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Managers' Perceptions of Artificial Intelligence and Automation: Insights into the Future of Work

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Abstract

The impact of Artificial Intelligence and Automation (AIA) on the future of work has been the subject of significant amounts of discussion from scholars, business people, governments, and scientists. The purpose of this research was to explore managers' perceptions of AIA, and how they think it will impact the future of employment. Semi-structured interviews were conducted with 11 high-level managers, six from the private sector and five from the public sector, all of whom are responsible for the recruitment and management of staff. All 11 managers predicted AIA would cause considerable disruption across the employment relations landscape and that the number of workers performing certain tasks would decrease through replacement with AIA. One of the key concerns raised by the managers was the level of uncertainty around the type of new jobs that may emerge as a result of AIA. The participants recognised employees may build up greater job responsibility as a result of AIA, including overseeing the automation of processes. The managers further discussed the importance of valuing employees through developing reskilling initiatives in expectation of AIA impact. This report adds a much needed insight into AIA from the perspective of managers as this view is very limited to date.

Keywords: Artificial Intelligence, Automation, Future of Work, Managerial Perceptions

Introduction

Many commentators have suggested that we are on the cusp of a new industrial revolution, situated within a transformational era where we are becoming capable of incorporating more automated processes into business operations. Research to date has primarily focussed on the impacts Artificial Intelligence and Automation (AIA) is likely to have on the future of employment (Frey & Osborne, 2017; Walsh, 2018), and whether the up-and-coming automation capabilities will remove human employees from the labour process. The capabilities of AIA are still in the developmental stages, with the Gartner Hype Cycle (Panetta, 2018) outlining several currently hyped technologies that are five to 10 years away from production, including Blockchain, Biochips, Autonomous Driving, and Artificial General Intelligence. However, with hype building around AIA, it is critical to start addressing the impact it may have on employment so we can better prepare for the ways in which it will impact the workforce.

Much of the discussion and research around what the future will look like comes from futurists. This study, however, looks at managers who have a direct relationship with the staff they manage, and focusses on addressing the question: What are managers' perceptions on the impacts of AIA and how is this relevant to employment relations in the future? Understanding managers' perceptions is based on the premise that we cannot predict the impact of AIA on employment without understanding how

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the end users, such as organisations and managers, will potentially incorporate and adopt AIA into business operations. This research is fundamental towards recognising the influence AIA will have on businesses and employees, and what this ultimately means for employment relations at the workplace and organisational levels. As there is a limited amount of research literature on managers' perceptions of AIA impacting employment, this study goes some way towards addressing this need.

Background

Historical Impact of Technology on Employment

The impact of technology on employment has been a reoccurring phenomenon throughout history. Ashton (1948) and Toynbee (1969) identify the mid-1700s as the first prominent period of technological disruption on both the workforce and the social landscape, causing this period to be defined as an 'industrial revolution. To date, it is widely accepted that an industrial revolution has occurred in three instances (Schwab, 2017): firstly, with the introduction of steam power in the mid-1700s; secondly, with the introduction of electricity in the mid-1800s (Craft, 1996), and – most recently – in the mid-1900s, with the emergence of computerisation. Subsequently, these disruptions caused widespread distortion across both the employment and social landscape, with workers' lifelong skills, experiences, and way of life made redundant in favour of reducing labour cost while boosting productivity and output capabilities throughout agriculture, factories, and the service sector (Outman & Outman, 2003; Shah & Mehta, 1998).

At the time of the first and second industrial revolutions, it was perceived that factories were taking over workers' jobs. However, this began to shift when factories started to introduce new jobs and skills (Rumberger, 1981), which contributed to a social shift from rural to urban areas of living (Outman & Outman, 2003) with the prospect of finding work as a result of the new incoming technological capabilities (Goldin & Katz, 1998). Despite the negative impact on employment at the time, each industrial revolution also introduced momentous social changes across the employment relations spectrum, including new policies to protect workers, the establishment of unions (Outman & Outman, 2003), and the securing of rights to the eight-hour workday (Gunton, 1889). Technological changes dramatically changed the nature of work and the social landscape: in earlier revolutions, large proportions of the working population moved from farms to factories; and the service sector became a prominent industry amidst the development of computerisation in the 1950s (Autor et al., 1998).

