiple reasons behind adopting ATPT. The significance of this is reflected in organisation theory; top managers recognised multiple considerations throughout the organisational context that need to take place when looking at any form of change. It is important to note that while top managers commonly reflected upon these five key drivers behind adopting ATPT, there is by no means a solid consensus on any of the key drivers leading to a negative impact on the future of work (i.e., job reduction) as there are multiple considerations at play.

On the notion of organisational considerations behind adopting ATPT, while these five themes emerged as the key reasons to adopt ATPT, as identified by top managers, there are multiple considerations within each of the five drivers that influence how the themes are interpreted. For instance, while cost savings and efficiencies have been recognised in previous industrial revolutions by the likes of Jensen (1993) as the purpose behind adopting technology, top managers in this research introduced a deeper and more intricate level of insight into how efficiencies and cost savings are actually achieved and into the impact on the future of work. While it is convenient to state that any of these five themes drive the adoption of ATPT, each theme represents a complex mechanism which organisations evaluate for the suitability and capability of ATPT, with no singular dominating approach recognised by top managers to recognise how the driver is achieved in an organisational context.

To explore the complexity of these five key drivers and themes behind adopting ATPT, each of the five drivers identified by top managers will be presented in their own sub-section covered between section 5.2.1. and section 5.2.5. The final component of this theme will present an overview of the interconnection between the five themes in section 5.2.6 and their relevance in understanding the implications on the future of work.

### 5.2.1 Adoption of ATPT to enhance organisational efficiencies

One of the consistently recurring themes which emerged around the purpose behind organisational adoption of ATPT was the optimisation of ATPT to enhance organisational efficiencies. Organisational efficiencies and similar terminologies used, such as process efficiencies and streamlining, have been recognised by top managers as the ability to enhance the performance of a particular function or task within an organisation to make a process more efficient through ATPT. Common examples used by top managers included the use of ATPT to enhance organisational efficiencies through the ability to import and export information and to process data. While not limited to this, these examples have been used by top managers as a baseline to register what they identified as the benefits of optimising ATPT, which in turn resulted in the ability to enhance organisational efficiencies through reduced processing time, minimising errors, and reducing the burden on staff.

Although this section is designed to focus on what drives organisational adoption of ATPT, it represents only a single layer of the issue as it is important to not only understand the driver behind adopting ATPT but how that driver impacts organisations. top managers identified organisational efficiencies as one of the key drivers behind the adoption of ATPT. In fact, a total of 25 out of 34 Managers identified organisational efficiencies as the primary purpose:

*“If we are talking what drives our decision-making, it would be efficiencies. How we can make the greatest efficiencies fundamentally comes down to streamlining by reducing unnecessary mundane work that is otherwise taking up valuable resources.”*

TM05

*“From a decision-making point of view, disruptive technologies is all about how we can gain greater efficiencies.”*

TM15

*“The whole process of digitalisation is to make an impact, and it is to make an impact on the efficiency of our processes.”* TM17

*“The end goal is to increase productivity and efficiency gains for the team. To put this into a measurable context, we review operational processes, evaluate and prioritise what can be streamlined.”* TM26

These vignettes provide an overview of how the theme of organisational efficiencies was widely recognised by top managers as one of the primary reasons for adopting ATPT. The notion of organisational efficiencies driving the adoption of ATPT also emerged with earlier research conducted by Mrowinski et al. (2020) on perceptions of ATPT among managers, who also recognised efficiencies as one of the key drivers behind adopting ATPT. However, the findings of this research go beyond simply recognising efficiency as one of the primary drivers behind ATPT by focusing on what top managers alluded to as the requirement for ATPT to meet the suitability criteria for enhancing efficiencies, which will be covered in section 9.2.1.1.

#### *5.2.1.1. Suitability criteria behind enhancing organisational efficiencies using ATPT*

Although efficiencies were identified as one of the key drivers behind adopting ATPT, top managers outlined the complexity of adopting ATPT— it is not as simple as adopting ATPT to enhance organisational efficiencies but is rather reflected in the additional requirement to meet the suitability criteria within the organisation. One of the complications of presenting the theme of suitability was due to top managers identifying the suitability of ATPT on a case-by-case basis, where there were no consistent rules behind what was deemed suitable due to it depending on the specific process in question. However, the core elements raised by top

managers came down to two notable variables which were recognised as the cost of ATPT and the requirement to fix a problem. While both cost savings and fixing a problem are recognised later in this section independently from organisational efficiencies as a key driver behind adopting of ATPT, there remains a deep interconnection between each of the four key drivers identified by top managers, which will be explored throughout this section and later summarised at the end of section 9.2.

The recognition of the suitability criteria introduces one of the early contributions this research makes to existing literature where the suitability criteria behind adopting ATPT for organisational efficiencies has been scarcely taken into consideration when attempting to understand the impact of ATPT on the future of work. The significance of the suitability criteria helps the conceptualisation process behind whether organisations adopt ATPT when it becomes available. The findings of this research suggest that organisations do not apply a company-wide rule for adopting ATPT. Rather, top managers recognised specific processes that could benefit from ATPT to improve efficiencies, ease workloads, or reduce stakeholder waiting times:

*“Put it this way, while automation is great for streamlining, it is expensive and not something we can just introduce. It needs to be viable, and by viable I mean meet our suitability requirements to have a positive outcome for our stakeholders through reducing our internal time delays.”*

TM03

*“It’s funny reading this stuff about industry-wide automation and the loss of jobs. We don’t see it like that at all. Do we have automation? Yes, but [Organisation] has strict criteria for any tech changes where we don’t just streamline something because a new*

*type of technology arrives; otherwise, we would be looking at tech changes every second day something new is developed. We will only look into it if there is the need to, and that need is typically if something is seriously wrong with our current processes; otherwise, I don't see a clear benefit to this at all.*" TM12

*"Technology is driven by profit. Reducing costs is and has been for some time a major focus towards achieving our organisational objectives, but if we cannot make our processes more efficient, then it is hard to capture any cost savings, so process optimisation has been a major focal point for us."* TM25

*"There are nice-to-haves and must-haves in all our departments. There is no point putting a blanket rule of automating everything to make it more efficient as some departments don't have anything wrong with the way they process, and others can be resolved without automation. Really, it just comes down to the basic fact of only automating what we must, and that is if there is a serious problem in the form of our processes."* TM26

*"If we were to adopt technology, it would be for efficiency gains, but the purpose is very different from reality. Automating a small task can take over fifteen years to pay off, so we target our process deficiencies and ensure we only automate what we need to."*

TM34

These results suggest that organisations do not simply adopt ATPT when it becomes available but rather evaluate the suitability of any technology against the criteria of cost, to fix a problem, reduce workloads, and reduce stakeholder waiting times. While efficiencies were recognised by top managers as one of the key drivers behind adopting ATPT, the wider recognition of the suitability criteria behind ATPT helps construct the complexity of the DMP which has been a core focus of this research. This complexity is framed through the significance of this research where ATPT has explicit benefits to enhance organisational efficiencies, yet it presents the notion that the availability of ATPT does not necessarily guarantee organisations will adopt it in every scenario. The prominence of these results further acknowledges that ATPT is scarcely adopted on a large scale across the entire organisation. Instead, it is aimed at specific processes.

In the context of understanding the implications on the future of work, these findings suggest that the adoption of ATPT is not going to be a big bang approach but rather a gradual progression depending on the suitability of ATPT within each organisation. This leads into the final sub-theme of organisational efficiencies, where the adoption of ATPT for efficiencies does not predetermine job loss. This theme once again links back to the suitability of ATPT, which contributes towards how employees are impacted by it.

### *5.2.1.2 Organisational efficiencies alone do not predetermine job loss*

The findings from this research suggest that adopting organisational efficiencies does not predetermine job loss. While there were instances of top managers recognising efficiency gains leading to the reduction in jobs, this was not consistent across the board. One of the inconsistencies was due to top managers recognising that ATPT used for efficiency purposes

can make certain jobs obsolete, but how this actually eventuates is still based on case-by-case analysis:

*“A request would come in from a customer to our [Department 1] requesting a particular service. From there, [Department 1] would review the request, fill in additional information, and send to our [Department 2]. They would contact the customer and confirm whether the customer was eligible. If they were, the request would go to the [Department 3] who would fill out the request and send it to [Department 4] to complete the fulfilment of the request for the customer...As you can see, it was all over the place, so we automated the tasks performed by both [Department 1] and [Department 3] effectively streamlining the process to be received directly by [Department 2] and be sent straight to [Department 4] for the fulfilment... Our [Department 1] and [Department 3] were not negatively impacted whatsoever; it was just taking away meaningless and inefficient processes that was just added work in addition to their primary role.”*

TM12

*“Figuratively speaking, I would expect to see fewer staff working in the areas which are being streamlined. Things are still some years away yet from witnessing that kind of disruption, but on the immediate horizon, things are much much more restricted and contained to just getting our processes in order and not so much about reducing employee to reimburse the cost of technology. We are still hiring, and I don't anticipate, well I hope that will never change.”*

TM19



*After about three months, we removed the [Team] which came with about twenty job losses... This didn't happen instantaneously, but the streamlining of our back-office processes actually performed greater than we expected so that people were running out of work to do."*

TM20

*"Your credibility as a business really speaks for itself if streamlining is only achieved at the sacrifice of employees retaining their jobs. Undoubtedly, streamlining means a form of change in the way our departments function and operate, but change is not always necessitated through job reduction. Our total of six, I guess you could say seven departments are never short of work. If it becomes apparent something needs to be automated, then we would support those staff impacted to transition to other areas which are in demand, but we haven't even had to look at that option as we only automate areas which are slowing our workers down, which in turn is used to make their jobs easier rather than remove it completely."*

TM21

*"It's difficult to answer that one. Every situation has its own requirements, but if anything, it comes down to what we talked about earlier on efficiencies. If most businesses are honest with themselves, they would realise employees are at the backbone of any business success where efficiency gains are all about how we can use the likes of automation to make their jobs easier... No two cases are the same which depends on the level of crossover between technology and staff, but rarely will we see people run out of work, and where this does happen, it is about designing the transition into other areas of the business, but where we do, but this happens regardless of new technology or not."*

TM31

The findings from this research indicate that the adoption of ATPT (for efficiency purposes) do not predetermine that job losses will eventuate. In saying this, the findings also do not neglect the notion that ATPT can have a negative impact on the future of work. While there remain inconsistencies about whether job losses will eventuate as a result of ATPT, what remains clear is that ATPT is likely to lead to some form of change in the nature of work, whether that be employees using ATPT, restructuring into different departments, or employers instituting job cuts.

Similar findings also emerged with union representatives, where three scenarios were identified consisting of no impact on employees, impact through restructuring, and reduction of jobs as a result for adopting ATPT for efficiency purposes:

*“By investing in the business transformation and the change of the computer system, their organisation would be more streamlined going forward, which meant the reduction of over 1500 staff.”*

UR02

*“We were not actually heavily involved in the process because there was good communication already established between management and HR, and there were no job losses on the table. It was just to enable HR to manage the workflow better.”*

UR05

*“The employees within the team were directly put at a disadvantage. Staff were going from one FTE to within the range of point seven five, point six five, and point four five FTE, which obviously came with reduction in wages. Although no jobs were lost because we had to fight for it, it really had an impact on the employees’ welfare.”*

Both top managers and union representatives raise the issue of variability in how ATPT can impact the workforce. This has led to the recognition of three primary outcomes of ATPT on employment consisting of no impact/positive impact, impact through restructuring, and impact through job loss. While these findings do not present a definitive answer to how efficiencies impact employment, they go a long way to fill the void in the current literature through establishing the possibility for ATPT to have a variable impact on employment depending on the situational context of each organisation. Further to the situational context, while efficiencies remain one of the most prominent drivers behind ATPT adoption identified by top managers, it was also widely recognised to have a combination of varying considerations including the interrelationship with reducing organisational costs, which will be covered in section 9.2.2. Although the key drivers behind adopting ATPT have been presented in individual sections, the results will continue to establish the interconnection between each theme as managers recognised interwoven elements that contribute to the overall DMP.

### **5.2.2. Reduction of Organisational Costs**

This theme was recognised by top managers as the process of adopting ATPT to reduce organisational costs. The requirement to reduce organisational costs was recognised by more than half of top manager participants with 22 out of 34 top managers recognising cost savings as the key driver behind adopting ATPT.

*“From a decision-making point of view, the board prioritises projects which automation has clear cost savings benefits”* TM01

*“[Organisation] uses Robotic Process Automation to significantly reduce unnecessary costs across our business”* TM13

*“I see automation as having a surmountable number of benefits, but the primary purpose, well that would have to be the respective cost savings that we gain. If there is no cost incentive the reasoning would have to be well justified but typically ninety five percent of the time cost savings is the rationale behind anything we do”* TM22

*“In order to make any technological transformation such as automating a process feasible, we must see a form of cost savings”* TM30

The concept of cost savings has regularly been at the forefront of technological adoption with the likes of Acemoglu and Restrepo (2019a), Jensen (1993) and Schneider (2014) all reflecting on how cost savings drive technological adoption. Despite the overwhelming response of top managers identifying cost savings as one of the key drivers behind ATPT adoption, there remains several key sub-themes behind reduction of organisational costs which contribute towards informing organisational DMP around how cost-saving capabilities is actually achieved through ATPT.

Reiterating from the previous section on organisational efficiencies, there remains a strong interconnection between the key drivers with top managers commonly recognising more than one key driver behind adopting ATPT. For instance, this theme of reducing organisational costs has a deep connection with the previous theme of organisational efficiencies where top managers widely recognised the method for achieving cost savings as the process of enhancing organisational efficiencies. However, it remains important to present these themes independently due to the varying nature of the DMP behind achieving cost savings. This particular element marks one of the core contributions of this research, where there are clearly

recurring themes behind what drives ATPT adoption but depending on the DMP behind it can impact the future of work in different ways.

Identifying these sub-themes is critical towards developing a deeper understanding into the organisational DMP behind the adoption of ATPT as it provides valuable insight into not only what is the key driver behind adopting ATPT, but also how that driver is identified. Top Managers introduced three areas which regularly feature in their DMP consisting of: cost savings through enhancing organisational efficiencies, return on investment, and tangible vs intangible costs. The underlying sub-themes recognised in this thesis includes enhancing organisational efficiencies to reduce costs and return on investment. Going beyond simply recognising cost savings as a key driver to understanding the ‘how cost savings is achieved’ is a highly relevant component of this thesis as it provides much needed insight into the implications of ATPT and the subsequent impact on the future of work.

