Gordon Institute of Business Science
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Strategic human resource responses to anticipated digital disruption

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ABSTRACT

The exponential rate of technological advancement has had many experts debating the impact it will have on the workplace, specifically on jobs and employment. Accelerated development in artificial intelligence, robotics, automation and machine learning have left many unanswered questions, especially for human resource departments in corporates. The purpose of this research was to determine the anticipated impact of digital disruption on employees and how human resource departments can strategically prepare to respond to this looming digital disruption.

This qualitative, exploratory research used the Delphi technique, which consisted of three rounds of data collection in the form of open-ended, semi-structured questionnaires created by experts across the various fields of human resources. These were analysed by means of thematic content analysis and fed back to the participants to inform their next set of responses. The key findings of the study are that it is anticipated that eight areas in human resources will be highly impacted by digital disruption in the next three to five years. The participants confirmed that human resource teams must focus on six priorities in order to successfully transition themselves and their organisations into the future world of work.

In order to adequately support these eight areas of disruption and achieve the six priorities, human resource teams must focus on building their own capability through developing new skills and competencies. This will equip them to better guide and lead their organisations into the future world of work. The next focus is on assisting their businesses to make a successful transition into the future world of work, which requires automating their human resource practices and identifying and developing the skills gaps amongst current and future employees, proactively preparing for skills shortages. Lastly, the research concludes that it is imperative for the human resource profession to come together to share their learning and experiences through increased collaboration in order to prepare for the future world of work.

The study provides a strategic framework to guide human resource teams to structure and prepare their strategic responses to the anticipated digital disruption.

KEYWORDS

Digital disruption, automation, human resource strategies, future of work, fourth industrial revolution, workplace of the future.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1.1. Technological advancements and the impact on human resource departments

In today's competitive business environment, the workforce is seen as the organisation's greatest asset. For this reason, business leaders depend on their organisations' human resource departments to provide the workforce with innovative opportunities that will deliver real value. Autor (2015) postulated that as a result of new technologies emerging regularly, resulting in a high rate of change, technology is often seen as the catalyst for innovation. Such technological advancements also create new opportunities for how employees are managed (Stone, Deadrick, Lukaszewski & Johnson, 2015).

Rapid advancements in technology have accelerated digital disruption across all industries and sectors, creating much volatility, uncertainty, complexity and ambiguity. While organisations started off with digitisation, many more are now shifting into digitalisation. Gans (2016) explained the difference as being that digitisation is the process of converting data or information from analogue to a digital format, while digitalisation is the process of transforming business models through the use of technology, creating new value producing opportunities while moving towards a digital business. Digitalisation thus takes a holistic strategic approach to transformation and impacts all aspects of the business value chain. In order to be a credible business partner that contributes strategic value, human resource teams need to be part of this digitalisation process (Ulrich, Younger, Brockbank & Ulrich, 2012).

Over the years, the human resource function has been significantly altered through the use of technology (Gleba & Andreasen, 2014). Various solutions like human capital management systems provide platforms to automate people practices, however for the human resource function to add value to an organisation, it is critical to ensure that the strategies they define are inclusive of the digital disruptive technologies that exist around them (Dulebohn & Johnson, 2013). Thus the problem organisations face today is to continuously re-engineer their people practices to ensure that they get the most effective processes in place to manage and automate as much of the employee experience as possible throughout the employee life cycle (Autor, 2015). To remain relevant and

effective, human resource managers need to include and adopt these technologies as part of their human resource strategies to enable digital transformation. This will create the platforms to enhance and improve the employee experience and will impact individuals' performance and engagement (Stone et al., 2015).

Digital disruption has been experienced across the human resource value chain, including recruiting and sourcing talent, training and upskilling employees through learning management systems, content sharing, assessment taking, virtual classroom capabilities, online collaboration amongst employees, automated performance management and succession planning, as well as automating jobs that have been previously done by humans (Kavanagh, Thite & Johnson, 2015). Many new technology systems in the human resource space have automated various human resource functions and tasks. Further, business processes and models are being transformed through digital automation (Gilbert, 2015).

1.2. Research problem

Despite the major shift in digitalisation within organisations over the past few decades, Autor (2015) claimed that technology has not totally replaced the labour market through substitution. He stated that digital disruption has rather complemented labour and increased productivity, resulting in a higher demand for labour. Colbert, Yee and George (2016) supported this view, arguing that developing the appropriate skills for the digital workforce of the future is a far greater challenge and imperative for human resource teams. The reason for a shift in human skills is that technology does indeed alter the types of job that exist and are in demand. As the world moves into a more digitised economy, the skills sets required are more analytical, problem solving, creative and critical thinking in nature (World Economic Forum, 2016).

Stone et al. (2015), Autor (2015) and Colbert et al. (2016) all agreed that while digital disruption in the workplace cannot be avoided or the impact it has on a workforce be ignored, it is imperative for human resource departments to reform their thinking and purpose for the future; they need to recognise how digital transformation will strategically influence and shape human resource strategies within organisations. Dulebohn and Johnson (2013) questioned if human resource teams have done enough to make the

shift to embrace digital disruption and adapt their strategies accordingly. If they have made the shift, in which areas, and if they have not, why? Seeing that digital disruption impacts the entire business value chain and creates much uncertainty, there is no definitive answers to what the future of business will look like. Yet it remains imperative for human resource departments to create future fit organisations that will embrace and adopt the digital transformation journey. This transformation will require a deliberate strategy to address challenges and design a future fit organisation.