Despite the emergence of computerisation in the 1950s, it was not until the 1970s that computerisation caused significant disruption throughout the workforce (Shah & Mehta, 1998). According to Cortada (2006), management initially adopted the use of computers to improve business operations, reduce operating costs through labour saving initiatives and improve customer services. Management was by no means immune to the impact of technological disruption which largely saw middle management positions disestablished (Shah & Mehta, 1998) due to the significant organisational restructuring designed to accommodate the capabilities of computerisation (Drucker, 1993; Shah & Mehta, 1998). The process of re-engineering the organisational structure in the 1980s witnessed the streamlining of organisational processes which saw a shift from paper-based processing to computer-based processing (Autor et al., 1998).

The rise of computing also had a substantial social impact through streamlining customer services, such as changing the way people access money through ATMs (Cortada, 2006), and introducing customer capability to buy airline tickets over the internet without having to go into see an agent or over the phone (Shah & Mehta, 1998). Subsequently, the shift to computer-based processing gave rise

to new jobs such as computer programmer, website creator, and computer technician. At the same time, this shift saw the loss of jobs in typing pools and assembly lines, alongside jobs involving secretarial tasks and switchboard operation (Volst & Wagner, 1988). Volst and Wagner (1988) also indicate that employees with wider skill sets were preferred: the job of specialised typist, for example, has transitioned in the modern-day position of personal/executive assistant or office manager (Onifade, 2009).

The impact of computerisation and automation within the manufacturing and agricultural industries saw a further shift of workers to the service sector which represented three quarters of all jobs by the 1980s (Plunkert, 1990). With the emergence of AIA, we are now witnessing another transition which may have a profound effect on many aspects of the way we currently work, with research to date having taken steps to estimate the impact AIA may have on the workforce (Frey & Osborne, 2017).

Predictions on the arrival of Artificial Intelligence and Automation

There is a general consensus that employment is going to be impacted through the introduction of AIA. Frey and Osborne (2017) estimate that around 47 per cent of employment will be affected by automation in the United States alone within the next two decades. The arrival of functional AIA has been the object of speculation, with Walsh (2018), for example separating expert and non-expert expectations. Experts predicted a 50 per cent chance of having fully functional AIA by 2065, while non-experts anticipated that AIA would be available much sooner, with a 50 per cent chance of its being fully functional by 2039. The relevance of understanding such predictions goes a long way towards preparing businesses and employees for the potential impact that AIA will have on employment relations. However, we do not need advanced technology, such as artificial intelligence, to displace workers from jobs. Global management consulting firm McKinsey & Company found that "50% of current work activities are currently automatable by adapting currently demonstrated technologies" (as cited in Manyika et al., p. 2). Manyika et al., (2017) indicated that automating specific tasks within certain occupations is currently achievable, but fully automating an entire occupation is less than five per cent achievable with current technology. For example, mainstream technologies such as self-checkouts, online forms, and smart phone apps are already having an impact but are still some time away from replacing an entire occupation. Despite this, a continued lack of social acceptance of technology is a barrier to its full integration into the workforce (Perakslis & Wolk, 2006).

Fraedrich and Lenz (2016) define the process of social acceptance as something which can vary dramatically over time as social expectations and norms change. When Walmart introduced radio-frequency identification (RFID) in the early 2000s, it was not accepted by the public. Perakslis and Wolk (2006) have associated lack of social acceptance around RFID with low consumer awareness and concerns pertaining to privacy and personal rights protection. Since then, Amazon has introduced Amazon Go, which is a transaction-less supermarket (Golden, 2020), which uses computer vision, sensor fusion, and deep learning to automatically detect when a shopper enters the supermarket, takes an item off the shelf and walks out to pay without the need of a checkout (Amazon, 2020). Although the technology in Amazon Go differs to RFID, the similarity indicates how social acceptance has shifted from monitoring in the early 2000s to present day.