#### *5.2.2.1. Cost Reduction through enhancement of organisational efficiencies*

Top managers framed a deep interconnection between both cost reduction and organisational efficiencies through the ability in which cost savings is achieved by enhancing organisational efficiencies in the form of improved processing speeds, reduced errors, staff reduction, appropriate organisational resources, and improved customer experience:

*“Our aim throughout this entire process of integrating Machine Learning is to enable the business to be more efficient in the way we process, which ultimately targets our core focus of operating faster at reduced costs.”*

TM04

*“while everyone ultimately wants to use AI [Artificial Intelligence] as a platform to reduce costs...for us, this has been through efficiencies through the ability to process faster with a reduction of critical errors. When we get things wrong it likely means a form of remediation, hence, being more efficient ultimately means a form of cost savings through a reduction of remediation issues”*

TM06

*“It allows us to process more requests for the same if not fewer number of staff. We saw greater costs saved through our ability to get through more work in a short amount of time which led to a greater customer outcome”*

TM22

*“[Organisation] has prioritised reducing costs especially after COVID-19. The way to engineer this is through streamlining processes to operate faster, which ultimately means [Organisation’s] revenue is drastically increased”*

TM23

*“Operationally, we have been able to make huge financial savings from using automation to make our operations more efficient. Our savings has been more in the form of staff resources through reappropriation where we now have four staff doing something a full team of eleven were previously doing.”*

TM29

This theme highlights how enhancing organisational efficiencies is one of the primary approaches used by organisations to reduce costs. The connection between cost savings and organisational efficiencies signifies how the adoption of ATPT is not subject to one single variable, but rather a combination of multiple considerations which shape DMP. Ultimately,

while at face value, cost savings and organisational efficiencies remain two separate drivers identified by top managers in this research, they remain highly integrated and interrelated elements of the DMP. To present this in a concise format, cost savings can be considered the ‘what’ in terms of what is driving organisational decisions to adopt ATPT, while organisational efficiencies is driving the ‘how’ in terms of how cost savings will be achieved. The significance of recognising the interrelation of cost savings with organisational efficiencies is there is no single explicit outcome or benefit behind adopting ATPT. Rather, it is a complex process which requires organisations to make decisions on the basis of multiple criteria that contribute to the DMP. While cost savings through organisational efficiencies establishes the relationship with other key drivers behind adopting ATPT, top managers also reflected on specific cost reduction frameworks through concepts including the return on investment which will be covered in section 5.2.2.2.

#### *5.2.2.2. Return on Investment*

Cost savings has a number of underlying variables which constitute how this is achieved within organisations. One of the approaches emphasised by top managers was the notion of Return on Investment (ROI). Top managers commonly referred ROI to the ability to gain a form of financial return from adopting ATPT:

*“If we look at RPA [Robotic Process Automation] we are looking at high six to seven figure costs to get it fully operational. [Organisation] needs to see a return on investment on this otherwise it won’t be feasible long term.”* TM02

*“Without our ability to recognise a return on investment I think we would struggle to push forward with anything. It is the deciding factor for us”* TM17

*“Put it this way, if we cannot capture a form of return on investment we would not have approval to even initiate a ML [machine learning] project”* TM32

*“Return on Investment is a critical pathway for our business process and decision model as it creates a clear foundational framework of calculating the cost of implementation versus the potential financial returns of the system.”* TM33

ROI is not a new concept when it comes to the adoption of technologies, where the high cost of technology in previous industrial revolutions saw a significant reduction of employees to off-set the cost of new machinery (Toynbee, 1969). While ROI is commonly associated with a financial or cost return, the relationship this has with the future of work has always been in question due to employees being viewed as a commodity under the capitalist system (Marx, 2008). However, top managers have clearly distinguished that current practice around the adoption of ATPT does not necessarily apply similar equations of capturing ROI by replacing employees. While ROI still holds prominence in association with the adoption of ATPT, the method in which organisations achieve this is more highly variable due to the numerous considerations identified by top managers.

*“I would be immensely surprised if return on investment is calculated only on the basis of the number of staff a company can reduce. Even though [Organisation] needs a form of return on investment, we have always taken a holistic approach by evaluating all possible options before our staff even enter the fray.”* TM02



*“A lot of research has really given a bad name to Machine Learning. It is not as simple as “here’s this new technology and see you later”, but more about evaluating the functionality of the Machine Learning capabilities and what this means for our business. More often than not, it is about enhancing the customer experience through efficiencies as opposed to offset with employees.”*

TM04

*“For projects with automation we calculate the average basis of time taken in reference to staff salaries minus the cost of technology and project it against a span of ten years. I think typically, most of our current technology sits at around the four year mark until we see the financial returns. This is about half the technology life span of ten years so we will end up with approximations of around six years of only the cost of running the automation. Now depending on the reach of the project with the number of staff impacted this could be anywhere in the facility of a few hundred to multimillion dollar savings over this six year period. The financial returns do not filter down to removing staff, it is just directly about the time spent on a particular task to free up time for more critical functions”*

TM28

One of the criteria behind ROI introduced by TM28 was on the notion of calculating ROI on the basis of time spent by staff performing a particular process. However, as iterated by TM28, these findings do not filter down to removing staff but rather calculates the time staff spend on a task to review the potential for ROI. These findings are not designed to provide a form of confirmation around how cost savings or ROI is achieved by organisations, instead attempting to frame the numerous considerations which direct the organisational DMP.

Although top managers alluded to the notion in which ATPT would not be worth pursuing without a form of ROI, there remains two sub-themes to ROI which top managers recognised as Value Adding Returns (VAR) and subscription-based cost models. The concept of ROI builds into the next theme of cost savings where top managers framed how ROI is more directly associated with off setting the cost of ATPT while Value Adding Returns (VAR) holds a more distinct prominence around ATPT adding value to the organisation which has an associated financial benefit.

#### Value Adding Returns

While ROI was heavily centralised around the ability for organisations to have a form of financial return from implementing ATPT, the concept of VAR was more prominent among top managers who identified specific organisational issues that ATPT was designed to resolve and subsequently improve the financial performance of the organisation. VAR was widely recognised by top managers as the process of ensuring the benefits of adopting ATPT outweighs the cost of the technology:

*“[Organisation] doesn’t look at it from a cost justification but rather value adding capabilities. There are instances which outweigh cost including reducing burden in certain areas for improving employee wellbeing.”* TM08

*“Automation is drastically changing the way people do business. Yes, under a capitalist system businesses look to maximise the return on technology but I think especially after COVID this is changing where value and functionality is more important than the financial returns. Businesses are rapidly realising that improving functionality with technology is a form of financial return”* TM10

*“Looking at it, the key determinators behind the decision for [Organisation] to automate something is our capability to have a distinguishable return on investment. Return on investment is not just about cost. Of course we consider how many years will it take to repay the cost of the system, but more importantly, does it do what we actually want it to do and add value to the appropriate areas of the business. In many instances, value is more important than cost.”*

TM28

The components of this theme centralises around recognising that ATPT is not only a process of reducing costs, but also that the improving the organisational value and benefits through ATPT. There are numerous methods identified by top manager to enhance the VAR, including reducing burden on employees which was introduced by TM08, and importantly TM28 raised that it is not just about ROI, but ATPT having the capability to perform what it was intended to. VAR solidifies the direction of the results in this thesis, where there is no one single approach to achieving cost savings and ROI but rather comes down to the approach taken by organisations and how they recognise the various scenarios in which ATPT is adopted. The recognition of VAR draws away from the common conception of technology replacing employees and focuses on what top managers recognise as how to add value to their organisation without necessarily replacing employees.

While the concepts of ROI and VAR have held distinct prominence through the DMP to adopt ATPT, top managers have also alluded to how the ROI requirement is gradually changing with more subscription-based services such as Microsoft Azure and Xero which removed the high upfront cost model of ATPT in favour of subscription-based models. While these subscription-based services may appear irrelevant, it holds distinct significance around how organisations and businesses of all sizes have increasingly more options around adopting ATPT.

### Subscription-based cost model

Cost models of technology have typically involved high upfront costs to develop ATPT capabilities which was largely responsible for the emergence of organisations in the mid 1700's where merchants grouped together to purchase machinery that would have otherwise been unattainable by any one individual (Toynbee, 1961). The high cost of machinery has been a prominent element even until today where top managers in this research recognise the importance of ROI to offset the high cost of ATPT. However, ATPT subscription-based or off-the-shelf providers such as Microsoft Azure and Xero are rapidly changing how organisations adopt ATPT with low upfront costs through subscription-based cost models. Subscription-based models can be seen in contrast to more traditional business models with a shift from previously required full upfront payments of the technology to instead including the ability to pay with weekly, monthly, or annual subscriptions.

Top Managers recognised the significance of the availability of subscription-based cost models when adopting ATPT through the ability to reduce large upfront payments and reducing the requirement to constantly monitor and upgrade the technology:

*“I have seen these subscription services open the door to a number of businesses that otherwise are entirely shut out of the market. We are fortunate as the up-front costs of automation and other technology can now be channelled into other areas with less need to develop, maintain, and upgrade our systems. This money has been put back into the business with additional training allocation for our continuous improvement programme”*

TM06

*“Because we pay on an annual basis for [Technology] we are able to rethink how to maximise the benefits, whereas return on investment well that is no longer at the forefront of our thinking”*

TM08

*“Using [Technology] we will be paying roughly one tenth of the cost we would have other paid over a ten year period. When the board decided on this the usual discussion around return on investment more on the fact that we don’t need one and can use [Technology] to promote better working standards which is good from a PR perspective”*

TM13

*“Our RPA [Robotic Process Automation] provider bills monthly. The bill is still expensive yet it comes only a fraction of the cost if we were have done it ourselves”*

TM23

*“[Organisation’s] previous business model was to purchase or develop a form of tech which would last is in the vicinity of ten to twenty years. That was because developments in our area moved much slower. Now if we decide to adopt something so big, we would likely be looking at sunken costs through technology redundancy. To counteract this, [Organisation] shifted from our inhouse build system to [Technology] which we pay on a monthly basis with any upgrades provided in the contract.”*

TM29

*“I am talking very small changes to automation and Machine Learning, but when there are lots of these small changes, the cost of upgrading our Machine Learning capabilities becomes extremely costly. We since made the decision to shift to [Technology] which is a subscription service which includes all these upgrades as part of our license. Instead of our company holding all the risk and the cost requirement when upgrading the technology, the vendor has all the risk”* TM33

These findings suggest that the type of subscription-based ATPT models has provided an alternative option for organisations to reduce organisational costs through reducing the high upfront costs in favour of monthly or annual payments. One of the reoccurring themes which top managers alluded to was the potential benefits subscription-based ATPT models has for organisations to reduce the risk on the organisation where the ATPT provider essentially become more responsible to develop, maintain, and upgrade ATPT systems. One clear example of this in the market today can be seen with Tesla cars. Purchasing a Tesla car today might consist of autonomous driving level 2, yet, customers are provided the option to purchase additional upgrades when new technology (Tesla, 2021). The alternative to this is purchasing a brand-new car each time a new autonomous increment is available which would ultimately be a significant cost for each upgrade. This feeds directly into what TM29 referred to as reducing the impact of technology redundancy with technology rapidly changing where the requirement to maintain top of the end technology is packaged with updates through the ATPT subscription-based providers.

While there is still a cost associated with subscription-based models, subscription-based services have the potential to open the door to a number of organisations and smaller boutique businesses that were previously locked out of the market due to the high cost of ATPT with different providers providing a wide range of cost options. However, it remains important to understand the implications subscription-based services has on the future of work as to whether

subscription-based models will lead to a rapid adoption of ATPT and sooner than expected impact on employment due to greater accessibility for organisations and businesses of all sizes to use ATPT. The significance of these findings is not to dictate how organisations adopt ATPT, but rather recognise what drives organisations to adopt ATPT. Further research into this area could be highly beneficial from a positivist or post-positivist paradigm to understand whether subscription-based services has led to a greater uptake on ATPT adoption. The significance of this theme further alludes to the complications of understanding the impact of ATPT on the future of work where there is no singular approach behind organisations adopting ATPT, yet, it is critical that future research reflects on the changing character of ATPT uptake with the DMP that drives organisations to adopt ATPT.

While a significant amount of focus within the future of work domain has been approached from a more negative avenue with ATPT replacing employees to save costs, the following theme raises conflicting arguments for the current literature where top managers identified the use of ATPT to benefit employees as a key driver behind adopting ATPT. While this is not to state employees are never negatively impacted by ATPT, it provides much needed insight into how employees feature in the organisational DMP when adopting ATPT.

### **5.2.3. Using ATPT for the benefit of Employees**

Although there have been bleak pictures regarding the future of work throughout the literature with the concept of machines and automation replacing employees, top managers have shed potential new light onto this from a completely opposite standpoint where 14 of the total 34 top manager participants recognised employees as one of the key drivers behind ATPT adoption. Top managers widely recognised the ATPT to benefit employees in three distinct ways: as a tool for employees, to reduce burden, and to enhance employee skill sets.

### 5.2.3.1 Implementing ATPT as a tool for Employees

The core component of this theme is derived from what top managers recognised as the decision to implement ATPT as a tool for employees to enhance the capability to perform their role. The emergence of this theme has prevailing significance in understanding the wider impact of ATPT on the future of work, where top managers recognised the significance of employees not necessarily replaced by ATPT but also as the end users.

*“We won’t see automation or artificial intelligence replace employees in our business per say anytime soon. We are focused towards using automation as a tool for our employees to use.”*

TM12

*“There are two things any organisation cannot succeed without: employees and customers. Without good employees you won’t retain customers, so we focus on how we can use Machine Learning to assist our employees as a tool to enable them to perform their work more efficiently.”*

TM21

*“We approach this by including our workers at every step of the way to ensure changes are made to benefit our employees as opposed to just the organisation as our employees are the end users of [Technology].”*

TM26

*“Our staff are at the centre of why we decide to implement disruptive technology. The nature of work will change but this will be a positive thing with new jobs being created using those tools.”*

TM29



*“Our whole motto at the time was really ‘if a machine can do something, imagine what it can do in the hands of people’, so that is what we did, we invested in automation for our employees to use. This was against advice from our consultants on how our competitors were using it but I stick with our decision and we have already seen the benefits.”*

TM32

The emergence of this theme has wider distinct crossover with other key drivers recognised by top managers where providing employees with the necessary tools to support their role had additional benefits on wider organisational efficiencies. While there has been significant focus in the literature around how ATPT will reduce jobs and have a negative impact on the future of work, this theme has introduced contrasting insights where top managers effectively recognised employees as the end users of ATPT. This theme holds a distinct connection with understanding the impact of ATPT on the future of work in reference to STS theory, where top managers alluded to the relationship between ATPT and employees. The development of this theme has contributed towards establishing an important dialog in the literature where the emergence of ATPT is not strictly concerned with replacing employees, but rather introduces the possibility as a tool to assist employees. This theme does not mean turning a blind eye to the potential negative impact ATPT will introduce, but rather aims to present the findings of this research accordingly. Later sections in this chapter will introduce the negative impact of ATPT recognised by both top managers and union representatives.

The decision for organisations to adopt ATPT to assist employees only represents part of the findings behind the driver of ATPT to benefit employees, where top managers also recognised the capability for ATPT to reduce burden on employees.

### 5.2.3.2. ATPT as a burden reduction mechanism

Highly routine, repetitive, demanding, burdensome, and strenuous work was recognised as some of the attributes which top managers labelled as the driver behind adopting ATPT. While the previous theme on ATPT as a tool for employees (section 5.2.3.1) illustrated the requirement for ATPT to benefit the end users, the theme of burden reduction focuses more specifically on how ATPT can benefit employees through burden reduction mechanisms. In this instance, the ability to use ATPT to reduce burden on employees holds significant ground towards framing the results of this thesis as suggests that while technology can replace jobs as often suggested, it can also have a positive effect through reducing burden. Top Managers recognised burden in several ways including short staffed, high workload, unpredictable workload increases, long work hours, employment conditions, Covid-19 burdens, and foster greater conditions for improving work-life balance.