While much research exists around the future of work, what the workforce will look like in the future, how employees will be managed and the role technology will play in disrupting the future of work, little has been done on how human resource departments will strategically respond to digital disruption and preparing their organisations for this future world of work. Human resource departments within organisations have started making the digitisation transformation journey as many guidelines and frameworks exist, however when it comes to starting the digitalisation transformation journey, many are unsure where to begin. While they are aware that such a journey cannot be circumvented, there are no guidelines for where they should start, what they should consider, and how they should prepare strategically in order to respond to the anticipated digital disruption.

1.3. Purpose of the research

It is evident that technology has changed how organisations store and manipulate employee data, has altered how leaders make decisions related to their employees, and has removed geographical boundaries regarding how employees engage and interact with each other (CedarCrestone, 2014; Dulebohn & Johnson, 2013). Yet while digitisation is taking place formally or informally amongst human resource departments and employees (Gleba & Andreasen, 2014; Utesheva, Simpson & Cecez-Kecmanovi, 2016), very limited research has been completed to date that illustrates how human resource departments can prepare to strategically respond to anticipated digital disruption. Colbert et al. (2016) claimed that organisations look to their human resource departments to help them lead the way through strategies in order to prepare for and take advantage of environmental and industry trends, so they can remain competitive. This view was supported by Ulrich, Younger, Brockbank and Ulrich (2013), who believed that human resources should play a strategic role in business and become a value-

adding contributor whilst seated around the boardroom table. This requires them to develop and harness strategic competencies like strategy formulation and organisation change management, which collectively enable successful business transformation (Ulrich et al., 2013; Lo, Macky & Pio, 2015).

The extensive use of technology in the workplace (Mazmanian, 2013), the increase in the number of virtual teams within organisations (Gilson, Maynard, Young, Vartiainen & Hakonen, 2015) and the entrance of a new generation known as the digital native (Colbert et al., 2016), all of which are underpinned by digital disruption, has resulted in a call for a new way of design thinking within the workplace (Gruber, Leon, George & Thompson, 2015). This demands a new approach to what individuals expect of work and collaboration practices influencing the employee experience, resulting in emotional engagement in the workplace.

There is no doubt that there is an increasing prevalence of digitisation that influences the manner in which employees approach work, how work is structured and carried out in organisations (Tyworth, 2014), and the competencies that need to be developed to support such disruption (Colbert et al., 2016). Gilbert (2015) postulated that such disruption has immense value for an organisation and it is crucial that in order to benefit from such disruption and to remain competitive, jobs and organisational structures might need to be rethought and redesigned. As a result of digital disruption only recently making an entrance into places of work but moving at an exponential rate, the role of technology has become extremely fluid; organisations are only now starting to comprehend the impact of how people are approaching this new world of work, thus supporting the need for redesign (Colbert et al., 2016).

While digital disruption is certainly an active player in the future of business, the impact it will have on the workforce is not clearly known and in many instances is unpredictable. The purpose of this research is to establish guidelines that will provide a starting point for human resource departments to define and design strategies to respond to anticipated digital disruption. This research thus looked to key experts in the field of human resources to answer the research questions. The study was dependent on the existing knowledge of such experts, coupled with their experience, to contribute to the research in order to derive some key insights. Such insights included what the possible

world of work will look like in the next three to five years. It further investigated and highlighted what human resource departments should start doing now to prepare for and equip their organisations for the changes and challenges that lie ahead. This will aid human resource teams to remain ahead of the curve so they can offer their organisations a competitive advantage. Through the use of literature and the insights from experts in the field, this research aimed to highlight some of the unknowns of digital disruption in the workplace at a strategic level, as well as the degree of change management required to succeed.

1.4. Research objectives

This research aimed to explore how human resource departments will strategically respond to the anticipated digital disruption within their environments. To accomplish the research aim, the following research objectives were set out:

Research Objective 1: To gain insights into how digital disruption is likely to affect human resource strategies in the next three to five years.

Research Objective 2: To explore what competencies human resource departments will need to start developing now in order to manage and support digital disruption.

Research Objective 3: To establish how human resource teams can strategically transform themselves to better support their organisations with more value-adding services.

Research Objective 4: To explore how the human resource profession can strategically partner together to embrace digital disruption.

The anticipated outputs of this research study will support and benefit human resource teams to design and develop corporate strategies that will assist organisations to prepare for the future of work. It aims to provide some elements that can be included in their strategies now, such as areas which are anticipated to be impacted by digital disruption in the future and the competencies that human resource teams need to start developing to prepare for the demands that lie ahead. It further indicates anticipated challenges and how human resource teams can prepare to respond adequately to such challenges in the future. The literature review in Chapter 2 will take a closer look at the current trends

of digital disruption in the workplace and provide a foundation of understanding of the landscape.

2. CHAPTER 2 – LITERATURE REVIEW

2.1. Introduction

The World Economic Forum (2016) claimed that the world is at the start of a Fourth Industrial Revolution that is a digital revolution. It is anticipated that in this era there will be extreme developments and advancements across technology, including artificial intelligence, robotics, machine language and nanotechnology, to name just a few. These are no longer operating independently in different silos but rather are augmenting each other for amplified performance. The result is that most industries are undergoing significant change, causing a major transformation in occupations. While some jobs are becoming threatened by redundancy, some are experiencing a change in skills sets and new jobs are seeing major growth (Autor, 2015). With such disruption in technology, coupled with a talent shortage and high unemployment rates, reskilling and upskilling current workers will become much more of a priority for the human resource function within organisations (Colbert et al., 2016).

Over the years, technology has rapidly transformed the manner in which we do things; it has changed the way we work, engage and connect with each other, consume content and analyse data, transforming communities and workplaces (Autor, 2015). This has been no different to how the human resource function has been impacted in corporate organisations across the globe (Stone et al., 2015; Kavanagh et al., 2015). Digital disruption has been experienced across the human resource value chain, from the way organisations recruit new employees to how they develop skills, manage performance, reward employees, promote talent and retire employees. Stone et al. (2015) argued that perhaps digital disruption has resulted in technology-led, transaction-based employee management, replacing the traditional relationship-based approach, thus compromising the emotional and relational aspects.