Reflecting on the Industrial Revolution and the gradual influence it had on employment (Outman & Outman, 2003), similarities can be established with the introduction of AIA, which is predicted to be a gradual process (Panetta, 2018). Warwick (2015) further alludes to the progressive impact AIA will have on employment relations, with the expectation that AIA will initially be dependent on human support and supervision to function. Whether or not AIA will ever be capable of performing without

human supervision is yet to be seen; even so, we are already beginning to see the impacts of basic AIA and smart technology on the workforce, with real concern rising around what this means for the future of employment.

Industry Susceptibility to Artificial Intelligence and Automation

The rise of organisational investment in technological development has resulted in an unprecedented level of uncertainty around the overall effect this development will have on the workforce and the social environment (Virgillito, 2017).

Frey and Osborne (2017) address lines of employment within the transportation and logistics industries as being highly susceptible to the introduction of AIA. We are already witnessing the significance of AIA in transportation and logistics, with driverless trains operating in South Korea and other parts of the world (Railway Technology, 2012) and autonomous driving level 2 already in the distribution phase. Harner (2017) outlines autonomous driving level 2 as a vehicle with assisted steering and acceleration functions, which still requires a driver to be alert and take control of the vehicle if necessary. It is estimated that autonomous driving will progress to level 5 after 2028 (Pollard, 2019). This level means that all driving tasks will be controlled by the vehicle system, with no human interaction required at all – not even a steering wheel (Harner, 2017). Autonomous driving level 5 is expected to have a significant impact on employment across the transportation industry.

Dolata (2008) characterises the technological impact of AIA into two distinct groups: anticipative and smooth adjustments; and reactive and crisis-ridden patterns of change. The current situation of AIA within the transportation sector represents a clear illustration of the technological and social divide. On one hand, workers in the industry such as taxi drivers are reactive to autonomous driving, while society is anticipative of the technology (Maurer et al., 2016). Since the introduction of smartphone applications, such as Uber, which use ride-hailing technology to pre-calculate taxi fares (Dudley et al., 2017), taxi drivers of the standard metering system have taken a reactive approach, protesting throughout the United States, Europe, United Kingdom, and Asia (Mulholland, 2014) and calling to ban Uber (Burry & Gordon, 2016). Despite resistance from taxi drivers, there has been regular social approval of ride-hailing technology. Subsequently, Dudley et al. (2017) have labelled ride-hailing technology as a successful disruptive innovator as a result of the conflict between workers in the industry and social acceptance of the technology (Fraedrich & Lenz). The introduction of autonomous driving has seen a continuation of a reactive approach towards sectoral adoption of autonomous driving, with the Licenced Taxi Drivers Association (LTDA) organising large demonstrations in protest against autonomous driving and ride-hailing applications (Tovey, 2016). In addition to social barriers, incidents such as the death of a pedestrian involving a self-driving Uber car (Rudgard, 2019) raise further barriers to autonomous driving. These barriers are related to the attribution of ethical liability if an autonomous car is involved in an incident, and have the potential to slow down adoption/development of autonomous driving (Taylor & Bouazzaoui, 2018).

Other than transportation and logistics, Davies (2017) identifies the service sector as one of the most likely employment industries to be impacted by AIA due to routine tasks being highly susceptible to automation. This has already become apparent in retail with self-checkouts, government departments with automated call centre operators, banks with smart ATMs, automated accountancy platforms, and general back office automated tasks. Social acceptance of AIA has already had a profound impact on the employment landscape, where technology has enabled greater convenience for customers in areas, such as online shopping and banking. Online banking can be considered basic technology, yet it has already had a widespread effect on employment, with bank branches across New Zealand closing and

reducing hours (Parker, 2017) due to customers having greater accessibility through mobile apps, online banking, and smart ATMs.