*“many of our staff have been over worked especially with COVID-19, and automation will help reduce this burden through the removal of rudimentary tasks that take up significant labour.”*

TM04

*“now because of automation, if someone is away on leave or sick we are not as pressured to work and perform as we used to be. This has created better conditions for our staff by reducing burden and fostering a better work-life balance culture in the office.”*

TM06

*“it is not moving people to another department or reducing staff, but is an enabler for people to get through more work in a day or week due to burdensome and overload of tasks.”*

TM26

*“For our workers it is about welfare, I am talking burden reduction. The nature of our business has a reputation for behind overly demanding caused by the fast passed environment we have to operate at. This has consequences on our workers welfare where not a day goes by someone isn’t placed under enormous stress, so we are automating what we can to reduce the burden.”*

TM13

The recognition of organisational adoption of ATPT as a burden reduction mechanism for employees is consistent with the literature where Aguirre and Rodriguez (2017) and Van der Aalst, Bichler, and Heinzl (2018) label the potential capability for ATPT to reduce burden on the workforce. The findings from this research indicate that burden reduction is not only limited to the work employees perform but also the ability for organisations to introduce a greater work-life balance for employees:

*“Where AI delivers more manageable workloads [Organisation] is able to introduce a more balanced work-life situation where the nine to five work culture is diminishing in favour of recognising more away time from the desk to allow for more family time. It is incremental, but we now have the resources through AI to allow our staff to self-manage their own time to focus on family issues or more downtime which is what matters”*

TM08

*“Our business used to have issues where our staff would fear asking to leave early to pick up their kids from school. Our drive was to be a family orientated business and this was not happening. Automation didn’t result in lost wages but just allowed for an extra hour or so each day which typically would see people arrive later, longer lunch breaks, finish earlier, or take half days or a day off each fortnight. We presented the option and let the staff independently choose their preference”*

TM12

While previous literature focused on how ATPT could potentially be used from an academic standpoint, the findings of this research take it a step further to recognise burden reduction through ATPT as a key attribute which drives organisational adoption of ATPT. Burden reduction has distinct importance towards establishing decent work and meaningful work through the removal of highly routine and repetitive work.

The recognition of ATPT as a burden reduction mechanism is a significant element in this research through the way it addresses the limitation in the current literature around how ATPT can be used to benefit employees as opposed to the more regular negative association of job loss. Although not all participants identified the importance of reducing burden, it holds promise for opening an active social dialogue regarding standards of good practice through using ATPT as a tool to support employees rather than them. However, in recognition of the emergence of both ATPT as a tool and to reduce burden on employees, top managers also raised the distinct connection this has towards the requirement to enhance employee skill sets to ensure that the workforce is capable of using the technology.

### *5.2.3.3 Enhancing employee skill sets*

The final key element Top Managers raised behind adopting ATPT to support employees was around the importance to either have or develop the relevant skill sets to use the technology. The inclusion of the sub-theme enhancing employee skill is recognised by Top Managers not necessarily as the drive behind adopting ATPT, but rather one of the outcomes or requirements top managers identified when adopting ATPT for supporting employees. While this may not always be the case depending on the ATPT systems, this was raised as a common issue and requirement among the participants who recognised employees as one of the key drivers behind adopting ATPT. There were two primary situations which emerged through this theme. The

first was where new forms of ATPT was introduced to support employees which required the need to reskill staff, and the second was in situations where people whose jobs were impacted by ATPT with the need to transition into other areas within organisational operations.

*“We have regular set backs with the resourcing of skilled staff who can use [Technology] and other things like [Technology]. The solution we designed was where our business now provides each employee a training allowance each year to ensure their skills are always up to date. In this market, there is a huge requirement to know how to work with and use automation so rather than paying huge six figure numbers for a new staff member to do this stuff, we invest in upskilling our staff. They really love it too, and it encourages growth not only for us but the workforce in general. If you have been in a job for a few years with no tech skills, you will enter the market outdated or needing this or that. For people who don’t want to upskill, well they are the ones who are going to face a harsh reality.”*

TM24

*“Upskilling goes hand in hand with automation. Just as an organisation needs to be agile in adapting to change, employees need to meet us halfway. This is how we can maximise the efficiencies of using automation.”*

TM05

*“There is going to need to be a significant uplift in the skills of our workforce. If all the simple and routine tasks are automated, well that just leave more top end jobs which require substantial skills to be able to perform effectively. It will entail a more educated workforce.”*

TM07

*“I don’t think it’s ethical to adopt automation to directly replace staff. Instead, we use automation savings to invest in the development of our staff.”* TM13

The introduction of new technology and the requirement for reskilling has been a reoccurring phenomenon throughout the literature with Bresnahan et al. (2002) addressing the capabilities for AI to have a potential positive impact on the workforce through creating a more highly skilled workforce. While the findings of this research do not suggest it will be possible for all employees to retain their jobs and reskill to either use the technology or new areas of business operations, it does raise the importance of STS theory to establish a clear relationship between organisations and employees to ensure there is adequate time to prepare for any potential impact of ATPT on their work. However, while upskilling has been recognised as a key factor behind the adoption of ATPT, there remains less ascertain behind what skills employees will be required to develop or enhance. This has wider complications from the employee standpoint as the duration behind reskilling through any potential qualifications required can vary immensely from a few months to a few years. Despite top managers identifying employees as a key driver behind the adoption of ATPT, there was not a single participant in this research who identified employees as the only driver, with top managers regularly referencing efficiencies, cost savings, customer expectations, and to fix a problem as a collective decision point behind adopting ATPT. It is important to note that while this section has focused predominantly on the positive impact of ATPT on employees, top managers and union representatives also raised incidents where ATPT has resulted on a negative impact on the workforce. However, as this section focuses on the drivers behind ATPT adoption, the negative impact on employees will be explored later in this chapter.

In addition to the previous sections on organisational efficiencies, cost savings, and employees as the key drivers behind adopting ATPT, top managers also recognised customer expectations as a critical driver behind ATPT which will be covered in the following section (section 5.2.4).

#### **5.2.4. Maintaining a Competitive Edge with Expediating Customer Expectations**

As explained earlier in this thesis through concepts such as the Gartner Hype Cycle (Goasduff, 2019), there is a level of ‘hype’ around the adoption of ATPT which to some extent forms a passage of expectancy for customers in a competitive market. One of the challenges raised by top managers was the ongoing requirement to constantly maintain a competitive edge due to customer expectations. The emergence of this theme is derived from the typical cliché of ‘if I don’t, they will’, which is closely linked to the Anglo-Saxon model of organisations feeling obliged to trade or upgrade their services in fear of being left behind. Top Mnnagers held a strong conviction that failure to meet their customer expectations would ultimately lead to their competitors adopting the technology and capitalising on the market:

*“Things went from ‘nice to have’ to ‘must have’ for our customers in a matter of days. We were effectively in the situation where [Organisation] launched [Technology] thirteen months before our scheduled release of a similar product and we had our customers coming to us on a daily basis requesting us to develop [Technology] otherwise they would effectively jump ship.”*

TM01

*“The market is rapidly changing. Customers no longer remain loyal to a provider for a lifetime like they used to. Instead, they go to whoever can provide the faster and cheaper service. Because of this we must constantly be innovative when adopting automation to ensure it meets the needs of our customers at a lower cost.”* TM07

*“[Organisation] has been racing for the better part of a year to keep up with customer expectations. If we decide not to automate something which would be beneficial for our customers, then our competitors would do it and ultimately causes us to lose money over it. In this sense, we have more to gain by servicing existing client expectations with capabilities introduced by automation”* TM14

The contents of these vignettes allude to a deep connection between customer expectations and the subsequent requirements it places on organisations to maintain a competitive edge. Both examples raised by TM07 and TM14 addressed the notion of ‘if I don’t, they will’, in relation to adopting ATPT with anticipation that their competitors will develop a service that meets customer expectations. Top managers reflected on three primary methods which ATPT is used to meet customer expectations to maintain competitive including the previous theme of enhancing organisational efficiencies (covered in section 9.2.1.), cost savings (covered in section 9.2.2.), and enhancing new tools and systems for customers.

*“...automation is changing our daily operations and processing from a customer standpoint through the likes of chatbots and supercharged technology that can answer customer enquiries without the need for wait time through call centres. Due to this change customer wait times has dropped from 45minutes to less than 3 minutes.”*

TM03



*“Automation is all about process improvement to enhance both customer and client experience.”*

TM06

*“This technology is designed to create a seamless, faster, and better customer outcomes”*

TM07

*“Automating those tasks enable us to redirect our internal services to more appropriate areas of the business to provide greater support with [Technology] for customers.”*

TM26

While on one hand, top managers established the significance of customer expectations driving the adoption of ATPT, while on the other there remains a deeper question around social responsibility and social acceptance behind the adoption of ATPT. Section 9.2.4.1 presents the emergence of the sub-theme of customers and the social responsibility of setting reasonable expectations. While the focus of this section on customer expectations remains on what drives organisational adoption of ATPT, it is equally as important to establish the role between societies needs and requirements on the impact on the workforce.

#### *5.2.4.1. Social Responsibility of setting reasonable expectations*

Following on from the overriding theme of customer expectations driving ATPT adoption, this sub-theme has been framed through the role and responsibility society plays towards driving organisational adoption from the experience of union representatives. This sub theme was categorised on the basis in which customers set expectations on organisations to adopt ATPT regardless of the potential consequences ATPT may have on employment. While the inclusion

of Union Representatives in the results section up until this point has been limited, however it is relevant to include Union Representatives in this section to understand the issue from how organisational drivers impact employment. From a Top Manager standpoint references can be made back to the Anglo-Saxon model in fear of being left behind while Union Representatives approached the issues more from the standpoint of customers oblivious to the impact of their requests on organisations:

*“The primary purpose was to provide greater service to clients through the streamlining of processes, but I don’t think their clients fully understood what this would mean for the employees at [Organisation]”* UR03

*“Customer expectations are what drove [Organisation] to go down the path of automation. But realistically, if their customers also knew they would be reducing staff three months after implementing the new automation system I don’t think there would have been as much support for it”* UR05

*“When customers stand to benefit directly from [Organisation’s] implementation of the new system then there is little resistance to question the loss of jobs.”* UR07

*“It was actually a customer orientated change. [Organisations] reasoning was that people no longer had the time or patients to deal with customer service representatives, where their customers have been requesting to be able to independently login and control their own account for a long time. It was essentially customer driven to enable more customer independence. Customers just had enough so I don’t think they knew what was going to happen to the staff nor did it look like they cared.”* UR10

The core components of this theme suggest that the impact of ATPT on the future of work goes beyond organisational decision-making processes, and a core element of it remains how society accepts technology and sets expectations. Within the context of understanding the purpose behind adopting ATPT, this illustrates how customer expectations hold significant influence over how organisations make decisions behind adopting ATPT. The notion of organisations needing to adopt ATPT in order to remain competitive has a wide range of potential consequences which need to be recognised under the stature of the future of work.

The wider repercussions of this theme suggest a deeper issue than just organisational decisions impacting the adoption of ATPT, but rather the social landscape as well through customers driving organisations to adopt ATPT. In the scope of decision-making, this can occur with a top-down approach through investigating how ATPT can greater support customers versus bottom-up approach which is customer initiated. One of the common issues raised by Union Representatives was that while they recognised the impact customers have in shaping organisational decisions, there is a tendency to request technology without fully understanding the impact. This area is nothing new, as when organisations previously went ahead of what society found acceptable there was large resistance. This calls for areas of further research as to the impact of COVID-19 on the adoption of ATPT. Since COVID-19, there has already been

wider registered accelerated adoption of ATPT systems such as amazon shopping which were previously on the borderline of social acceptance/resistance.

One of the reoccurring themes in this research is the complexity of DMP, where one factor is not the only contributor towards adopting ATPT with the likes of organisational efficiencies, cost savings, employees, and customer expectations all deeply engrained. This is an important element for later in this chapter and the results section through recognising adopting ATPT is not as simple as a yes or no answer, nor understanding the impact of ATPT on the future of work due to the complex layers involved.

The final theme which emerged behind the driver for organisational adoption of ATPT was the requirement for ATPT to fix a problem. Out of the previous four ATPT drivers, this theme is the most generic due to the varying situations and problems organisations reflected on.

### **5.2.5. ATPT as a Solution to a Problem**

One of the complications in presenting the findings of this research is how ATPT impacts each organisation in different ways due to the differences in their operational model. This is evident in the final ATPT driver identified by more than half of top manager participants with 20 top managers recognising the requirement for ATPT as a solution to a problem as one of the key drivers behind adopting ATPT. Top managers used the term 'solution to a problem' in a wide and varying context ranging from maintaining competitive advantage, fixing system issues and outdated systems, enhancing organisational capabilities, loss of profit, and so on.

*“We needed to solve a problem as we were having issues getting certain reporting done in a timely fashion.”* TM04

*“It is only when we come across huge issues or problems that affects our decision to adopt automation takes effect.”* TM18

*“If we are talking what is behind our decision to save costs, it would ultimately be to fix a problem”* TM22

*“We adopt these technologies to generally fix a problem. Generally if things are running smoothly, even old technology, you do not need to automate that process.”* TM34

The requirement to fix a problem continues to raise a repeating trend throughout the findings, where each of the key drivers behind the adoption of ATPT including organisational efficiencies, cost savings, employees, customer expectations and solution to a problem are deeply ingrained and overlap with each other. While the theme of ATPT as a solution to a problem could be filtered down into the other four key drivers, this theme maintains a distinct importance through the way it enables reflecting on the deeper importance where organisations widely took the adoption of ATPT into consideration only when there was a problem to be solved, be it for organisational efficiencies, cost savings, customers, or employees. However, despite the wide recognition by top managers, it remains important that ATPT is not the solution to every problem.

5.2.5.1. *ATPT not the solution to every problem*

With the recognition of Top Managers adopting ATPT to fix a problem, one off set of this is how ATPT is not a solution to every problem. More specifically, there are instances where ATPT holds little value for organisations. While there are certain scenarios where ATPT can be effective to solve a problem, TM07 and TM11 recognised how ATPT is not likely to have any benefits on them:

*“It is not really beneficial for us. The work we do is really personal that automating something just doesn’t seem to be viable.”* TM07

*“There is so much manual stuff that we have to do which falls outside the scope of automation capabilities”* TM11

In more specific detail, TM17, TM21 and TM31 acknowledged that there are certain tasks which ATPT is less capable of performing which skill requires human input.