When one looks at digital disruption and technology advancements, there is always an unknown element in what the future holds. For this reason it is imperative for organisations to prepare adequately for such unknowns by making some assumptions and predictions based on past experience and current expert knowledge. Such preparations for future events are often incorporated and included as essentials within

an organisation's strategy. Porter (2008) defined strategy as an organisation's competitive positioning on how it chooses to respond to the industry trends around it. He further described positioning as a choice an organisation makes in order to compete in a manner which gives it a sustainable edge over its competitors. Digital disruption is clearly an industry trend and how organisations choose to respond to it will give them their competitive edge. According to Ulrich et al. (2012), human resource teams play a vital role in contributing to an organisation's strategy, as they are responsible for its greatest, most powerful resource, its workforce.

2.2. The role of a human resource strategy in an organisation

Ulrich, Brockbank and Johnson (2009) postulated that the strategic role of human resources in an organisation is an imperative one. They coined the term "strategy architect" to describe a role that is responsible for advancing an organisation through its people. Strategy, as defined by Porter (2008), is the ability of an organisation to position itself competitively whilst aligning itself to industry trends. The role of human resources in achieving this goal is to focus on the trends that affect an organisation's workforce. Over decades, such trends have included the management of talent, the development of skills amongst a workforce, the strategic attraction and recruitment of people, and the development of leadership and succession pipelines, to name a few (Ulrich et al., 2012).

Often the starting point to defining and creating a human resource strategy is to understand the organisation's greater strategy and to determine how the human resource team can assist in the achievement of that strategy (Ulrich et al., 2009). However, over the years, human resource teams started making the shift from having strategies that were focused on transactional tasks to ones that are more strategically focussed (Lo et al., 2015). This shift was supported by Ulrich et al. (2013), who claimed that it has become imperative for human resources to focus on tasks that are more value-adding to the organisation, as this will allow them to be viewed as credible advisors and business partners. They further stressed that it is important for human resources to consider and acknowledge the environment in which they are currently operating, as well as the trends that surround them.

According to Lo et al. (2015), having the ability to define and implement strategies in an organisation has become a strategic competency of human resource executives that cannot be ignored. They further added that assisting an organisation to manage change is another strategic imperative for human resources. Colbert et al. (2016) supported this view when they noted that in order for organisations to thrive in a digitised economy, they must look to their human resource teams for guidance on how to prepare the workforce for such changes that lie ahead. They further claimed that human resources holds the key to an organisation's success in the way they train and upskill competencies for the future world of work, as well as transition the workforce to this new way of working that digital disruption demands. While it is not exactly known what the future impact of digital disruption holds, what is evident is that human resource teams cannot sit around and wait, but must rather make some assumptions and start preparing for the revolution that lies ahead.

2.3. What is digital disruption?

The Oxford English Dictionary (n.d., 414) defines disruption as "being a disturbance or problem which interrupts an event, activity, or process". However Christensen, a Harvard Business School professor, had a different definition of "disruption", which he outlined in his book *The Innovator's Dilemma*. In a simple way, he defined a disruptive product as either an item that addresses a market that previously could not be served, calling it a new-market disruption, or as offering a simpler, cheaper or more convenient alternative to an existing product, known as a low-end disruption (Christensen, Raynor & McDonald, 2015).

Some people refer to technology as being a disruptive conduit, while others argue that disruption stems from a business operating model that is different to anything that already exists. Often technology is used as an enabler to cause disruption by a company within their industry. Uber is a good example of disruption, as they did not invent a new industry but rather changed a transportation business model using technology to enable the disruption (Christensen et al., 2015). Today Uber is a taxi service business but does not own a single vehicle or employ any drivers; instead they use technology as a platform to enable their customers to use their taxi service. Gans (2016) explained that digital disruption as a phenomena brings about change when business models and

technologies alter the value propositions of current and already existing goods and services on the market. These changes significantly differentiate the incumbent from its competition. Embedded within this definition of digital disruption lies artificial intelligence, machine learning, robotics, chatbots and predictive analytics. Each of these will be briefly explained below:

2.3.1 Artificial intelligence

Artificial intelligence (AI) is a machine's ability to have human-like intelligence. Computers can be programmed to learn with data in order to perform a task, and improve at the task as more data enter into the system. AI is the powerful force behind new technologies such as self-driving cars and search engines, and is making its way into revolutionising the talent industry. This next-generation technology helps human resource specialists to increase their efficiency by automating elementary administrative tasks, and to become smarter by transforming data into insights which they would not necessarily be able to create themselves (Hovy, Navigli & Ponzetto, 2013; Russell & Norvig, 2016).

2.3.2 Machine learning

Machine learning is a method of analysing data through automation, thus making it a subset of artificial intelligence. It uses analytical modelling based on the concept that systems can learn from various data sets, draw inferences and patterns from the data set and then make decisions with little to no human intervention (Neff & Nagy, 2016). The algorithm used in the learning process has the ability to compare its developed output to the correct, intended output and determine any deviations. Based on the findings the algorithm will modify the analytical model accordingly in order to improve its rate of accuracy (Brougham & Haar, 2017). Due to its quick speed and rapid analytical capabilities machine learning enables large amounts of data to be analysed in a short space of time (Autor, 2015).