Prior to improved technological capabilities of the last decade, this would not have been possible. The nature of business is changing; what this means for employment relations is changing along with it. Even so, there is still limited clarity on managers' perceptions around the impact of AIA on the future of employment. Much of the knowledge regarding the future of work has been produced by scientists and technologists without addressing how businesses and managers intend to incorporate and use AIA in business operations.

Managing Employee Skill Sets Through Industrial Change

The development of AIA for market availability is far from an instantaneous process, with both the creation and adoption of AIA expected to take several years (Agrawal et al., 2018). The relevance this has on employment relations corresponds to organisational strategy to prepare both management and employees for any potential change in skill sets that AIA is likely to cause as a result. One of the more recent historical comparisons is the introduction of computer-based technology in the 1980s (Ben-Ner & Urtasun, 2013). While the use of computer-based technology dates back to the 1980s, the most substantial change happened between 1970 and 1998. This period of change was characterised by an accelerated adoption of computerisation in conjunction with a rise in worker skill set (Autor et al.,1998). In this skill-based technological change, computer technology changed both the nature of work and the skill sets required to perform the work (Ben-Ner & Urtasun, 2013). Skill-based technological changes shifted the nature of work from paper-based processing to computer processing in the late 1980s, introducing an increased use of computers which – in turn – required an increase in worker skill set to perform nonroutine cognitive tasks (Autor et al., 2003). The ability to predict the impact that AIA is likely to have on employee skill sets is no simple task (Agrawal et al., 2018), but it should not act as a barrier, discouraging organisations from preparing for what it could mean for their organisation and for the potential impact on employment relationships, working conditions, and work prospects.

Autor et al., (2003) encourage the adaption of AIA, which they argue presents an opportunity to lessen the demands on employees by automating less cognitive, time-consuming tasks, and an opportunity to open the door for employees to develop deeper processing skills. Organisational strategy is consequential in that it measures the consequences of business decisions in future employment relations (Warwick, 2015). For example, if organisational strategy calls for cost reduction by reducing human capital through introducing AIA, one can expect to see staff reductions. However, if the strategy is to focus on burden reduction or process efficiency, one could expect to see AIA taking over several tasks and freeing up employee time to work in different areas of business operations (Habakkuk, 1962; Warwick, 2015).

Ultimately, automation is close to taking over some tasks, but we are years away from AIA replacing large proportions of the workforce, with both human integration and supervision still required to make AIA functionable (Michalski et al., 2013). There are certain applications where new occupations will be created to offset new technological capabilities introduced by AIA (Walsh, 2018). The concern this raises, however, is whether the skills that workers have today will be relevant for the future. Decisions made by organisations to adopt AIA should be as transparent as possible to provide employees with ample time to reskill if such training is required to expand their employment opportunities, rather than using redundancy as the primary solution (Agrawal et al., 2018). Lavigna (2014) addresses one of the issues businesses might face around reskilling employees, where employees' lack of motivation has the potential to form barriers to upskilling, especially in occupations that already require a low skill

set. Experts identify individual skills as one of the key indicators linking employees to job loss susceptibility where repetitive and less complex jobs (Frey & Osborne, 2017) increase the likelihood of exposure to AIA taking over some form of task. Research on employee insights into the future of work (Brougham et al., 2019) provide a much needed perspective into how staff perceive technology (i.e., AIA) impacting their future career prospects. Managers' perceptions offer the other side to the spectrum which is currently unaccounted for in the literature.