*“Businesses can’t just decide to adopt something because the tec is out there. You need to thoroughly understand the implications and benefits at every level of the organisation”.* TMP17

*“Technology is less effective in hard brain tasks as algorithms follow a more routine set of tasks”* TM21

*“We use consultants to apply critical thinking to a situation and identify a solution which requires critical thinking which is harder to automate than just repeatable processes. There are multiple roadblocks we need to automate, but its just not possible for our industry”*

TM31

Although ATPT may be available in certain industries does not guarantee it is a viable option nor will it be adopted in every scenario. This has been well documented throughout the literature with the likes of Frey and Osborne (2017) developing the list of jobs most susceptible to ATPT. While establishing the drivers behind organisational adoption of ATPT has been beneficial towards contributing towards current literature by proving insight into what influences organisations to adopt the technology, it remains equally as important to understand how the adoption of ATPT impacts the future of work. One of the primary reasons this section has avoided entering the discussion around how each driver impacts the future of work was due to the inconsistencies and inconclusiveness pertaining to how organisational efficiencies, cost savings, customer expectations, employee benefit, and to fix a problem actually impacts the future of work, where top managers regularly cited the impact on employees as a case by case basis, and did not necessarily result in either a positive or negative impact on employment each time organisations adopt ATPT. Unless the purpose of adopting ATPT is to reduce employees, there is no reason to suggest that the purpose behind adopting ATPT has a direct association with how employees are impacted. This is primarily from the recognition that each independent driver has the potential to have a positive or negative impact on the workforce. As evident with the numerous subthemes under the four main themes, there is no singular one approach for what drives ATPT adoption, and this thesis recognises the likelihood of key ATPT drivers to exist beyond these five themes.

### **5.2.6. Overview of Organisational Drivers Behind ATPT**

This chapter lay the groundwork for the remainder of the results section through attempting to understand what drives organisational adoption of ATPT. The findings of the organisational drivers behind the adoption of ATPT suggest there is no singular approach to why organisations adopt ATPT, rather, it is a combination of the five key themes that emerged consisting of organisational efficiencies, cost savings, supporting employees, customer expectations, and a solution to a problem.

Despite the consistency, there remains unanswered questions as to the relationship between what drives organisational adoption and the impact on the future of work. These unanswered questions are largely reflective of the nature of each of the five key themes which have the potential to have both a positive and negative impact on employees. With that being said, out of all 34 top manager participants in this research, no participants identified the purpose behind adopting ATPT to reduce the number of employees. This is not to suggest employees are not impacted by ATPT, but rather requires a thorough breakdown of the process in which organisations follow when deciding to adopt ATPT which will be covered in the following section (section 9.3) on the impact of ATPT on the future of work. This leads in to the wider significance of this current section, where it was important to distinguish the core characteristics of the drive behind ATPT adoption to develop the process involved behind ATPT adoption.

While the theme definition was originally categorised as the ‘purpose behind ATPT adoption’ this was later refined to the use of business requirements through follow up interviews where top managers. One of the main limitations across the literature to date has been the lack of recognition behind what drives organisational adoption of ATPT. The findings of these five interrelated drivers hold distinct significance in the field of research insofar as there is no singular approach to adopting ATPT, but rather has a wide range of potential



benefits for not only the organisational adopting ATPT but the employees of that organisation. In particular, with 14 top managers establishing employees as a key driver behind adopting ATPT suggests that the future of work is not necessarily all doom and gloom as it is dependent on what drives organisations to adopt ATPT in the first place. Without this component, research has been limited in the ability to paint an accurate representation of how ATPT will impact the future of work, which has resulted in expanding assumptions that ATPT will result in significant disruption across the employment landscape with as high as 60% of jobs predicted to be impacted by ATPT (Bowles, 2014) by the year 2030. As most of the research has measured the impact of ATPT on employment against technological capabilities as opposed to organisational DMP, it remains unclear what drives organisations to adopt ATPT and the association of this driver towards establishing any impact on the future of work.

Understanding the purpose of adopting ATPT is a highly relevant aspect within this research and the overall spectrum of decision-making as it lays the groundwork to understand the finite layers involved when adopting ATPT. Due to the vast complexity involved throughout the organisational DMP, this section has been presented in five key themes behind what drives organisational adoption of ATPT; Process efficiencies, cost savings, customers, employees, and to fix a problem. Although each theme has been presented in an individual sub-theme, there is an interconnection across each theme which will be explored and referenced throughout each section and even more so in the overview section.

This thesis recognises organisational drivers behind adopting ATPT as a foundational requirement to understanding the impact of ATPT on the future of work and is where it looks to make a significant contribution to the literature and future research practices through establishing a framework behind the organisational drivers of ATPT. The key contributions of this section are not only to fill the current gap within the literature, but also establish a working

model to recognise the influence organisational decision-making processes have on the outcome of ATPT on the future of work.

In recognition of top managers acknowledging the potential for the drivers behind ATPT to have either a positive or negative impact on the future of work, the following section presents the findings on the impact of ATPT on the future of work. The following section will draw upon both top managers and union representatives experience to explore the findings behind how ATPT can impact organisations to different extents.

### **5.3. Scenario of ATPT Adoption**

Following on from the previous section of this chapter on what drives organisations to adopt ATPT, this section introduces the level system behind how ATPT can impact the future of work. Before rushing straight into the findings on the impact of ATPT on the future of work, it is critical to lay the groundwork behind the different levels in which organisations adopt ATPT. While it is convenient to state that ATPT may have either a positive or negative impact on the future of work, this is not as clear cut as it sounds due to the nature of and extent to which ATPT is adopted. One of the reoccurring findings of this research was how ATPT impacts organisations in different ways depending on how ATPT is used. For instance, if an organisation adopts ATPT for a single small task or function could be considered a lesser impact to an organisation that adopts ATPT throughout every task or process. This was widely reflective across top managers and union representatives experience, where no two scenarios of adopting ATPT are the same.

To breakdown the way organisations reflected on the extent of ATPT adoption, this research introduces the scale of ATPT adoption through four scenarios or levels, ranging from ‘No form of ATPT’ currently adopted or considered within the organisation to ‘Major ATPT Adoption’ which is considered in direct contract to No form of ATPT through organisational

wide adoption of ATPT including potential widespread impact. The importance of presenting these level systems relates to how ATPT can be adopted at different extends resulting in significantly different impact on employment.

### No form of ATPT

This first scenario marks the baseline for measuring the impact of organisational adoption of ATPT which is introduced by top managers as no form of ATPT currently adopted throughout the organisation. The rational by top managers for not adopting ATPT was largely due to what they identified as the suitability factor. While the previous section focused on organisational drivers behind the adoption of ATPT, this scenario encapsulates the notion that ATPT is not required for every situation, nor a suitable solution to every problem. Out of the 34 participants, there were only two who identified as having no form of ATPT throughout their business operations, even at the most basic level.

*“I believe there is just an overbearing expectancy for businesses these days to automate something. I evaluated it but there were just no viable options for us and we operate perfectly fine without it. Maybe one day we will, but at present its not necessary.”* TM10

*“From what I have been shown so far, machine learning is not really something that can do what we need it to at this stage so we have not invested in it.”* TM16

This scenario marks the only situation where closer certainty can be made around no impact on employment. However, the following three scenarios remain more contentious due to there being no set standard for how ATPT impacts employment, where in any scenario there is the potential for either a positive or negative impact on employment.

Minor form of ATPT Adoption

As the next step up from No form of ATPT adopted, this scenario is recognised as the adoption of ATPT at a very minor scale. Minor form of ATPT adoption was articulated by top managers as adopting ATPT to a minimal extent which consists minimal impact on organisational operations and employees.

*“Frankly, I think this whole talk about AI replacing the workforce is nonsense. We first developed AI a couple of years ago but not to the scale that it transpires to a state of transformation for our business. It is used as a mechanism for greater oversight for our Data Insights team to use to support their informed decisions. Something significant for our business with improvements to informed decisions but minor from an impact standpoint”*

TM06

*“It was about as basic as you can get, it just pulled and formatted our daily data file for us. No one was formatting it previously, so it was something new we were able to do. As I said, about as basic as you can get with minimal disruption on our processes”*

TM22

*“Automation was integrated as an additional enhancement to current processes thanks customer data to our data warehouse. Not much changed in terms of the current process as this happened at 10pm every Thursday. The only additional work that was required was to confirm the file was transferred each Friday morning which had very very minimal impact on the business and our staff.”*

TM29

While the scenario of minor form of ATPT adoption can result in potential impact on employment, top managers categorised this as minimal impact on employees due to no

substantial workflow disruptions. The findings around the different levels, in particular minor adoption of ATPT suggests that while the technology is available not all organisations are going to adopt ATPT to significant extents that result in wide spread impact on the organisation and subsequently employees. The implications this has pertain directly to the nature of understanding the impact of ATPT on the future of work, which suggests the scenarios organisations follow to adopt ATPT are highly variable and that adopting ATPT does not necessarily translate to an organisational impact. The next scenario or level presented by top managers consists of what this research defines as ‘significant form of ATPT adoption’, which is a step up from a minor form of ATPT adoption where top managers detailed the impact ATPT had on employees. It is important to reiterate that the impact of ATPT on the future of work is a two-sided coin, with the potential for there to be both a positive and negative impact which will be discussed in the following section.

### Significant form of ATPT Adoption

As discussed in the introduction section of this thesis, organisational processes are considered to be made up of multiple job tasks which when combined make up the components of a job. A significant form of ATPT adoption is defined in this thesis as the use of ATPT across single or multiple job tasks but limited insofar as it does not impact entire jobs. The categorisation of significant form of ATPT adoption was on the basis of top managers’ reflection on scenarios that impacted job tasks.

*“There is a change manager assigned to each automation project to guide the organisation through change which is necessary when we are automating a significant proportion of tasks. When the period of the project is reached where the specific functions have been automated, our change management plan kicks in with appropriate work delegation for those whose jobs have been impacted”*

*TM01*

*“As a business we are only willing to go to the extent of automation or AI supporting our employees jobs rather than seeing us turn into an AI business. Two years ago was our most recent AI project which saw twenty two percent of our operations automated. It sounds like a lot, but when it is broken down into what it was actually doing, you are looking at about ten percent or less of each of our employees job”* TM08

*“In a practical application, we use targeted automation to hone in on specific job tasks that can be performed by robots. Without a doubt this has transpired into some disruption for people who struggle with change, but for the most part people realise we are not replacing their jobs with robots, just specific functionalities that our business performs.”* TM19

*“We contracted a consulting company to design a roadmap for us down the automation pathway. Without going into explicit detail, the gist of it was to automate routine tasks that were clogging up valuable staff time across several departments.”* TM03

*“It was just part of a process that involved automating sending the request for approval from the [Department]. This reduced the days delay which was being incurred through the request approval process. Now we can receive the request, review it, confirm request with the customer, load into [Technology] and have it approved instantaneously.”* TM31

Union Representatives also had vivid experience with the scenario of significant form of ATPT adoption, with seven out of ten union representatives reflecting on their experience of organisations adopting ATPT impacting job tasks. It is important to note, that with the critical indecent technique adopted with Union Representatives, no scenarios emerged ranging between no form of ATPT and minor form of ATPT.

*“[Organisation] gave us assurance early on that there would be no job losses. That’s good and all, but when the automation came into fruition with seventy five percent of the, I was going to say department, but more team was automated, [Organisation] only needed to retain two out of six them [employees], so the other four were restructured into different teams within the department. Because of the reduction in tasks they needed to perform, there was too much free time for the team, resulting in the restructure to keep everyone occupied.”*

UR04

*“The situation we were dealing with was a lot of small changes to maximise outputs by reducing process times by automating it. This was just specific tasks that the employees at [Organisation] were performing and because they were highly repetitive tasks anyway, there were no complaints when it came to automating it as it had the potential to improve the quality of the work.”*

UR08

*“The union was advised by [Organisation] that they were planning to streamline a few tasks. There was initial uncertainty because the first reaction is job insecurity, but it transpired in the end to make their jobs easier by streamlining a lot of the more ugly and mundane work that was being done. The work remained the same, just without the component that required data validation.”*

UR10

Defining the parameters of ATPT adoption holds distinct relevance in understanding the organisational DMP, where ATPT can be used to varying extents throughout organisational operations with varying degrees of impact. While it is entertaining to predict the future of work through suggestions from the literature around a doom and gloom viewpoint on the future of work, research into understanding reality behind organisational practice suggests that while there are extreme cases of disruption, the findings from this research suggest the impact of ATPT varies in the degree of how it is used. Later components of this chapter present the findings on business ethics which participants drew upon to form the basis on how ATPT is used appropriately.

The final scenario of ATPT adoption is recognised as a ‘Major form of ATPT adoption’, which in comparison to the previous three scenarios, is recognised as ATPT impacting entire jobs and departments.

### Major form of ATPT Adoption

The final scenario recognised of ‘Major form of ATPT Adoption’ is defined in this research as the use of ATPT across entire jobs and departments. In comparison to the previous scenario on significant form of ATPT adoption which encapsulates only the use of ATPT across job tasks, the major form of ATPT adoption is recognised as an extensive form of impact resulting in major disruption for both the organisation and employees.

*“Essentially, we had a team that literally received the data and put it in a file for our analysts. It was one of our smallest departments of about three or four people. It just didn’t make economic sense not to automate it when we were going through a transformation of our business... Unfortunately, the members of that team were made redundant roughly a year ago.”*

TM15



*“We decided to streamline a lot of our back-office processes which were becoming extremely outdated. Certain requests would go through multiple teams and it was hindering our organisational transformation. We fully automated our [Department 1] by removing the front point of contract and enabled the request to feed straight through to our [Department 2] team. After about three months we removed the [Department 1] which came with about twenty job losses.”*

TM20

*“AI has enabled us to remove a couple of our processes mainly from the frontline. Using smart forms, our customers now fill out the forms online and are required to ensure all the data is correct. Once they submit it the smart form integrates with our inbuilt AI system to filter through the request, place order, and send the order all within the space of two minutes at any time of day without requiring any staff intervention.”*

TM27

These two examples raised by TM15 and TM20 raised the concept of organisational transformation using ATPT by essentially removing old systems with the new. Subsequently, this also included the reduction of employees as part of the transformational process where the departments from both TM15 and TM20 cases were no longer required.

The impact of the major form of ATPT adoption also was recognised by three out of ten union representatives, who largely reflected on negative outcomes experienced by employees through the wide scale adoption of ATPT.

*“The agreement between [Organisation 1] and [Organisation 2] was that by [Organisation 2] investing in the business transformation and sponsoring the project to change the computer system, the [Organisation 1] would be more streamlined going forward which meant the reduction of over 1500 staff with two entire departments replaced by AI bar a few people who were retained to use the new system. This was a huge thing at the time, where [Organisation 1] were so proud at the time of their accomplishment with AI”*

UR02

*“When the Union was first informed, we put forward our case that staff could upskill into back-office rolls as that had been what was done in the previous situations. Negotiations later broke down because the proposed area that [Union] recommended for the staff to upskill into was expected to be automated in the next ten months which [Organisation] admitted were expected to come with additional cutbacks. So job loss was basically inevitable because of this new mindset to transform with automation effectively replacing jobs”*

UR09

*“In 2018 [Organisation] introduced a new automated platform to automate about 60 percent of procedures in one of the back-office department teams. Although the staff in this team consisted of about thirteen people, it was indicated early on by [Organisation] that there would be significant job losses within the team.”*

UR07

One of the commonalities between the scenarios presented by both top managers and union representatives under the major form of ATPT adoption was the widespread impact ATPT had on the workplace, leading to what the majority of participants described as ATPT replacing employees. While situations such as reskilling employees have been suggested as a

possibility when adopting ATPT, UR09 reflected on an incident involving an organisational transformation which restricted the options of employees due to the numerous changes occurring across the organisation at one time including the ability to reskill staff into new areas of the organisation. Table 12 below details the overview of the scenarios or findings which have been presented by top managers.