2.3.3 Robotics

A robot is a mechanical device that is programmable by a human or another robot to perform activities that allow it to complete various tasks and jobs by interacting with its environment. Robotics is the study of science combined with technology specialising in

how robots are designed, built and programmed via software applications. Robotics is becoming of increasing interest amongst university students, as they see this as being a big part of our desired future. With the development of robots, many industries such as manufacturing and the motor industry have been able to automate their production lines, which has ensured faster and more efficient production levels. Lately this has spilled over into other industries like the medical field and warehousing, where drones are being utilised (Autor, 2015; Murashov, Hearl & Howard, 2016; Brougham & Haar, 2017).

2.3.4 Chatbots

Chatbots are a form of computer programme that are developed and programmed by humans; they have the capability to engage with other human beings via text or audio. A chatbot can be described as a conversational computer programme that automates certain tasks through text or voice commands, typically by chatting with a user through a conversational interface. They are highly engaging and can be customised using mobile devices, web browsers, chat platforms like Facebook messenger, and Slack. Chatbots have programmed algorithms that use data within their ecosystems to answer questions posed by humans and provide information. They are also able to perform tasks like resetting passwords, responding to frequently asked questions, and even provide health-related information and recommendations (Neff & Nagy, 2016; Brougham & Haar, 2017).

A bot's primary function is to streamline interactions between people and services, eliminating expensive interactions with traditional customer representatives while providing content, facilitating a purchase or simply connecting with consumers. Powered by AI, a chatbot is able to understand complex requests, personalise responses and improve interactions over time (Russell & Norvig, 2016). At the end of 2017, over 1.6 billion people were using mobile messaging apps (Facebook Messenger, WhatsApp and Skype), where chatbots see the most usage. By the end of 2018, that number is expected to reach 2 billion, roughly 80% of all smartphone users. As more bots interact with customers, the capacity for them to learn and grow increases exponentially (Brougham & Haar, 2017). Finance, travel and retail are all prime candidates for chatbot applications, as bot AI can uncover behavioural patterns and base future queries and purchases off them. This newfound relationship between consumers and technology can be leveraged across consumers, customers and suppliers, creating a continuous channel for self-service engagement (Brougham & Haar, 2017).

2.3.5 Predictive analytics

Predictive analytics is an extension of advanced analytics, where a computer is able to use new and historic data within an ecosystem to forecast and project future trends, behaviours or events. In order to achieve this capability, a software computer programme utilises data and performs various techniques like statistical analysis and modelling, data mining, machine learning and artificial intelligence (Hovy et al., 2016). This allows organisations to use their data to produce patterns and create business intelligence for more effective decision making and actions (Stone et al., 2015). If used optimally and intelligently, predictive analytics can provide the foundation for organisations to outperform their competitors through innovation and disruption (Gans, 2016).

Hovy et al. (2013) and Russell and Norvig (2016) voiced a concern that some human bias exists when a programmer is writing the algorithm or code to enable artificial intelligence, robots, chatbots and predictive analytics. These biases may manifest in the responses provided by the digital source, however the algorithm coded by a human is the basis for such bias interpretations and responses. Ulrich et al. (2013) postulated that most human resource specialists fear that digital disruption will take away their jobs, making them redundant in the workplace. Instead of viewing it as digital disruption eliminating one's job, individuals are encouraged to rather view it as being able to augment one's job by analysing more information faster and smarter than a human could possibly ever do alone. Digital disruption has the capability to automate low level tasks so one can focus more time on strategic elements of a job and contribute more significantly to business results (Ulrich et al., 2013; Stone et al., 2015).

Colbert et al. (2016) claimed that digital disruption is least likely to replace the parts of a job that require personal and emotional engagement, as a machine with human-like empathy is currently almost impossible to replicate or produce via programming code. Utesheva et al. (2016) argued that even if this was possible, it still would not be a question of a machine replacing humans, but rather a question of how much the machine could amplify a human's productivity. Digital disruption provides organisations with opportunities for improved performance thus delivering value and results beyond expectations. However, in order to be successful the organisation's workforce will need to change in order to become harmonised to this new way of learning and working (Gans, 2016). For the purpose of this research, all elements of the digital disruption framework,

including artificial intelligence, machine language, robotics, chatbots and predictive analytics, were considered and explored.

2.4. Technology tipping points anticipated to be reached by 2030

The rate at which artificial intelligence, machine language, robotics, chatbots and predictive analytics are impacting our world and the future of work is no longer incremental, but rather exponential. This rapid change cannot be ignored as it is changing the way we operate and engage as social beings. In a study conducted by the World Economic Forum in 2015, where over 800 executives and experts from the technology sector participated and shared their perspectives and respective timelines for when emerging technologies would become mainstream, 21 defining moments were highlighted for where technology tipping points are predicted to reach by 2030 (World Economic Forum, 2015). All these tipping points are anticipated to have a cross-cutting impact on jobs and the nature of work. Featured amongst these tipping points were big data for decisions, artificial intelligence for decision making, artificial intelligence and white collar jobs, as well as robotics and services.

The report further noted that by 2021, robotics will have influenced many jobs across industries like manufacturing, agriculture, retail and services. Robots will be used mainly in streamlining supply chains to deliver more efficient and predictable business results. Caution was sounded that one should not only anticipate that blue collar jobs will be replaced by automation, but that by 2025, a situation can be anticipated where AI substitutes a vast range of tasks currently performed by people including white collar jobs. As a result of artificial intelligence having the capability to process large amounts of data across multiple platforms and produce outputs in nanoseconds, it is anticipated that by 2026, big data and artificial intelligence will play a critical role in decision making across many industries (World Economic Forum, 2015).

2.5. Jobs that are anticipated to be impacted by digital disruption

This research adopted the framework used in a study by Frey and Osborne in 2013, which has been widely publicised and cited. Their study focused on 702 jobs in the United States to determine how susceptible they are to being replaced by digital technologies.