What AIA means for the future of employment relations

Research to date has predominantly focussed around acknowledging the general impact of AIA on employment (Frey & Osborne, 2017), with limited explanation or research into how managers intend to incorporate AIA or further address employment relations issues that will arise as a result. The method managers and businesses use to implement AIA can be expected to have diverse consequences in employment relations, subject to the organisational strategy behind incorporating such technology. Managers' perceptions hold immense value towards understanding and evaluating the purpose of incorporating AIA. Whether it is to reduce tedious tasks, develop employee skill sets, promote a healthier work-life balance, or achieve cost reduction, we can expect to see some form of impact across the employment relations landscape in the future. The present study aims to give insights into how managers view the future of work in relation to employment so we can better understand how the relationship between the organisation and workers may develop as AIA continues to develop. This is important because, in 2018, 66 per cent of directors across New Zealand discussed how AIA could impact their organisation (Patterson, 2019), this is an increase from 2016 where over 40 per cent of New Zealand organisations were "considering investment in robotics or automation over the next year" (Smylie, 2016, p.1).

Methodology

Eleven semi-structured interviews were used in this study to explore managers' perceptions of AIA and its impact on the future of work. Participants in this research were identified through purposive sampling (Bryman & Bell, 2015). The criteria for participation required participants to be responsible for the hiring and management of staff, with a general understanding and knowledge of employment relations. No prior knowledge of AIA was required to participate in this research.

The interviews were conducted in New Zealand between December 2018 and January 2019. Out of the 11 managers in this research, two worked for a small to medium-sized organisation with 20-49 employees, three worked for a medium-sized organisation ranging between 50 and 99 employees, and six worked for a large organisation with over 100 employees. No participants identified themselves as working in a micro or small business with fewer than 20 employees. Managers in this research represented a total of seven different industries; five managers were from the public sector; and six managers from the private sector.

An overview of participant information is provided in table 1 below.

Participant	Industry	Sector	Organisation Size
MP1	Business and Finance	Private	Large
MP2	Education	Public	Large
MP3	Business and Finance	Public	Large
MP4	Energy	Private	Medium
MP5	Transportation	Public	Medium
MP6	Architecture	Private	Small
MP7	Healthcare	Private	Small
MP8	Business and Finance	Private	Large
MP9	Transportation	Public	Large
MP10	Information Technology	Public	Large
MP11	Healthcare	Private	Medium

Table 1: Participant Information

Interview Questions

The present study used semi-structured interviews to collect insight into managers' perceptions of AIA and what this means for the future of work. The interview structure consisted of follow-up and probing questions.

A sample of the interview questions included: (1) *What is the likelihood AIA will be integrated into your organisation or department once it is available?* (2) *Out of the employees you currently manage, how do you perceive your capabilities of hiring and retaining staff will be impacted through the introduction of AIA?* (3) *How do you envision the future of the workforce is likely to look like IF AIA is fully integrated into business operations?*

Procedure

The data were collected and analysed using thematic analysis with an inductive approach. The emergence of themes was constantly being monitored throughout the interviews, and data saturation was recognised to have been achieved within the 11 interviews included in this research (Guest et al., 2016). All audio recordings were transcribed by the lead author, and the participants were provided with a copy of the final transcript to validate it. The evidence of data saturation and interpretations of themes are presented in the results section of this research to clearly distinguish between participants' responses and our interpretations of them (Shank & Brown, 2007; McGregor, 2018).

Results and Discussion

The results of this research introduced managers' perceptions of AIA and what this ultimately means for the future of work. Managers addressed how AIA could be used to enhance business operations while at the same time recognising what AIA could mean for employees' job prospects in the future. The managers' insights were distilled into six themes through thematic analysis outlined below.