*Table 12: Organisational Impact Level of ATPT*

Scenarios of ATPT adoption	Definition	Index
No ATPT Adoption	No form of ATPT currently adopted throughout any organisational operations. No impact to be perceived.	No Impact
Minor ATPT Adoption	Minor ATPT adoption with minimal organisational impact. Impact on employment may consist of burden reduction and process enhancement with no significant impact identified.	Minor Tasks
Significant ATPT Adoption	Significant ATPT adoption impacting one or multiple job tasks within a job. The impact on employment may consist of minor restructuring, burden reduction, task reallocation, and potential job loss.	Multiple Tasks
Major ATPT Adoption	Major ATPT adoption impacting entire jobs and departments. Impact on employment may consist of job loss, restructuring, and wider organisational change.	Entire Jobs and Departments

### 5.3.1. Implications of ATPT Scenarios on Future Research

The findings from the four scenarios hold distinct significance towards addressing the primary research question behind how organisations adopt ATPT. Current literature including Arntz et al. (2016), Frey and Osborne (2017) Manyika (2017), and Webb (2019) has established the premises of predicting the impact of ATPT on the future of work. However, one of the critical elements which have been excluded from current literature is around how the term

‘impact’ has been defined. While the findings align with the literature in the sense that the majority of top manager participants in this research identified their organisation as adopting some form of ATPT, the extent of impact in which different organisations adopted ATPT remains highly variable.

The findings from this research suggest that the impact of ATPT on the future of work is one that is highly variable in nature through the emergence of the four distinct scenarios consisting of: no form of ATPT adoption, minor form of ATPT adoption, significant form of ATPT adoption, and major form of ATPT adoption. Excluding no form of ATPT adoption, the other three scenarios where ATPT has been adopted suggests how the term ‘impact’ that has been widely used throughout the literature must be interpreted from a highly general viewpoint unless clearer categorisation is used behind the variable extents in which organisations adopt ATPT. This further reinforces the methodological approach taken in this research to construct an understanding behind how in practice organisations actually adopt ATPT. However, even in relation to these four scenarios, the use of ‘impact’ needs to be considered with reserve due to the potential for any form of ATPT adoption to have both positive and negative impacts on the future of work.

These findings have wider implications for future research within the future of work domain due to the careful consideration required to understand the different extents and scenarios in which organisations adopt ATPT. Ultimately, this refers to the inability for research to generally classify ‘impact’ due to the variability of ATPT adoption. Therefore, research attempting to predict the future of work or the number of employees expected to be impacted by ATPT should be approached from organisational practice or how organisations intend to use ATPT as opposed to a form of theoretical viewpoint of ATPT capabilities. This recommendation for future research is driven on the basis that each organisation adopts ATPT to different extents that are dependent on the purpose for adopting the technology. This links

back to the significance of understanding the purpose behind organisational adoption of ATPT (as discussed in section 9.2), where organisations identified a number of different drivers behind adopting ATPT which influence how ATPT impacts both the organisation and employees. For instance, out of the 14 top managers who identified employees as the key driver behind adopting ATPT, none of them were identified as adopting ATPT to a major extent. This implies that the term ‘impact’ cannot be used to dictate an adverse impact on the future of work, as it can have both a positive and negative association.

Up until this point of the chapter, the results have presented key findings behind how organisations adopt ATPT at multiple layers through the organisational drivers/purpose behind the adoption of ATPT and the four scenarios organisations identified to the extent in which ATPT was adopted. While there has been ongoing discussion across these two sections on the future of work, the primary justification behind placing restraint on detailed analysis of the impact on employees was due to the complexity involved and numerous variables which lead to the recognition of ATPT impacting employment in both negative and positive ways. The following section (section 9.4) marks one of the distinct transitions of this chapter with a shift away from organisational practice into the implications of organisational adoption of ATPT on employment and the future of work. This section discusses the impact of ATPT identified by both top managers and union representatives on employment in conjunction with both adopted and potential strategies to minimise any adverse impact on employees and the future of work.

## **5.4. Impact of ATPT on the future of work**

Establishing the impact of ATPT on the future of work has taken place through a deep journey to understand what drives organisations to adopt ATPT in conjunction with the different scenarios that top managers and union representatives identified. These findings drew closer to the conclusion around how the use of the term ‘impact’ can represent both positive and negative impacts of ATPT on the future of work. Following on from this, section 9.4 presents the findings raised by both top managers and union representatives on the impact of ATPT on the future of work. However, in reference to the variable outcome of the findings, this section will be presented as two primary themes consisting of adverse impact of ATPT (section 9.4.1) and positive impact of ATPT (section 9.4.2). Following on from these two themes, this thesis will present the findings on good practice that emerged as a result of this research (section 9.4.3) which both top managers and union representatives recognised as effective practices to use ATPT effectively which not only minimised the impact of ATPT but also contributed to enhancing organisational practices.

### **5.4.1 Adverse impacts of ATPT on employment**

While much discussion has been presented on the variable nature of impact leading to both adverse and positive outcomes on employment, this section presents the findings specific to the adverse impact on employment raised by both top managers and union representatives which covers the results on the loss of work through ATPT (section 9.4.1.1), and the increased technical complicity of job tasks (section 9.4.1.2).

#### 5.4.1.1. Loss of work through ATPT

The literature within the future of work domain has been heavily focused on the negative impact of ATPT, suggesting as high as 60% of jobs could be impacted by ATPT within the next few years (Bowles, 2014). Although the purpose of this research is not to quantify the number of jobs impacted, it remains relevant to understand how organisations adopt ATPT, and whether this leads to the reduction in employees. One of the key correlations identified in this theme is the correlation between the loss of work in association with the key organisational drivers/purpose behind the adoption of ATPT. Top managers who identified ATPT leading to job loss regularly citing organisational efficiencies, customer expectations, and cost savings as the primary reason for ATPT and subsequent job loss.

*“Unfortunately, the members of that team were made redundant roughly a year ago...when we were in the process of building more efficient processes we eventually got to the testing phase where our people were slowing down the automation capabilities, and in this age of discovery we just needed to keep moving forward by, I know it sounds harsh, but with technology and automation as it is more reliable than people.”*

TM15

*“AI has enabled us to remove a couple of our processes mainly from the frontline...the consequence was a seventy five percent reduction of frontline staff. Customer requirement of frontline had drastically diminished and the frontline were twiddling their thumbs for most of the day. Basically a two factor decision driven by AI and customer need.”*

TM27

*“The objective was to save costs, and we could only achieve this by rebuilding the teams which ultimately didn’t require as many people.”* TM21

*“It was to speed up processing capabilities. The off set of this was due to the high cost of the technology that a reduction in staff was the only option proposed by the organisation, but we managed to negotiate the number of staff.”* UR06

*“There have been redundancies which have come into place with the change that are being implemented now. They are relooking at roles especially in the frontline area which will not be a change to the jobs but a straight reduction in the numbers. It will be job losses. The customer need for these roles has diminished over the years”*

UR07

While the theme of ATPT adoption leading to job loss reinforces existing literature, the significance of these results presents specific contribution to the literature through the recognition key organisational drivers behind adopting ATPT (including organisational efficiencies, cost savings, and customer expectations) help understand the rational behind why employees are impacted. This further reinforce the importance of presenting the key drivers behind organisational adoption of ATPT early on in this chapter due to the deep interrelationship it holds with other themes throughout this research. This aside, while both top managers and union representatives raised the impact of ATPT leading to job loss, this remained only a small proportion of participants, with most top managers citing the capability for ATPT to have a positive impact on employment including reducing burden and enhancing employee skill sets.



The next step down, one of the emerging themes raised by union representatives was not only ATPT to lead to job loss, but also reduction of work hours which can lead to an unfavorable impact on employees through loss of wage which will be covered in the following section (section 9.4.1.2).

#### *5.4.1.2 Reduction in work hours leading to loss of wage*

The negative impact of ATPT on the workforce is not only concerned with whether employees retain their jobs or not but how jobs are retained. One of the themes raised by union representatives was how they perceived organisations as only presenting the positive impact of ATPT to stakeholders by using reduction of hours to reduce the negative association that comes with job loss. In some instances, reduction in work hours can be perceived as a better outcome for employees in comparison to the loss of work. However, union representatives detailed how reduction in work hours can have the complete opposite effect leaving employees in a worse off situation than redundancy. This is primarily due to incidents identified by union representatives where employees would have been entitled to significant redundancy packages if there were job losses, but under the reduced work hours are only left with less work and lower wages as a result.

*“[Organisation] is a well-known company throughout New Zealand so it would have been a front pager for days in the news if the suggested redundancies came to fruition. [Organisation] avoided this by changing the majority of staff’s FTE [Full-time equivalent] status from one to point two five, point four five, point seven five and so on. As a union, we try to promote how automation can increase wages and ensuring employees retain their jobs can be seen as a great outcome, but in this market, people cannot live off half their income they were previously earning.”*

UR09

*“it is easy to think having a job is better than not, but they were left without a redundancy package and instead left with fewer hours and smaller wages. Now obviously there is an expectation by [Organisation] that staff will eventually resign as no one can last on fifty percent less salary, and when that happens, well it’s just a sneaky way around the contract not having to pay out redundancy.”* UR03

While there is talk of ATPT improving greater flexibility with reduced hours while maintaining the same wage, these incidents presented by union representatives suggest that organisational adoption of ATPT can lead organisations to make the opposite decision through a reduction in work hours and subsequently wages. It is important to note that this theme was only recognised by two union representatives and no top managers. Despite this, it remains relevant to understand from a union standpoint the impact reduced hours can have on employees which extends current knowledge around the extent in which ATPT can impact the future of work.

Additional negative impacts identified by both top managers and union representatives consist of the the notation of ATPT increasing the technical complexity of jobs and job tasks required to perform the role. While there has been focus in the literature on how ATPT can result in a positive impact through improved skill sets, the following theme (section 9.4.1.3) suggests ATPT has the potential to create a greater divide between the skilled and unskilled workers.

#### *5.4.1.3. Increased technical complexity of job tasks*

A lot of focus in the literature has been on how ATPT can foster positive change through enhancing employee skill sets which can lead to more meaningful work and higher wages. However, the findings from this research explore the other side of the spectrum where top managers cited ATPT as resulting in more complex and challenging work environments with

job tasks shifting towards more advanced technical requirements that are beyond the capabilities of some employees. This added complexity has resulted in increased demand placed on employees to rapidly adapt to the change in skill requirements, resulting in additional pressure and burden placed on existing employees to adapt to the ATPT systems. While new technological changes and the complexity that comes with it may be a fresh new challenge for some people in the workforce (which will be presented in section 9.4.2), situations facing organisations allude to an emerging divide between the skilled and unskilled workers.

*“[Organisation] is faced with a massive skill shortage. We tried reskilling staff into new roles and departments, but the new processes pose more technical challenges than that they have been exposed to. With automation data can flow extremely fast and we have already had instances where customer data has gone to the wrong place because employees have not learned how to manage the systems. These data breaches has really taken some people to a dark place, and there is a growing sense from those few on their inability to perform their new roles. We really tried to keep and help transition everyone, but in the coming days I will have to make a decision which will likely see a couple of them go... not only because of the data breach, but because we need people committed to upskilling and not everyone is, and the ones who aren't are rapidly being left behind.”*

TM26

*“[Technology] is not something that can just be learned overnight, so we have to be patient knowing it will be challenging times. Fifteen months prior to go live for [Technology] we funded all our staff for the relevant training courses, but there are about twelve percent who still have not passed the first level out of four courses because of the technical component which is challenging for them. Post go live, the issue we now face is for them to learn these new systems on the go which has the added burden of needing to perform BAU [Business As Usual], and learning the new requirements to perform BAU. The technical stuff just isn't for everyone.”*

TM08

*“With the new [Technology] system now performing most of the leg work, we need people working in the background to deep dive into the [Technology] system. Honestly, I even had a crack at it and could barely get my head around it... There is huge pressure on staff because their old jobs have become obsolete and for some of our staff I fear, well I know the work is too difficult for them.”*

TM19

*“Perhaps if we took a more gradual approach and maybe invested in [Technology] in phases then this skill gap would be less apparent, but from a business sense there was no practicality in this as there was only a small number of staff lacking skill wise. We can't, we just can't hold back our organisational transformational process just because of five or six staff. I know a couple of them have had to get counselling sessions because of the stress placed on them to adapt to the new job requirements, but at the end of the day in reality we have to remain competitive as a business and this will likely see a greater divide between the skilled and unskilled workers.”*

TM32

In general, union representatives viewed upskilling employees as a positive impact on the future of work. However, UR07 reflected on a similar negative incident as to the ones presented above where the new skill requirements and expectation of the organisation became too much for some staff who ended up resigning from the organisation:

*“The approach taken by [Organisation] was initially to retain their employees through this transition phase that was all laid out, but the issue we ran into was a huge skill divide between what [Organisation] expected and where their people were actually at. This stuff takes years of training, so three months to prepare just wasn’t sufficient by any cause. Even when it came to testing they [Employees] were in the blue when trying to use the stuff. It was just a skills mismatch between what [Organisation] wanted and expected and what their employees could actually do. Just imagine the stress of knowing you are likely to lose your job if you can’t learn this stuff, I mean its seriously damaging for people and their families. In the end a few of them decided to take the redundancy package on offer as it just got too much”*

UR07

Although there has been ongoing discussion in the literature around how SBTC can introduce the potential for ATPT to foster in a positive change across the labour market through what Bresnahan et al. (2002) categorises as opening the door to enhancing employee skill sets including higher wages and more meaningful work, there remains the other side of the spectrum through leading to a greater technological divide between the skilled and unskilled workers. This technology divide has resulted in instances which have led to employees struggling to gain the relevant qualifications and skills, which inevitably foster their suitability for continuing the role and leading to harder working conditions with additional burden placed on employees. This remains a serious concern in the coming years especially in areas where ATPT

adoption and the relevant technical requirement becomes industry standard. One of the challenges raised moving forward was the complication behind how technical capabilities or skills are not something that is suitable or desired by everyone.

Earlier discussion in this thesis focused on STS theory and the underlying relationship between organisations, employees, and ATPT. While these findings are far from suggesting everyone will be required to develop a highly technical skill set, there remain incidents where in order for employees to become users of ATPT will require more advanced skill sets from the ones they currently have in situations work is transitioning from a non-technical to technical demanding work. Despite this, findings from this research also suggest the opposite can occur, with both top managers and union representatives citing how reskilling has led to improved employment conditions with higher paid jobs and more meaningful work, which will be covered in the following section (section 9.4.2).