They used a Gaussian process classifier to identify the impact of technology on these jobs and the probability of these jobs being replaced either partially or completely by computerisation. They further defined tasks within a job occupation and assessed how many of those tasks can be automated using any form of technology, be it artificial intelligence or robots. The outcome of their study aligned to already existing literature, which predicted that workers in the industries of transportation, logistics, production as well as office work and administration, are hugely at risk. They added that jobs in the sales, retail and services industries are also highly susceptible to digitisation. They depicted the various industries and jobs prone to digitisation as per Figure 1 below.

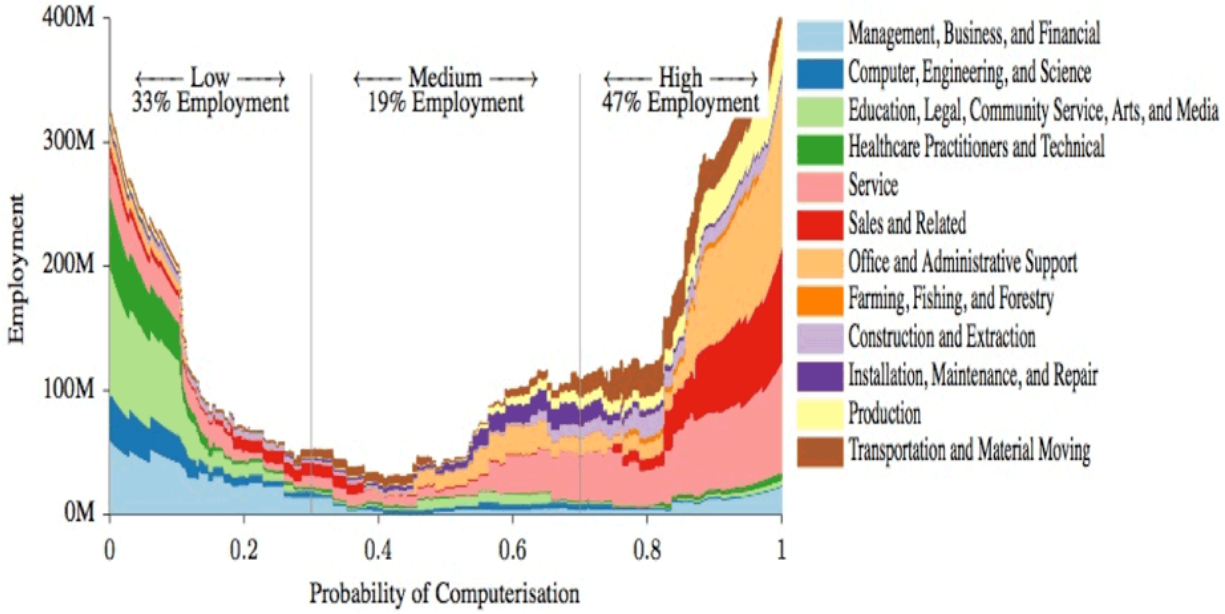

Figure 1: Jobs at risk in the United States. Source: Adapted from Frey and Osborne (2013)

Frey and Osborne (2013) predicted that of the 702 jobs analysed, approximately 47% face the risk of decreased employment over the next 10 to 25 years as technology continues to revolutionise and disrupt the workplace. According to the World Bank Group's World Development Report (2016), developed economies adapt to technological change much faster than developing economies due to their industries being far more advanced. Developed economies also pay higher wages and these two factors make them more susceptible to the automation of jobs. Despite this, the authors claimed that two thirds of all jobs in developing economies are susceptible to automation (see Figure 2 below).

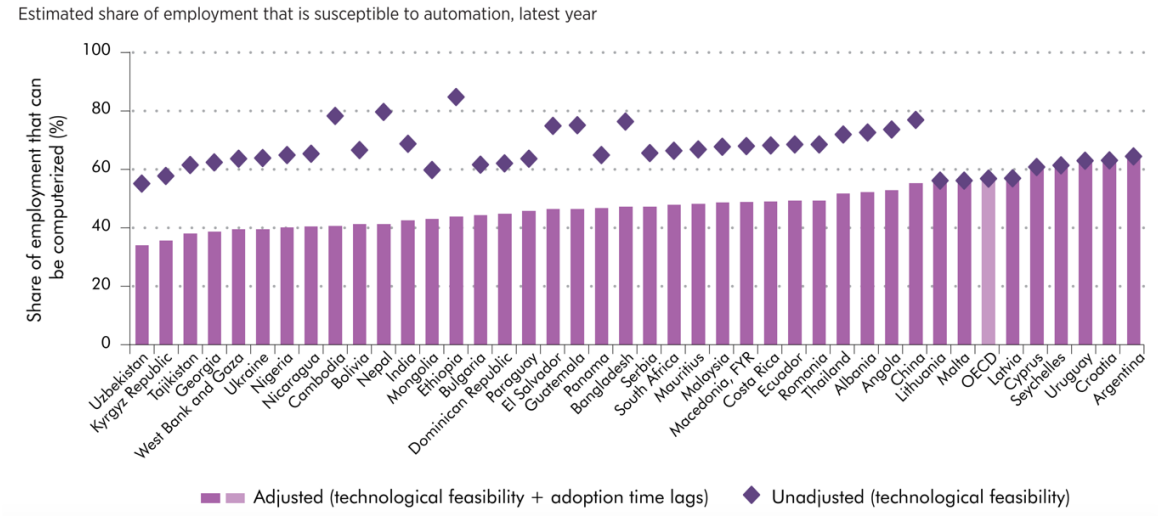

Figure 2: Estimated share of employment susceptible to automation.