Theme 1: Cost-effective solutions through integrating AIA

The managers identified cost savings as one of the initiatives for incorporating AIA into business operations. This presents a serious challenge for employment relations in the future where we can expect to see jobs made obsolete because of AIA capabilities. Some of the managers' comments include:

"The speed of being able to do complex tasks and the cost as well. There is a lot less cost, so it's faster, more accurate, and costs less than human employees." - MP11

"The initial cost is massive, but you don't have to pay people to do things, you don't have to pay wages." - MP4

"If you've got five staff on one hundred thousand, and robotic process automation costs you a quarter of a million, you can save money." - MP2

"It takes 1,500 or 2,000 medical coders to transcribe all the records... if we can get the transcription done by machine... there goes 1,800 of those people." - MP10

The correlation between technology and cost saving has been a continuing trend throughout history. Cortada (2006), for example, reiterates how managers in the 1980s introduced computing technology into organisational operations to reduce operating costs and to enhance efficiencies.

Theme 2: Enhancing Organisational Efficiency

Respondents emphasised organisational efficiency as one of the driving forces behind exploring the capabilities of AIA. This was primarily due to managers perceiving AIA to be capable of performing at a much higher rate than humans, and with fewer errors:

"I see it as more useful and about efficiencies. The number of efficiencies gained would be where you make your wins." - MP1

"It just helps do things a lot faster. Efficiency is probably the main thing for us." - MP11

"In terms of what drives an organisation to explore or introduce and adopt new technology, fundamentally it's about efficiencies." - MP3

Manager MP3 also felt that AIA would change the nature of work for employees as well:

"With machine learning and advanced AI, you could reduce a lot of the burden such as paperwork." - MP3

Managers in this study indicated that AIA is likely to be used for efficiency gains, and this observation corresponds with other prominent periods of technological disruption. The 1970s to 1980s saw a shift from paper- to computer-based processing which enhanced efficiencies for business and customers (Autor et al., 1998). This shift ultimately also saw the loss of several sectors such as assembly line, secretarial tasks and switchboard operators. With managers identifying efficiency gains as one of the primary incentives for adopting AIA, there is an increased likelihood of significant technological disruption across the workforce. Frey and Osborne (2017) predict that as many as 47 per cent of jobs will be impacted as a result of AIA.

Theme 3: AIA Is Not the Solution for Every Scenario

Research to date predominantly focusses on industries that will be impacted through the integration of AIA into the workforce without understanding the organisational agenda behind incorporating AIA and what this will mean for employment relations. The managers alluded to this saying that simply because a technology is available does not guarantee it will be incorporated into business operations:

"That client service element …there is lots of client bots. I can't ever imagine us using them. I think there is always that client service element that will be required." - MP8

"[… whether] efficiency is a problem for that organisation or not. Now that will vary from one organisation to the next, one business to the next. If you look at a more commercial private sector lens, it varies between industry to industry as well." - MP3

"You cannot substitute [a human] and send a robot and tell somebody who's got brain tumour they only have three days to live... you can free up a lot of the roles of nurses and doctors from their administrative burden." - MP3

"There is so much manual stuff you have to do to see if they are eligible. I can't really see how you would gain a huge amount of efficiencies with automating." - MP2

MP11 further indicated how certain industries, such as those where creativity is involved, are less susceptible to AIA due to the difficulty of AIA performing creative tasks:

"I feel like a lot of creative fields won't get as heavily impacted as the logic-based ones because computers are not good at getting things wrong; they are good at getting things right. A lot of creativity goes around getting things wrong and trying new things." - MP11

Levy (2018) addresses the importance of understanding organisational agenda rather than simply assuming AIA is going to have an industry-wide impact.

> The current debate on 'the future of work' or 'jobs at risk of automation' seems to implicitly adopt a pure science-push view, which assumes a path for technology driven by what science makes achievable, rather than what is needed by firms (p. 394).

To understand what impact AIA may have in organisations, we must first identify the reasons for organisations to adopt AIA rather than assuming every organisation or business will do so simply because it is available.