### **5.4.2 Positive impact of ATPT on the future of work**

One of the primary focuses of this research has been to understand how organisations adopt ATPT and the impact on the future of work. The emerging themes from section 9.3 suggest that organisational adoption of ATPT is highly variable and ranges from minor impact to major impact on both the organisation and employees. One of the challenges encountered in this research is the diverse character of impact where both top managers and union representatives have detailed conflicting accounts of both positive and negative outcomes on ATPT on the future of work. Continuing on from the previous section (9.4.1) on adverse impacts of ATPT on the future of work, this section establishes the emerging theme of the positive impact of ATPT on the future of work ranging from burden reduction, and up-skilling employees. The significance of this theme contributes to what both top managers and union representatives labelled as good practice behind the adoption of ATPT and had a distinct

benefit throughout the literature as to how ATPT can be used to improving employment conditions in the future.

To avoid repetition with the earlier theme presented on employees as one of the key drivers behind organisational adoption of ATPT, this section will provide more in-depth detail into each theme, and more specifically, detailed accounts of how each theme has been conveyed through the perspective of the participants involved in this research.

Revisiting the impact employees from the earlier section on the positive impact on employees

#### *5.4.2.1 Organisational Adoption of ATPT Does Not Necessarily Cause Job Losses*

In contrast to the theme on job loss presented in section 9.4.1.1, the prevalence of the theme of ATPT does not cause job loss came through top managers and union representatives recognising how ATPT can lead to organisational change as opposed to job loss. Some top managers also identified the value employees hold towards shaping the culture of an organisation, while others the potential for ATPT as an opportunity to create new jobs.

*“You cant just have no change when you adopt automation. No matter what, there is some form of change somewhere in an operational sense, that be a process or procedure, but a change in a process in comparison to automation resulting in job loss, well they are two very different things... Business change does not mean loss of employees, its really just an excuse for businesses that have much deeper issues that they think can be solved with technology, but not all things can.”* TM02

*“I’ll tell you one thing, I’ve seen some of our competitors use automation and AI to reduce staff, but that is a huge mistake. When you reduce staff you lose years of experience with all the rich knowledge employees hold. It is actually something more than knowledge when I think about it, its culture too. When you work somewhere, you don’t think how nice it was to work for [Organisation], you think about your colleagues and the people around you, that is what really makes the culture of a business. My point is that businesses that begin replacing staff with AI will soon realise the downfall of their culture. For [Organisation] replacement is off the table.”* TM12

*“Our transformation to automated systems has already seen a steady change towards increasing our growth capabilities through our ability to hire more staff than we previously could manage. Its all thanks to the additional cost savings [Organisation] has achieved... now they work on the manual things that cant be automated, and there is a growing trend in this area, mainly analysing the data outputs”* TM11

*“I can’t see AI replacing employees. Obviously, it is going to be something that impacts businesses differently, but for us its not about replacing employees with AI as we still rely on them to understand the outputs produced from the AI. Yes it can do things very fast, but because of this it is actually producing more work as an output that we have to work through and understand and we need continue to grow as a business for the extra support required in this area.”* TM21

These findings suggest that the term ‘impact’ of ATPT on the future of work cannot be interpreted as job loss, as the essence of this theme indicates it is not always the case. While this theme in part can be viewed as a continuation from the four different scenarios of ATPT



adoption, it remains relevant to present the findings that does justice to the conflicting results with themes emerging with the potential for ATPT to have both a positive and negative impact on the future of work.

In addition to the themes of enhancing skill sets presented earlier in this chapter, top managers and union representatives raised ATPT as having the potential to create more meaningful work for employees through automating routine and repetitive tasks which is presented in section 9.4.2.2.

#### *5.4.2.2. Fostering Meaningful work through ATPT*

One of the key areas which emerged was the creation of more meaningful work through the use of ATPT to automate routine and repetitive jobs, freeing up staff time to focus on more important tasks. Creating meaningful work came with the recognition of upskilling employees to perform the new roles. It is important to reflect back on section 9.4.1.2 on the negative impact reskilling has had on employees. However, as much has been the case with the findings of this research, top managers also viewed reskilling as a positive outcome.

*“We try to get them to focus on more value adding activities and also actually focus on people’s development plan. None of the people that we have actually want to stay in accounts payable processing and invoicing for five days a week. They always want to do something better. They always want to improve and develop their skill sets”*

TM18

*“Technology is less effective in hard brain tasks. This is where the employee is more effective and can move away from boring work to creating more interesting work for employees”*. TM21

*“the main driver to take away from administrative tasks of people and free them up for more value based activities like interrogating data and making better decisions, instead of administrative overhead.”* TM26

*“These savings have enabled our workers to focus on more meaningful areas across the organisation, which previously were not possible due to the time-consuming tasks that were being performed.”* TM31

*“through productivity savings by investing in automation, the analyst team had more time to work on value adding activities and more meaningful work which their previous working conditions prevented them from doing so.”* UR08

The components of this theme suggest how ATPT has been adopted across different organisations to remove highly routine and repetitive job tasks to provide employees with the opportunity to explore more meaningful work. The recognition of this theme holds strong ties to how ATPT also has the potential to enhance employee skill sets as employees move onto new tasks which are more manual and less automatable. This theme has wider implications in relation to STS theory, where the relationship between organisations, employees and ATPT is not necessarily about ATPT replacing employees, but also as a mechanism to improve organisational operations through enabling employees to focus on more relevant job tasks.

Although the findings on the impact of ATPT has been highly divisive between a positive and negative impact on the future of work, it highlights valuable insight into how organisations adopt ATPT and what it means for employees. While there is nothing to suggest ATPT will impact in one form or another, these themes highlight how it is possible for ATPT to have a positive impact on the future of work which has been regularly overlooked in the literature. However, establishing organisational use of ATPT for either a positive or negative

impact on the future of work can only be tied in with the organisational drivers behind adopting ATPT. One of the significant outcomes of this research suggests that there is no set level of impact of ATPT, with both union representatives and top managers presenting scenarios on the different extents it can have on the future of work ranging from no impact to major impact. Although there are no distinctive findings behind what leads to one outcome or another, the contribution of this research raises the importance for future research to take into consideration the high variability of ATPT adoption, where predicting the future of work is highly variable, which in a lot of ways signifies the importance of an interpretivist and constructivist paradigm for this research to understand this phenomenon from multiple perspectives. With that being said, both top managers and union representatives raised the importance of specific good practices around the adoption of ATPT to ensure that positive outcomes can be achieved, which will be covered in section 9.4.3.

### **5.4.3. Recognising Good Practice behind ATPT Adoption**

One of the final themes associated with the impact of ATPT on the future of work was the emergence of what both top managers and union representatives described as good practice behind the adoption of ATPT. The subthemes identified in this research consist of maintaining transparency (section 9.4.3.1), and benefit register (section 9.4.3.2).

#### *5.4.3.1. Maintaining Transparency through the adoption of ATPT*

With a significant proportion of the literature and media focusing on the negative impact of ATPT on the future of work, any notion of technological change can result in uncertainty for employees. This can also result in wider complications for unions to negotiate where there is lack of insight into what organisations are attempting to accomplish. One of the methods of good practice raised by union representatives is the importance for organisations to maintain

transparency with employees to ensure that any changes, especially in situations where reskilling is required, provides employees with adequate time to prepare.

*“At the heart of it all is transparency. Good practice is where we can sit down and work through what plans [Organisation] has without being constantly left in the dark on issues. That would have to be my number one requirement to improve current practices.”*

UR07

*“In the past a lack of transparency has really caused problems where the union has been left in the dark about what is happening, and employees are in a state of insecurity where they know change is coming in the next few months but have no clue what shape or form it might look like. Good practice would really have to be to build better transparency for those impacted by technology, mainly employees.”*

UR03

*“Transparency is the number one thing that would make a huge difference. I have had incidents where we were not advised of redundancy until the very last minute even though they knew for a while. Businesses take time to go through change, and so too do workers, it is only right better transparency practices are followed to provide adequate time to prepare for any change.”*

UR05

The significance of this theme on developing greater transparency to promote good practice suggests there is a distinct need to open a dialogue to promote further discussion between top managers and union representatives.

The final section of the impact of ATPT on the future (section 9.4.3.2.) of work presents recommendations for good practice by both top managers and union representatives on the significance of using a benefit register to ensure that the adoption of ATPT benefits the intended users.

#### *5.4.3.2. Ensuring the end users of ATPT receive the associated benefits*

The use of the benefits register when implementing ATPT has been identified a vital step towards establishing good practice through ensuring the intended users of ATPT receive the benefit.. As a standalone, the driver behind ATPT adoption indicates numerous possibilities behind how the workforce will be impacted, but it is not until this is compared against a measurable context where the value of recognising the driver behind ATPT where the driver behind ATPT becomes truly valued. While there is no clear direction behind how employees are impacted, Top Managers recognised the importance of actively monitoring the benefits of ATPT to ensure that the purpose behind ATPT aligns with the benefits. Furthermore, while the benefits register is typically used to capture the benefits of a project, it has the ability to capture and unintentional benefits or consequences of the adoption of ATPT.

The benefits register has been defined by Top Managers as the process of defining the objective, identifying the benefits, define process to deliver on benefits through implementation of ATPT, and Implement ATPT and monitor process to ensure all benefits have been delivered.

*“It is important early on to recognize and register who will capture the benefits of investing in automation. We follow the IES model of identify, execute and sustain to capture the benefits of automation. When this is lost any purpose associated with automation can be rapidly lost”*

TM04.

*“Because complex nature of intangible and tangible elements across the benefits management, this is constantly monitored at regular intervals across the project to identify new benefits and risks and monitor old ones when implementing any form of technology”*

TM12

*“Normally this is a requirement from the project team to provide an overall objective which entails identifying and labelling each benefits which is actively monitored throughout the project when adopting ATPT to ensure the right stakeholders benefit”.*

TM24

These findings are consistent across the literature and project management guidelines introduced by Project Management Institute (2017) which strongly recommend the use of models including identify, execute and sustain raised by TM04. When adopting ATPT or any form of project, this largely consists of balancing a wide range of expectations to produce a product which meets the expectations of the numerous elements involved including stakeholders, employees, customers, products, business strategy, and legal obligations (Project Management Institute, 2017) which require active monitoring to avoid unexpected benefits and risks:

*“Benefits are measured against different timeframes across the implementation phase so until all the benefits have been registered we continue to monitor and identify additional benefits as the capabilities of the automation emerge.”*

TM09

*“It is a never-ending process even after implementation. With all the stakeholders and wider interests of the business we constantly review the benefits and risks associated with automation as it is a continuous improvement journey which never really ends”*

TM29

*“We just need to actively track the benefits to ensure the right stakeholder groups are receiving the benefits. If it is more focused towards one particular group like the business as opposed to employees or customers, then we can run in to trouble.”*

TM26

*“I think unions are often misunderstood when it comes to the adoption of automation and other technology. Largely, we are not part of the Luddite movement in previous industrial revolutions. As [Organisation] has shown how automation can be adopted to have a positive impact, we advocate for better employment practices and automation can support that, but at the same time it can have the opposite effect when the benefits of technological change are only directed at the organisation, so the benefits need to be constantly monitored to ensure the relevant people benefit, and not just the organisation but employees too.”*

UR08

The importance of recognising the driver behind ATPT adoption in relation to the benefits register of the project is to ensure that the implementation of ATPT meets the initial objectives when deciding to adopt ATPT.

The final theme presented in this research introduces the importance of business ethics behind the adoption of ATPT (section 9.4.3.3), with participants raising the need for greater regulation around the use of ATPT especially in areas where it has the potential to easily be misused.

#### 5.4.3.3. *Business Ethics and Regulation behind ATPT adoption*

The final theme presented in this thesis is the notion of organisational ethics behind the adoption of ATPT. As illustrated in the results section of this thesis, while there has been suggestion that ATPT has the potential to result on both positive and negative outcomes on the future of work, there remains no set standard or guidelines behind which influence how organisations use ATPT. This issue was regularly raised by participants in this research who established the need for greater regulation around the use of ATPT to ensure it was not misused.

*“Some form or another of regulation around AI is paramount. It is so easy for it to be misused, not just from a replacing the workforce kind of thing, but how data is being used and managed.”*

TM14

*“I frequently worry about the state things are going to be left in, we try to follow good practice but its just like the whole factory thing right. People used coal like crazy, and now well its not such a good thing for the environment but people still use it because it makes money. I’m not saying AI is going destroy the environment, but if AI can really take over the world one day then there needs to be some kind of policy to ensure there is still work in the future to ensure businesses use AI ethically”*

TM16

*“Facebook is a good example of how the use of AI becomes questionable. AI is all about data, and when it starts collecting massive amounts of data, it becomes an ethical question on what are the limitations of the data source and how the data is used. If it just free run at the moment, and it is concerning especially as data is becoming power. It needs to be reeled in with some cap or restraints for businesses.”*

TM20



*“If too severe, AI regulation can have detrimental implications on our ability to keep up with the rest of the world. We need something in place, but not to the point it prohibits businesses from using it.”*

TM30

One of the challenging areas of regulating ATPT is the impact it may have between national and international regulation, where local businesses could be impacted by international competition. If ATPT eventually leads to what is widely predicted to be substantial impact and unemployment due to ATPT, then governments are likely to play a significant role, whether this be through unemployment support, or return to work. However, the findings suggest this is likely to be a gradual change which is why it is important to prepare for any impact on the future of work. The following chapter of this thesis presents the closing segments of this research with the discussion/conclusion of the research.

## CHAPTER 6: CONCLUSION

### 6.1. Research Questions in Relation to Research Findings

In the introduction section of this thesis, the research questions were designed to investigate the organisational decision-making processes behind incorporating ATPT and the subsequent impact on the future of work. To address this research question, three subsidiary questions were designed: (1) What are the key drivers behind organisational adoption of ATPT?; (2) what type of impact will organisational adoption of ATPT have on employees?; and (3) what are the ethical dilemmas organisations face when adopting ATPT?

#### 6.1.1 Sub-Question: Identification of the key drivers behind organisational adoption of ATPT across the public and private sectors.

The first subsidiary research question addresses the emergence of five key themes driving organisational adoption of ATPT: enhancement of organisational efficiencies, cost savings, supporting employees, customer expectations, and fixing a problem. The adoption of technology for cost savings and efficiency purposes has been in circulation throughout the literature for some time, with the likes of Jensen (1993) presenting how cost savings and efficiencies have been some of the primary reasons organisations have adopted technology in the past. Although the use of technology to achieve enhanced organisational efficiencies and cost savings can widely be perceived as being achieved through the reduction of employees, the participants in this research clearly indicated that is not always the case as it highly depends on the scale or extent to which ATPT is adopted. The contribution of these findings also introduces the emergence of the three new themes—supporting employees, supporting customers, and fixing a problem—which drive organisational adoption of ATPT. One of the important areas for discussion is the emergence of supporting employees. This indicates a shift

in organisational practices from previous industrial revolutions, which have historically seen technology predominantly designed and used to benefit the organisation, to now seeing how ATPT can be used to not only benefit the organisation but also its employees. The fact that predictions have never taken into consideration ATPT's potential positive impact on employees suggests that current predictions, including Bowles (2014) Frey and Osborn (2017), may have overestimated the extent to which ATPT will impact the future of work. This is not to say that ATPT will not replace jobs in the future, but the findings of this research indicate the requirement to consider ATPT's both positive and negative impact on the future of work.