Source: World Bank Group (2016, p. 129)

A recent study of the South African market conducted by Accenture adopted the work of Frey and Osborne (2013) to illustrate the top 10 jobs at risk to digitisation (Accenture, 2018). The findings showed that 35% of South African jobs, including both blue and white collar jobs, are threatened by automation. This is a staggering ratio of one in three jobs, which is not a promising outlook for the future, especially in a country where unemployment is currently at an all-time high of 28%.

Table 1: Top 10 jobs at risk in South Africa

South Africa			
Rank of automation risk	**Occupation**	**Industry**	**Number of jobs**
1st	Book keeping, accounting & auditing clerks	Office & admin support	99 190
2nd	Moulding, coremaking, casting machine setters, operators & tenders, metals & plastics	Production	18 031
3rd	Furnace, kiln, oven, drier & kettle operators and tenders	Production	6945
4th	Labourers & freight, stock & material movers	Transportation & material moving	94 439
5th	Insurance claims & policy processing clerks	Office & admin support	68 633
6th	Electrical & electronic installers & repairers, transportation equipment	Installation, maintenance & repair	28 111
7th	Bill & account collectors	Office & admin support	20 283
8th	Team assemblers	Production	37 656
9th	Heat treating equipment setters, operators & tenders, metal & plastics	Production	1 656
10th	Farm equipment, mechanics & service technicians	Installation, maintenance & repair	96 756
		Total	**471 700**

Source: Adapted from Accenture (2018)

As per the findings from the studies detailed above, it is evident that the time is rife for human resource teams in organisations to transform their strategies in order to adapt to the changes that technologies are bringing, and to prepare their workforces for digital disruption. As depicted in Table 1 above, the main industries likely to be affected in South Africa are production, office and admin support, as well as installation, maintenance and repairs. However human resource departments also find themselves experiencing first hand such disruption in their core responsibilities and duties, which are mainly impacted by high volume administrative responsibilities. If they are able to include the impact of digital disruption in their core strategies, they will be better positioned to support their larger organisations. As in South Africa we are only starting to see the impact of jobs being automated in some of our industries, the exact impact of this is not yet known or realised, however one can only expect such automation to increase and gain momentum. For this reason it is imperative for human resource teams to have foresight and make assumptions about the impact of digital disruption, as well as to start preparing now for the transformation that lies ahead.

2.6. Areas of the HR value chain that digital disruption has influenced and automated

Stone et al. (2015) and Ulrich et al. (2013) explained how digital disruption has already impacted and changed the various elements within the human resource value chain. These include areas like recruitment, onboarding, employee training and development, benefit enrolments and performance reviews, all of which are briefly explained below. However, Autor (2015) argued that the impact of technology within the human resource function has just commenced, adding that with further advancements in digital disruption, we can expect more changes in the near future.

2.6.1 Recruitment

When it comes to attracting and hiring employees within an organisation, this can be a mammoth task, especially where volumes or seasonal hires are concerned. Recruitment can be extremely time consuming, from sourcing resumes and screening and shortlisting them (Badger, Kaminsky & Behrend, 2014), to scheduling interviews, tracking progress at each stage and then the offer phase which can be drawn out with extensive negotiations and convincing the right candidate to accept the offer (Stone, Lukaszewski, Stone-Romero & Johnson, 2013; Dineen & Allen, 2013). In industries like retail and hospitality, where demand influenced by seasonal patterns impacts high volumes of recruitment, technology has indeed played a role in improving efficiencies. Recruitment systems that provide an application tracking system have disrupted how organisations recruit employees (Stone et al., 2015). Here, low level tasks like pre-screening, using artificial intelligence, and even in some instances first round interviews using chatbots, have been automated. Badger et al. (2014) claimed that organisations that have utilised such disruptive technologies have reduced the time and cost of hiring by approximately 70%.

Despite this remarkable transformation, Dineen and Allen (2013) claimed that organisations still need people to persuade and negotiate, to understand candidates' needs, and to build communities and cultures. Paradoxically, the more you use technology, the more you can invest in the human side of the job. While it is not yet easy for a computer to bond with a hiring manager or convince a candidate to relocate, looking ahead the technology will improve and start to infiltrate these higher-order tasks, further augmenting the role of a human resource specialist (Badger et al., 2014). This has

caused much fear amongst such specialists, however the key element is for them to see the bigger picture and understand how their role can be aided with such technology rather than being displaced. Instead of fearing the worse they need to focus their energies on where they want to develop new skills and become adaptable in this changing world of work (Colbert et al., 2016; Lo et al., 2015; Dulebohn & Johnson, 2013).

2.6.2 Onboarding

It is critical for organisations to ensure that new employees are successfully onboarded into the new environment. Onboarding includes making new employees fully aware of the company's policies and procedures, wellness and benefits offerings, as well as the organisational structures (Badger et al., 2014). Often this is extremely time consuming, yet it needs to be given the relevant attention so the employee is completely oriented to the new business environment.

Organisations that use human resource information systems have automated capabilities where new employees have a series of documents to go through and their progress is tracked and monitored. Often they have a limited period to understand such documents, which include the company's policies and procedures (Stone at al., 2013). Recently, advanced organisations have started utilising chatbots to facilitate discussions with employees. Here new employees can post questions to the chatbot and have their questions answered and more information provided. This frees up the time of human resource specialists to focus on more strategic tasks while elementary transactional tasks are automated (Ulrich et al., 2013; Lo et al., 2015).