Theme 4: Managers' Predictions of Industry Susceptibility to AIA

One of the leading themes that emerged in this research is managers' predictions of industry susceptibility to AIA and what this means for the future of employment relations. Automotive and front-line customer service sectors were at the forefront of managers' expectations as to AIA influence. Additionally, managers expect that businesses will develop relevant employee skill sets if business is impacted by AIA, as opposed to resorting to redundancy.

Automotive

The managers identified employment within the automotive industry as very likely to be affected due to the rising capabilities of autonomous driving:

"It doesn't take one person to manage one automated taxi. One person might be able to manage a fleet of 2000 automated taxis." - MP10

"Bus drivers potentially…they would be all on a designated self-piloted route to time." - MP5

"Self-driving cars and taxis… you can share cars and send them, and they will come pick you up and drop you off, and you don't even need to have a driver." - MP1

It is anticipated that this will be one of the most AIA-susceptible industries, with the automotive industry regularly featuring in the media in relation to self-driving cars and the expected capabilities of autonomous driving level 5 which enables the vehicle system to drive completely autonomously without any human interaction (Harner, 2017).

Frontline customer service

The managers identified customer service positions as another industry/occupation susceptible to the impact of AIA implementation in business operations:

"In the call centres and branches where actually people do not need as many staff." - MP1

"Because the checkouts and all this sort of stuff, you don't need as many people." - MP4

"The service stuff like the way that you see, we no longer have to deal with someone at the gas station or McDonald's counter if we don't want to." - MP10

"You've got to kind of find that fine balance where customers can do their own stuff, but where they can also have human support if they need." - MP1

"We will have a system that people can log in, and they can answer questions themselves, and it does it for them…Because at the moment, we have people that do that." - MP10

Kim et al., (2014) outline the impact that self-service and customer independence has on employment where "the customers can actually perform the work that an employee might otherwise perform, and thus the customers actually replace an employee" (p. 256). Given the prevalence of these types of jobs within the New Zealand context, it is reasonable to expect to see a continual impact on employment towards more customer-integrated services, leading to a reduction in the workforce within the industry.

Theme 5: Organisational Initiatives to Enhance Employee Skill Sets

Responses from the managers outlined solutions to minimise the impact of AIA on employment. One of the key themes that emerged was the importance of organisations taking responsibility to develop employee skill sets in other areas of business operations as a method of minimising the impact on employment relations:

"If you are suddenly saving one million dollars because you have a robot that can do a job of ten people and in half the time with zero errors, I would expect most companies will put five hundred thousand dollars of that into training people doing things we still need them to do." -MP1

"What it will mean is that actually people in those roles will be able to re-train, and I think a lot of people want to do that… you will have people who will want to specialise in something or move into a different department." – MP3

"… potentially having a programme where you can identify a cohort of people in your business who might want to retrain in another department." - MP9

The managers did not consider themselves immune from the impact of AIA; they identified the importance of continuously adapting their own skills sets as AIA continues to develop:

"What it means for me is my skills will need to constantly evolve and adapt." - MP9

"Adapting. If I look back to when I was your age, thinking about how the career design has changed for two decades, it's made me keep catching up." - MP5

Given the strong indication from the managers that adopting AIA for cost-saving and efficiency purposes would be a good idea, we think that investing in employee skill sets goes some way towards minimising the impact of AIA on employment relations. It is also likely that new jobs will be created as the introduction of AIA creates a need to develop new skills (Manyika et al., 2017). However, this poses certain challenges, for example, employees may be resistant to the idea of reskilling into different areas of business operations, especially when moving from a non-technical role into a technical one as required or imposed by managers:

"Job descriptions will probably evolve to reflect the changes that have happened as a result of adopting new technology." - MP3

"We are going to need people who are more savvy in terms of being able to look behind the technology." - MP8

Theme 6: Reduction in the Working Populace

The managers also raised concerns over AIA resulting in the displacement of workers and leading to large-scale unemployment.