### **6.1.2. Sub-Question: Identification of the impact that ATPT adoption will have on employees.**

The second subsidiary question on the type of impact organisational adoption of ATPT will have on employees was addressed in two parts in the results section. The first part presented the four scenarios of organisational adoption of ATPT on both the organisation and employees: no impact, minor impact, significant impact, and major impact. This theme uncovered deeper complications in understanding the impact of ATPT on the future of work where the four scenarios indicate the potential for ATPT to impact employees to different degrees. This research further solidifies earlier research conducted by Arntz, Gregory, and Zierahn (2016) who established the premises for predicting the impact of ATPT on the basis of job tasks as opposed to entire jobs. The emergence of the four scenarios presents a wider contribution to the literature on how ATPT impacts the workforce in multiple ways. This is further iterated through the four pathways below reflecting the four scenarios of impact presented in this research.

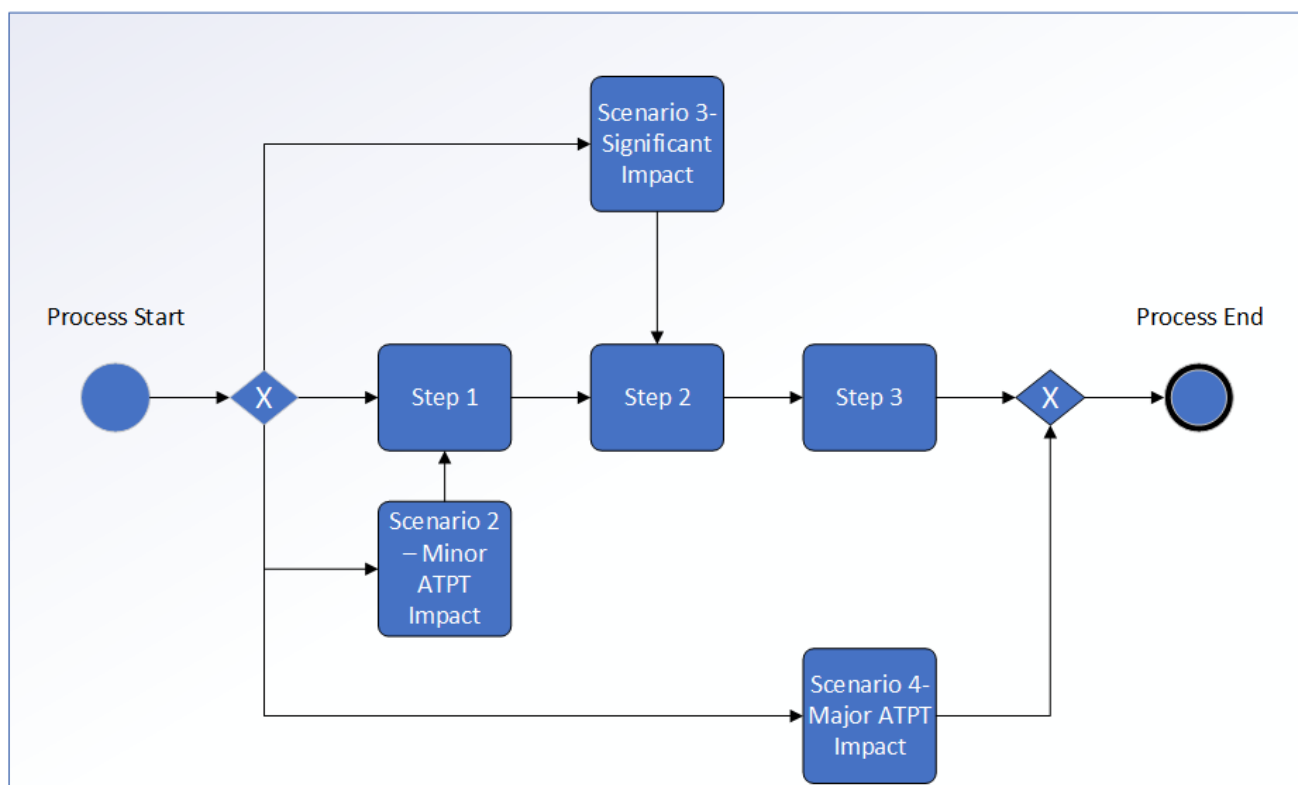


Figure 24: Scenario of Organisational Adoption of ATPT.

The four pathways are indicative of the different scenarios behind the possible impact of ATPT on the future of work. Pathway 1 indicates no impact with the continuation of the same process while pathway 2 shows a slight deviation in the original process, but the tasks remain the same, which is reflective of the minor impact. Pathway 3 sees the first significant change in a potential process with the use of ATPT to automate one or multiple tasks an employee performs while pathway 4 is the most extensive on the scale with the ability to automate replacing entire jobs with ATPT.

However, the limitation of these four scenarios pertains to how the participants recognised the potential for positive and negative impacts on employees to occur at each level. This leads into the emergence of the second theme relevant to understanding the type of impact organisational adoption of ATPT will have on employees, which can lead to either a positive or negative outcome on employees. Although the findings did not provide a conclusive response to the impact of ATPT on employees, it remains a significant breakthrough in the

current literature where organisations widely reflected on the capability for ATPT to have a positive impact, including burden reduction, enhancing skill sets, and creating a greater work-life balance. This also included negative outcomes such as potential reduction in jobs and more technical complex work. One of the key differentiating elements between establishing a positive and negative impact on the future of work is what participants recognised as good practice and ethical considerations behind ATPT, which leads into addressing the third and final sub-question of this thesis.

### **6.1.3. Sub-Question: Identification of ethical practice that underpin organisational decision-making processes behind the adoption of ATPT.**

The final sub-question addressed in this thesis related to the identification of ethical practice that underpin organisational DMP and dilemmas organisations face when adopting ATPT. This research question was addressed through the emergence of what both top managers and union representatives classified as ethical practice behind the adoption of ATPT, which in turn acknowledged the importance of underlying good practice behind the adoption of ATPT. Between both top managers and union representatives, one of the most important criteria identified was the use of the benefit register to ensure that the benefits of ATPT adoption extend beyond the organisation out to employees as well, and that these benefits are actively monitored throughout the adoption of ATPT.

With organisations identifying customer expectations as one of the key drivers behind adopting ATPT indicates a deeper correlation with stakeholder theory and the notion of corporate social responsibility with responsibility of ATPT not on organisations alone, but society as a whole. This leads to the need for further research into social acceptance of ATPT and what society views as ethically acceptable use of ATPT. Ultimately, ethical responsibility falls upon all members of society to uphold ethical norms and good practice behind the

adoption of ATPT. However, union representatives raised the importance of transparency to ensure that all stakeholders have insight into how organisations use ATPT to maintain a form of accountability.

## **6.2. Overview and Theoretical Relationship between Research Themes**

The previous chapter of this thesis presented the results of this research consisting of the organisational drivers behind the adoption of ATPT, scenarios of ATPT adoption, the positive and negative impact of ATPT on the workforce, and the significance of business ethics towards establishing good practice for the adoption of ATPT. In comparison to existing literature, the findings from this research suggest that there is no one singular approach organisations use to adopt ATPT, which has led to the varying nature of ATPT's potential impacts on the future of work. While these findings do not present a conclusive argument towards suggesting ATPT will impact the future of work in one way or another, the variability itself remains a significant contribution to the discussion on the future of work as the findings suggest the issue cannot be based on the expectation that all organisations will adopt and use ATPT in the same way. Because of the variable nature of organisations' decision-making power to decide how to adopt ATPT, the outcome may lead to either a positive or negative outcome on the future of work. The importance of these findings ties back to the drivers behind adopting ATPT where organisations only recognised the need to adopt ATPT as required to enhance organisational efficiencies, reduce cost, reduce burden on employees, meet customer expectations, or fix a problem. While there is existing and available technology out there, unless it meets the requirements of organisational objectives, there can be no guarantee it will be adopted. Hence, while current literature has focused on the susceptibility of jobs to ATPT capabilities, there are no guarantees—first that organisations will adopt ATPT, and second, if

they do, that this will result in the loss of jobs as the findings suggest it can lead to both a positive and negative outcome.

Organisational drivers behind ATPT lead into the potential for the adoption of ATPT following one of the four adoption scenarios. Excluding no adoption of ATPT, this can range from minor impact to major impact on the future of work. Beyond this, the impact on the future of work flows on to potentially three outcomes on the future of work consisting of either a negative, neutral, or positive impact on employment. Beyond this layer, good practice and business ethics are established towards what shapes the direction of impact on the future of work.

To understand this in greater detail, the conceptual Autonomous Task Performing Technology Impact Framework (as seen in Figure 25) has been designed as a representation of the various drivers and subsequent impact of ATPT with the underpinning of ethical principles and good practice which shape the outcomes of ATPT among employees and in terms of the future of work. This ATPT framework goes some way to making a distinctive contribution to the literature through showing that the impact of ATPT on the future of work cannot be measured on the basis of job susceptibility to ATPT as organisations have illustrated the potential for ATPT to have both positive and negative outcomes on the future of work depending on both the drivers and scale of ATPT adoption. This interpretative framework recognises the distinct relationship between the drivers of ATPT leading to the impact on the future of work through conceptualising how organisational drivers lead to the adoption of ATPT, which in turn can result in a number of potential scenarios ranging from minor impact to major impact on the future of work. The framework illustrates how the extent of ATPT adoption can lead to both positive and adverse outcomes on the future of work. The underpinnings of these findings recognise the complex network defined in organisation theory where organisational DMP behind adopting ATPT can be used in a wide range of different

contexts and to different extents. This reflects back on the importance STS theory, where the relationship between organisations, employees, and ATPT is highly influenced by what drives



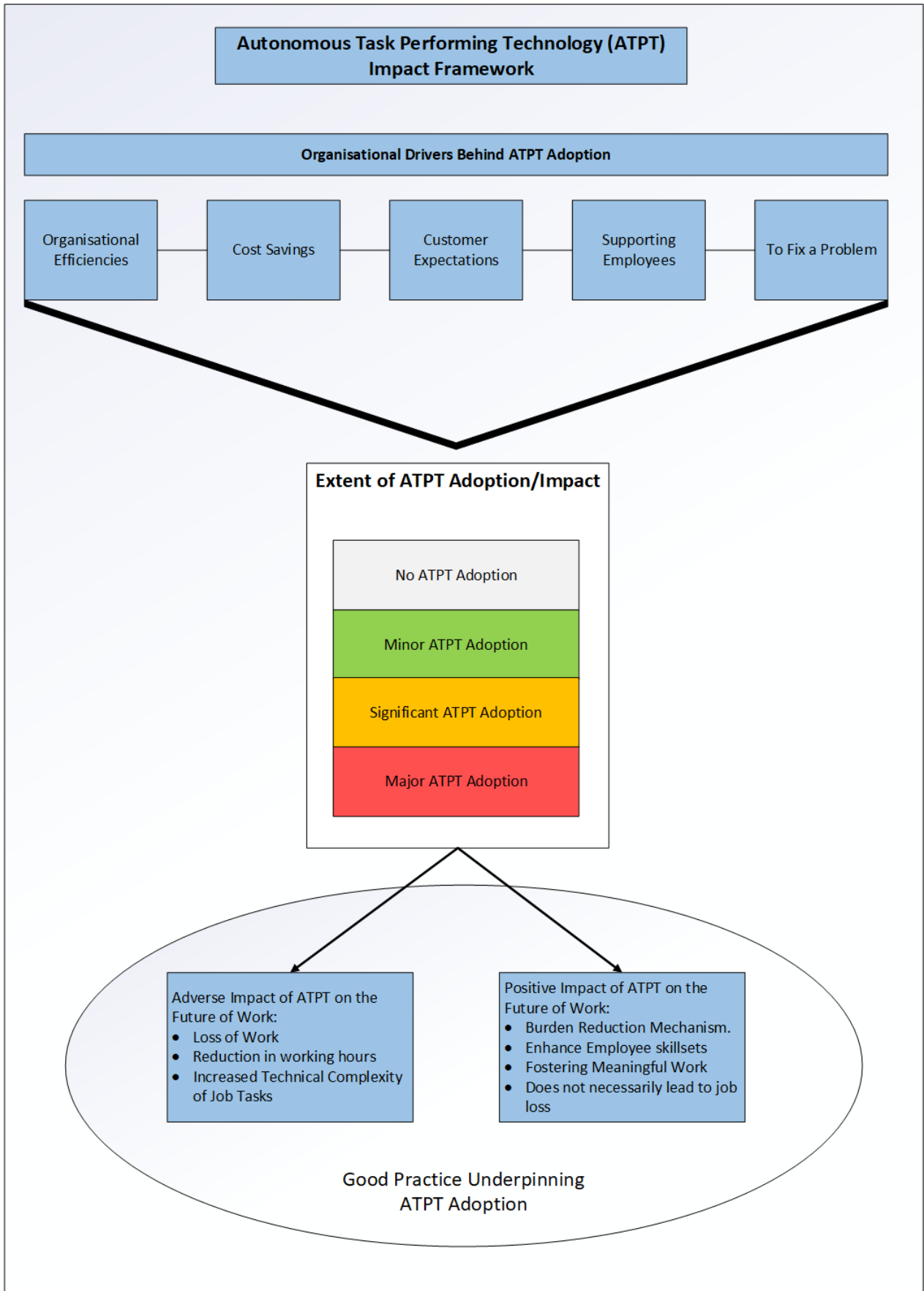


Figure 25: Main themes presented in Autonomous Task Performing Technology Impact Framework

organisations to adopt ATPT. Top managers and union representatives narrowed down the specifications of this relationship being influenced by good practice.

The ATPT impact framework recognises good practice as one of the key underpinnings of this research, which consists of maintaining transparency, ensuring the end users benefit from the adoption of ATPT, and adhering to ethical requirements. The justification for good practice underpinning both adverse and positive outcomes in terms of the future of work is through both top managers and union representatives acknowledging good practice will not prevent any negative outcome, but it provides the opportunity to ensure all those impacted by ATPT have the tools and resources to prepare for any change while ensuring that the end users of ATPT, including employees, remain at the heart of the adoption. As ATPT capabilities continue to be developed, it is critical to continue ongoing research in this area to establish industry good practice and how any negative impact on employees can. Furthermore, while a significant proportion of this research has focused on the organisational DMP, society also has the responsibility towards holding organisations accountable through forms of corporate social responsibility to ensure good practice is adhered to, and that the end users of ATPT are clearly identified and monitored to ensure the relevant parties receive the intended benefit.

The design of the ATPT impact framework ties back in with the primary research question to understand how organisations make decisions to adopt ATPT and the subsequent impact on the future of work. This has been conveyed through the interrelationship between the key drivers and the extent of ATPT adoption/impact on the future of work.