2.6.3 Employee training and development

Another area that has been significantly disrupted by technology is employee development. Within this space, technology has automated learning materials and made collaboration amongst virtual teams possible (Gilson et al., 2015; Reyt & Wiesenfeld, 2015). Learning management systems have been optimising the laborious administrative tasks of learning and development, while making content available online for employees to consume anywhere, anytime (Stone et al., 2015; Brown & Charlier, 2013). Virtual classroom facilities enable trainers to reach geographically distributed employees remotely, allowing employees to always remain skilled and knowledgeable.

This has significantly reduced cost and training time, while enabling organisations to achieve quick to market strategies (Reyt & Wiesenfeld, 2015).

Further, Haas, Criscuolo and George (2015) stated that with online collaboration technologies, organisations can enable employees to share and discuss problems, find solutions and resolve business problems. They added that such capabilities allow employees to improve and grow their own competencies through knowledge sharing that is more frequent and easier to enable. At a strategic level learning, management systems that are integrated with other human resource information system technologies, like performance and succession management, can provide immense value and insights into tasks like personal development plans that are linked to performance management and succession planning (Stone et al., 2015).

2.6.4 Benefits enrolments

Benefits management is a crucial element for human resource teams, thus it is vital for them to ensure that it is correctly and adequately managed. While highly resource intensive and time consuming, it is a role that human resources cannot underestimate (Stone et al., 2015). Benefits management includes elements such as health insurance choices (medical aid options and plans) and pension contribution options, all of which employees need to decide and confirm upon starting in an organisation. These are governed by various legislations, thus they result in many questions being raised by employees, which they require clarity on in order to make informed decisions.

Technology has aided in this era by automating many documents and explanations, thus avoiding the printing of large manuals and documents. It also stores documents online, making filing redundant and providing easy access to documents for future purposes such as audits. Chatbots have aided with easy access to information and employees having their questions answered timeously as opposed to submitting a query to the human resources team and waiting for a response or resolution (Brougham & Haar, 2017).

2.6.5 Performance measurement and reviews

Managing performance has become an imperative responsibility for line managers as they must ensure that organisational strategic goals are met. This is accomplished by ensuring that individuals, teams and departmental objectives are aligned. For this reason, organisations must ensure that goals are cascaded timeously throughout the business and closely managed. The creation and alignment of key performance areas for departments and employees must thus be quick and effective, and goals must be clearly stipulated (Ulrich et al., 2015; Chui, Manyika & Miremadi, 2015).

Technology has enabled organisations to achieve this, thus changing the role of human resources to become less transactional and more strategic by aiding managers to effectively manage employee performance, hence contributing to business success. With the change in the make-up of the future workforce, where millennials require more regular feedback, managers can no longer wait for the annual performance review process. This means they must be quick and agile in their performance management processes and approaches, however technology has disrupted this space, enabling such demands. Stone et al. (2015) postulated that automated performance management systems have enabled improved approaches and transformed the performance management process in organisations.

It is evident from the paragraphs above that the automation and digitisation of tasks has benefits for the human resource value chain, thus one can expect to derive similar value from automation to other business areas. However, Colbert et al. (2016) postulated that organisations look to their human resource teams for guidance on how to transition from their current state to a future state to achieve such value from digital disruption. When it is not exactly clear to human resource teams how to precisely achieve this transformation, they need a strategy to start at some point.

2.7. Benefits of digital disruption to the HR value chain

Ulrich et al. (2013) and Stone et al. (2015) argued that many benefits can be realised by an organisation when digital disruptive technologies are integrated and operating as part of its human resource value chain. It is evident that labour efficiencies are increased

through various forms of digital disruption; as organisations automate more repetitive routine tasks they increase productivity, which results in a decrease in costs across production and labour as well as a reduction in time to produce outputs. When recruiting new skills, some organisations are able to produce short-listed candidates with a 70% time reduction (Stone, Lukaszewski, Stone-Romero & Johnson, 2013; Dineen & Allen, 2013; Kavanagh et al., 2015). Further, with the use of the right technology, organisations are able to connect virtual teams with ease, thus increasing collaboration, while saving time and money. It also presents opportunities for employees to share knowledge and learn (Gilson et al., 2015; Tyworth, 2014; Haas et al., 2015). Digital disruption has also provided organisations with the ability to deliver an improved employee experience. This can be achieved with easy access to information that can be found online or provided via chatbots, automated onboarding experiences that are seamless and less time consuming (Badger et al., 2014) and access to learning anytime anywhere via e-learning capabilities (Brown & Charlier, 2013; Kavanagh et al., 2015). It has further made data available which organisations are able to analyse and use to predict employee behaviours and trends.

2.8. Challenges an organisation can expect to face with digital disruption

Gans (2016) postulated that in order for organisations to thrive in the digital disruption space they will have to invest significantly in resources. This is not limited to technology, but includes all the peripherals that surround disruption such as information security, legal boundaries, audit logging and system extensibility, to name just a few.

With the use of artificial intelligence, chatbots and robots, it is imperative to ensure that the data of both customers and employees remain within the corporate firewalls of the organisation's security architecture (Brougham & Haar, 2017). It must further ensure that all information is encrypted and that the human resource teams can use technologies that reside on the premises, in the cloud or a hybrid of both to achieve this.

Legal and ethical boundaries are of vital importance when human resource teams use chatbots to engage with employees, therefore it is critical for chatbots to remain in their swim lanes (Chui et al., 2015; Neff & Nagy, 2016). This means that when chatbots are asked to provide information of a complex nature or that they are not qualified in, they

must refer the query to a human resource professional. Two typical examples are providing medical recommendations or financial advice. In the medical example, if an employee states that a family member has a particular medical condition and asks for a medical aid plan recommendation, the chatbot should redirect that query to a human. In the example of financial advice, if an employee claims to have bad debt and seeks financial advice on how to manage that debt, again the chatbot is not qualified to provide such advice. In these two examples there could be major legal and ethical consequences for automating such responses.