"The obvious picture is that eventually there are too many people and not enough work because of what AI can do… because you don't need as many people."- MP4

"They are talking in certain areas of a fixed wage or a living wage being given to the populace." - MP4

"We need to work through with the greater society, I think there is going to be a massive breakdown with things that we don't have." - MP5

"I don't think we can create as many new jobs as we can remove." - MP10

"It is going to be different from what we ever expected because of how quick we are moving; we are not going to be able to guess what that is accurately. I think a lot of jobs we have now won't exist in ten, twenty years." - MP11

Not all managers predicted mass unemployment, with MP11 addressing it as a period of adjustment that will be required to develop the necessary skills which the marketplace demands:

"I don't see it as suddenly there will be a mass of unemployed. There will be a period of adjustment for all of us where we have to reskill and move into different areas and into different careers." - MP11

"It is just a question of when these things will be accessible to us. It could just be around the corner and overnight." - MP9

This raises a large level of uncertainty pertaining to the future of employment, with managers predicting large-scale unemployment. If this does eventuate, it will be paramount that we continue to conduct further research to understand whether this will be a long-term or temporary phenomenon as the labour market acclimatises to the impacts of AIA, with reskilling to meet changes in work as well as the potential creation of new work.

MP11 addressed the complexity of predicting the future, citing previous industrial revolutions leading towards new and unimaginable outcomes.

"I don't think it's easy to guess what future jobs there will be. At the moment it's kind of guessing. Before the Industrial Revolution, everyone is basically farmers, then they suddenly start mass-producing things. Then we became office workers; I don't think anyone predicted that we would be sitting in front of computers all day, not going outside at all." - MP11

Our experience of previous industrial revolutions indicates that technological developments have largely contributed to wide-scale disruption across the employment relations landscape. However, as new jobs emerged, labour laws and regulations were developed to match the changes. To what extent is this the case with AIA is yet to be seen. It will depend on our evolving understanding of AIA capabilities as well as how managers and businesses intend to develop initiatives to minimise AIA's impact on work and employment relations.

Conclusion

The results from this research indicate that managers expect AIA to result in instability across the employment landscape. The interviewed managers identified cost-saving and efficiency as primary incentives for investing in AIA, which they predicted would result in a substantial reduction in employment numbers in the future. One of the methods the participants identified to offset the expected impact on employment is to reskill employees in other areas or tasks within business operations. This presents an opportunity for both employers and employees to collaboratively develop interesting work (Burchell et al., 2014) in addition to reducing burdensome aspects of work for employees. The results of this research indicate that, if the organisation's primary objective of introducing AIA is to reduce cost and ultimately employee numbers, we can expect to see a breakdown in employment relations. However, as managers have indicated, technological adaptability is important: simply because a form of AIA exists does not guarantee it will fit within business operations. From this aspect, it is imperative to develop effective solutions for incorporating AIA into business operations, such as the capability of AIA improving work for employees as opposed to strictly reducing staff numbers.

The significance of this pertains to managers and businesses achieving and maintaining good faith in the employment relationship through effective social dialogue with the workforce concerning the introduction of AIA. From this point, discussions can be formulated between the manager and employee to develop initiatives utilising employees' skill sets within business operations if employment is expected to be impacted as a result of AIA.

Concerns raised by the managers involved in this research identified the susceptibility of certain industries and what this ultimately means for employment relations in the future. Managers addressed specific concerns regarding the automotive industry where we can expect to see a large shift towards autonomous driving services in the future. There are high expectations regarding the capabilities of AIA, and it is likely that employees will ultimately be automated out of work once the technology becomes available and ubiquitous.

This research aimed to understand managers' perceptions around AIA and what this means for the future of employment. While this research might not offer conclusive decisions on how to minimise the impact of AIA on employment, it introduces the importance of social dialogue to collaboratively manage the impact of AIA on work and employment relations. The results signal the need to further explore how this collaborative process will occur and the role of all stakeholders in ensuring the transition to AIA-based work is a smooth one.

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