These findings have wider implications for future research concerning the impact of ATPT on the future of work, where it is not explicitly possible to predict this impact without first taking into consideration the variability of organisational adoption of ATPT leading to multiple possible outcomes. Just how this would be achieved remains to be seen. However,

this highlights the relevance of approaching this research from an interpretivist and constructivist research paradigm/epistemology through the ability to construct reality from multiple perspectives across both top managers and union representatives via a qualitative framework. These findings suggest that the criteria for predicting the future of work require more advanced algorithms than measuring the susceptibility of ATPT on the future of work as every independent organisation is highly unique in how they identify using ATPT, which favours a qualitative framework through the ability to understand organisational adoption of ATPT at a more in-depth level. Hence, the recommendation from this research is for the requirement to establish greater parameters around the organisational DMP if research designed to quantify the impact of ATPT is to be conducted.

Ultimately, the future of work is not determined by the capabilities of ATPT, but rather by the ATPT impact framework, and how organisations can responsibly use ATPT to minimise the negative impact on the future of work.

The following section of this chapter outlines the research contributions (section 6.3) followed by the acknowledgement of research limitations in section 6.4.

### **6.3. Research Contributions Revisited**

In addressing the research question outlined in this thesis, the primary contribution of this research is the establishment of valuable insight into how organisations adopt ATPT and the subsequent variability of how this impacts employees. One of the underlying contributions of this research has been the valuable steps taken towards opening and maintaining a dialogue between organisations and employees. This relationship, through the representation of STS theory, provides the relevant groundwork towards finding workable solutions to minimise the impact of ATPT on employees and turns to functional and workable solutions through

recognising employees as one of the key beneficiaries of ATPT capabilities as opposed to being replaced by the technology.

#### **6.4. Research Limitations**

Extensive consideration was given to the limitations of this research across a number of different variables and factors. This includes the relationship between union representatives and top managers, no specific industry, union representative participant size, and the expertise of top managers with ATPT capabilities.

The first limitation identified in this research relates to the quality of relationship between top managers and union representatives. While both perspectives are vital towards understanding the impact of ATPT on the future of work, there remains a partial limitation on the ability to cross examine the results between top managers and union representatives due to the union representatives interviewed holding no direct link with the organisation the top managers represent. However, in recognition of this limitation, there are two primary reasons the union representatives outcomes did not include incidents involving the same organisation as the top managers. Firstly, if the same organisation had been used across both top managers and union representatives, this would have opened the door to wider ethical implications in order to gain access to both relevant parties, which would have reduced the number of participants. In saying this, further research could be conducted in this area if the relevant ethical approval is obtained. This leads to the second reason this approach was not adopted. While the findings from this research raised similarities between both top managers and union representatives' experience of adopting ATPT, instances of varying accounts between top managers and union representatives would have the potential to distract from identifying themes relevant to this research by focusing on the similarities and differences between accounts of the incident. However, once again, there remains value in this approach for future

research towards establishing an open dialogue to understand how issues were overcome, which could lead to improved employment practices in the future.

The other important limitation to address pertains to how no single or specific industry was the focal point of the research. Although it was an intentional element of the research design to ensure that a wide range of industries were captured, certain industries may experience ATPT to various degrees depending on the requirements of the work being performed. Hence, further research into the impact of organisational DMP could take into consideration focusing on specific industries to understand whether ATPT will impact the future of work in certain industries more than others. Beyond this,

An additional limitation of this research was the smaller union representative size, consisting of 10 participants in comparison to the 34 top manager participants in this research. There are two notable reasons which justify the smaller union representative size. Firstly, union representatives regularly cited COVID-19 issues impeding their capability to participate. The impact of COVID-19 was resonated by top managers who identified the struggles of finding time to participate with ongoing COVID-19 challenges. The second and most notable justification was the specific inclusion criteria for union representatives with the requirement to have experience with organisational adoption of ATPT. This criteria heavily restricted the number of union representatives who could participate in this research, yet, remained essential as part of the critical incident technique used with union representatives.

The final notable limitation relates to not knowing how expert (or non expert) these top managers were with technology or change management. This is important to address in relation to Walsh's (2018) research on expert and non-expert opinion about technology unemployment, where the findings suggest a distinct gap between experts and non-experts. However, there was no way to test this limitation in this research.

In recognition of these limitations in addition to the research findings, this thesis has a number of recommendations for future research.

## **6.5 Recommendations for Future Research**

A number of recommendations were considered for future research to support the current limitations in the literature, and expand on the present research on the impact of ATPT on the future of work.

One of the recommendations stemming from this research is to explore the impact of ATPT on different industries and jobs. While the focus of this research has been from a high-level organisational viewpoint, the next phase requires further drilling down into specific industry sectors and jobs to identify the particular challenges each industry faces with the adoption of ATPT. This research should take into consideration the industries and job specifications outlined in government reports, which, in the New Zealand setting, could include Stats NZ and Ministry of Business Innovation and Employment for additional details on relevant industries. This leads into the next recommendation on conducting a quantitative study to incorporate the different industries.

Additional recommendations for future research recognise the importance to increase the scale of understanding organisational DMP behind adopting ATPT using a quantitative study with surveys based on the findings of this research. This could include; a focus on organisational DMP behind adopting ATPT on specific industries and jobs, the impact of COVID-19 on the adoption of ATPT, and how policy can influence the adoption of ATPT.

There are three key underpinnings to explore the significance behind policy and ATPT adoption. First is the recognition of more and more countries/governments investing in the development of ATPT including China, United States, Russia, Germany, Malaysia, and India just to name a few, and ultimately whether this will create a further divide between first world

and third world countries. Second, if there is a race between countries to achieve 'AI', what is the likely impact on this acceleration on employees and their ability to prepare for any form of impact. Thirdly, with the emergence of increasing technological capabilities such as the autonomous car, there remains an ethical challenge for policy makers when a form of ATPT causes an accident such as on the road, and more importantly how these ethical challenges will be addressed. In recognition of the current literature limitations, there is an urgent need for future research to support policy makers make informed decisions when adopting ATPT.

## **6.6. Concluding Remarks**

Historically, technology has had a profound impact on the workforce through wide displacement of jobs. With the emergence of ATPT, there have been predictions around a significantly reduced workforce. However, the results presented in this thesis strongly indicate that although organisations are increasingly turning towards ATPT for the future, there is no formal business rule associating ATPT adoption with job loss. Rather, to understand the impact of ATPT on the future of work, it is important to understand the purpose behind adopting ATPT and the business ethical values of the organisation adopting it.

The purpose of this research was to explore how organisations make decisions around adopting ATPT and the subsequent implications this has on the future of work. To determine how organisations make decisions, an element of discovery was required to establish the parameter towards uncovering what drives organisational adoption of ATPT. Although the four key drivers identified by Top Managers held little indication as to how the future of work would be impacted due to both positive and negative implications identified, it marked the vital breakthrough required to contain and peel back the multiple layers of reality to uncover the important relationship between the drivers of ATPT, technological capabilities, ethical considerations, and subsequently who is intended to benefit. This research stops short of

attempting to outline what decisions will lead to what outcomes as while an intended positive outcome influences the decision, poor outcomes can still eventuate.

The important take-away from this research is that ATPT is not a doomsday for the workforce but rather a platform that can uplift employment standards, which has a flow-on effect for organisations. ATPT brings directly into question the value of workers, and while there remain elements and social situations where ATPT may be favoured over employees, it remains an issue of finding sustainable ways of moving forward. Throughout the literature, assumptions have largely been made around what drives organisations to adopt ATPT. However, little research until now has to such an extent consisted of a process of discovery through findings leading to determine what, in the experience of both top managers and union representatives, were the underlying impacts of ATPT.

In addition to the theoretical contributions and establishing an open dialogue between organisations and employees, this research indicates wider implications on the future of work through the importance of understanding the social divide that is likely to occur as an outcome of a lack of established good practice for organisations to align with. The findings provide much needed insight into the complexity behind the adoption of ATPT. Going forward, a new discussion needs to emerge around the ethical practice behind adopting ATPT. The future of work is not an obligation placed on organisations but rather requires a commitment by society to establish better employment practices

It is critical to emphasise that the impact of ATPT does not fall on the shoulder's organisations alone. Rather, there remains a deep social responsibility with government, policy makers, and society as a whole to maintain and uphold ethical norms behind adopting ATPT. There remains an urgent need to build on this research to support policy makers with the rapid advancements of ATPT capabilities and the emerging ethical challenges that come with it.



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**APPENDICES**



## Appendix A: Information Sheet



### **Organisational decision-making processes behind incorporating autonomous task-performing technology and the impact on the future of work**

#### **INFORMATION SHEET**

*This research is being undertaken by Ben Mrowinski, a PhD researcher at Massey University in the School of Management, who is passionate about understanding the impact of automation on the future of work.*

#### **Project Description**

With emerging technological capabilities such as automation and artificial intelligence, there is increasing speculation about how such technology will impact the future of work. For the purpose of this research, automation has been broadly defined as the automation of a job or job task that a human worker could otherwise perform.

Research to date has largely focused on the impact of automation on the future of work by measuring against what jobs are most susceptible to automation. As a result, the organisational perspective and subsequently the decision-making processes involved behind incorporating automation have largely been underrepresented, which this research project is designed to address.

This research aims to explore the decision-making process behind incorporating automation into business processes/operations, short term and long term goals, and the impact such decisions will have on employees.

#### **Participant Identification and Recruitment**

- Potential participants have been identified through the companies register, media, social media such as LinkedIn, and referrals through the initial identification phase.
- The selection criteria for this research project requires participants to hold a position within top management responsible for organisational decision-making and institutional decisions.
- I aim to interview 50 people; 20 from the public sector, 20 from the private sector, and 10 union representatives.
- Participation in this research project is voluntary.

#### **Project Procedures**

Participants will be required to be available for a 45-60 minute interview. The interview will be audio-recorded and later transcribed, which the participant can request to be turned-off at any time. The location and time of the interview is to be arranged between participant and researcher.

**Data Management**

The data recorded in the interviews will only be used for the purpose of this research project and will not be passed on to any third party. Once the interview is complete, the data will be transcribed and verified by the participants, after which the recordings will be permanently deleted. Any identifiable responses that arise in the interview such as names or locations will be omitted from the final transcription. After the research has been completed, the data will be used to publish the findings in relevant journal papers and conferences.

**Participant's Rights**

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question.
- withdraw from the study (up to 12 days after the interview being conducted).
- ask any questions about the study at any time during participation.
- provide information on the understanding that your name will not be used unless you give permission to the researcher.
- be given access to a summary of the project findings when it is concluded.
- ask for the recorder to be turned off at any time during the interview.

**Project Contacts**

*If you require any additional information or queries in relation to this research you are welcome to contact the researcher:*

**Ben Mrowinski**

Email: [REDACTED]

Ph: [REDACTED]

Alternatively, you are also welcome to contact either of the supervisors of this research project:

**Dr David Brougham**

Supervisor

Email: D.Brougham@massey.ac.nz.

**Associate Professor David Tappin**

Supervisor

Email D.C.Tappin@massey.ac.nz

*This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 20/31. If you have any concerns about the conduct of this research, please contact Dr Fiona Te Momo, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 43347, email humanethicsnorth@massey.ac.nz.*

## Appendix B: Participant Consent Form



### ***Organisational decision-making processes behind incorporating autonomous task-performing technology and the impact on the future of work***

#### **PARTICIPANT CONSENT FORM**

I have read and I understand the Information Sheet for this study. I have had the details of the study explained to me, any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study up to 12 days after the interview has been conducted.

1. I agree / do not agree to the interview being sound recorded.
2. I wish / do not wish to have my transcript returned to me.
3. I wish / do not wish to be provided access to a summary of the project findings when it is concluded
4. I agree to participate in this study under the conditions set out in the Information Sheet.

#### **Declaration by Participant:**

I \_\_\_\_\_ [print full name] hereby consent to take part in this study.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



## Appendix C: Authority for the Release of Transcripts



### ***Organisational decision-making processes behind incorporating autonomous task-performing technology and the impact on the future of work***

#### **AUTHORITY FOR THE RELEASE OF TRANSCRIPTS**

I confirm that I have had the opportunity to read and amend the transcript of the interview(s) conducted with me.

I agree that the edited transcript and extracts from this may be used in reports and publications arising from the research.

**Signature:**

**Date:**

**Full Name - printed**

## Appendix D: Ethics Confirmation Letter



Date: 17 August 2020

Dear Benjamin Mrowinski

Re: Ethics Notification - **NOR 20/31 - Organisational decision-making processes behind incorporating autonomous task-performing technology and the impact on the future of work**

Thank you for the above application that was considered by the Massey University Human Ethics Committee: **Human Ethics Northern Committee** at their meeting held on **Monday, 17 August, 2020**.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Professor Craig Johnson  
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

## Appendix E: Top Manager Interview Structure



### Interview Structure – Top Manager

1. To begin, does your organisation have any short-term or long-term goals to implement automation?
2. What would you say are the main reasons for adopting automation?
3. How would you describe the decision-making processes your organisation uses when evaluating the adoption of automation?
4. How do you anticipate automation will impact the functionality and processes of your organisation?
5. Are there any instances where automation is likely to be effective or less effective in your organisational operations?
6. Have you faced any barriers or challenges around finding suitable solutions around incorporating automation?
7. Considering the recent impacts of Covid-19 in New Zealand and across the globe, has this in any way impacted your decision-making processes around automation?
8. Have your stakeholders outlined any expectations or concerns around the adoption of automation?
9. How do you anticipate employees will be impacted by automation?
10. What do you envision as the positive and negative outcomes of automation on employees?
11. Do you have any expectations or concerns around how other organisations plan to incorporate automation, including the impact on employees?
12. Finally, in general how would you say automation is likely to change the nature of work and organisational operations within the next 10 years?

## Appendix F: Union Representative Interview Structure



### Interview Structure

#### INTERVIEW QUESTIONS

For this interview, please reflect on a particular scenario or incident where an organisation(s) or businesses you have represented employees for have been impacted by automation or technology.

##### *Part 1: Identifying the incident*

1. Can you identify an incident or event where an organisation looked to incorporate technology such as automation?
2. What circumstances existed leading to the organisation to incorporate automation?
  - a. Did the organisation identify the purpose for incorporating automation?
3. Throughout this incident or event, were there any beneficial or positive outcomes on employees?
4. Were there any detrimental or bad outcomes on employees?
5. Can you identify what led to this/these outcomes?
6. What happened before this outcome was reached?
  - a. Did the outcome change at all throughout the course of the organisational decision-making processes?

***Part 2: Specific actions taken***

1. What actions did the organisations take to work towards establishing a positive outcome on employees with the adoption of automation?
2. Were there any specific courses of action that the organisation responded positively and/or negatively to?
  - a. Why did this help (or not help) the incident to occur?
3. Can you identify what you or your union did to encourage a positive outcome on employees?
  - a. What was the outcome of these actions on employees?

***Part 3: Future impact of automation on employment***

1. How do you anticipate organisational adoption of automation to impact employees in the future?
2. How do you think automation can positively affect both organisations and employees?
3. Do you anticipate organisational adoption of automation to increase?
4. Considering recent events of covid-19, how do you anticipate this will change organisational adoption of automation and the impact on employees?
5. From experience, what are potential solutions organisation could use behind adopting automation to minimize the impact on employees?
6. What would you consider as best practice behind adopting automation?