For auditing purposes it is imperative for HR chatbots to preserve and store all interactions with employees. There should also be an audit trail of all interactions and responses which must be stored for a period of time (Chui et al., 2015). When the organisation undergoes an audit or there is a follow-up query, the HR chatbot must be able to produce all evidence of the interactions via the data that were stored (Neff & Nagy, 2016). Lastly, another challenge when using digital disruption is the possibility of extending and developing the chatbot, robot or artificial intelligence capability (Murashov et al., 2016; Brougham & Haar, 2017). Organisations often experience growth as they move along the business life cycle, and such a growth trajectory will demand more capabilities and complexities. As an organisation evolves, the skills of HR chatbots, robots and artificial intelligence must evolve with it. For this reason, it is important for HR departments to be able to easily extend the bot with more skills and capabilities. While not all the challenges are entirely known or might vary between industries, human resource teams need to make assumptions based on legislation and their current operating environments in order to begin preparing for this new future of work.

2.9. What do HR teams need to consider regarding digital disruption?

In order for human resource teams to be deemed credible in an organisation, it is imperative that they design and deliver people practices that are innovative. Such innovation generally starts at the transactional level of people practices, which are often highly administrative. For this reason, the use of HR technology to improve efficiencies and drive the effectiveness of such administrative transactions is of paramount importance, as many distributed and virtual teams can be found within today's workforce (Lo et al., 2015; Gilson et al., 2015). If human capital teams are not optimising the use

of technology within the value chain, they will find themselves falling behind the industry curve and limiting themselves from achieving an optimal impact as a business partner.

Ulrich et al. (2013) identified human resource competencies in six categories, two of which are human resource innovators and integrators, and a technology proponent. In their paper, the authors posited that it is no longer useful for human resources to place an emphasis on competencies that add very little or no value to the business, but rather they should focus on competencies that are adding more business value. They deduced that the elements that add most value to a business include aligning strategy and culture; connecting people though technology; and sustaining change (Ulrich et al., 2013). This clearly indicates that in order for human resources to remain relevant in an organisation, there is a need for teams to embrace the digital disruption happening around them. Further, Hecklau, Galeitzke, Flachs and Kohl (2016) postulated that human resource teams need to have the right competencies in order to support their organisations transition successfully into the future of work-optimising technology. Makridakis (2017) supported this view, claiming that the way organisations manage their workforce in preparation for the looming digital disruption will define their competitiveness. According to DeCanio (2016), this means that human resource teams must be able to determine which business processes can be substituted by machines and which technologies can be used to complement human skills to drive efficiencies.

Autor (2015) and Colbert et al. (2016) claimed that human resource teams have a mammoth task ahead of them to prepare a workforce that can align itself to the digital disruption surrounding them. This means ensuring they have a digital transformation strategy which is part of their greater human resource strategies. This should incorporate a wider use of data analytics in the form of predictive analytics (Makridakis, 2017). It implies a smarter and bigger use of human resource technology that combines various elements of data to enable data mining, statistical analytics and modelling to predict future events and behaviours like employee flight risks, readiness for promotion and career advancements, as well as skills and learning gaps.

Further, at the rate of change experienced in jobs today, it has become apparent that the skills acquired by employees five years ago will no longer be relevant in a few years' time, therefore human resource teams have to find and establish creative ways to encourage and incentivise lifelong learning. In fact, the World Economic Report (2016) stated that 65% of children entering basic education in the primary schooling system

today will end up being employed in jobs that do not even exist currently, indicating rapid transformation. With the employment landscape changing so quickly, it is becoming an ever increasing priority for human resource teams to have the ability to anticipate and prepare for future skills that their businesses will require (Makridakis, 2017). Human resource teams need to help and guide employees prepare for these future skills by unlearning old skills in order to learn new required skills, so that a supply of the right skills are readily available in order to ensure their organisations are able to seize the business opportunities when they arise.

With the increasing need for automation and jobs becoming redundant thanks to robots, human resource teams need to devise strategies for how they will redeploy the skills being replaced by technology (Ulrich et al., 2013). It is often elementary routine tasks that are being replaced, which demands that employees receive training and development so as to ensure they can be placed in other jobs in the business value chain, hence not further placing a strain on an already over unemployed society (Colbert et al., 2016). Employees need to adapt to the changes that digital disruption brings and the human resource teams within organisations must assist them to achieve this (Ulrich et al., 2013).

From a cultural perspective, the human resource team needs to ensure that employees remain emotionally included and connected as they depend on a sense of belonging and being in control (Utesheva et al., 2016; Tyworth, 2014). This implies the strengthening of human relationships and engagement via face-to-face interactions and not solely via technology, thus creating opportunities that will encourage human collaboration and emotional connections, resulting in stronger relationships and improved wellness amongst the workforce (Mazmanian, Orlikowski & Yates, 2013). This will enable employees to embrace the new organisational culture which promotes human interaction and wellbeing while working in conjunction with the machines (Gilson et al., 2015; Butts, Becker & Boswell, 2015; Strohmeier, 2018). While there are many theories and research that specify the role and manner in which technology is disrupting the world around us, there are also many unknowns in this demanding future. The preparation needed for this future world of work by human resource teams is thus inevitable.

2.10. Robots and humans – is it a matter of complements or substitutes?

A further major consideration for human resource teams is the anxiety, fear and intimidation that employees feel in relation to the fourth industrial revolution, yet DeCanio (2016) questioned if it is a matter of machines complementing or substituting human labour. Makridakis (2017) was convinced that machines and artificial intelligence will not completely replace the human element in the labour market. Accenture (2018) supported this view and encouraged human resource teams to understand what is needed to make humans work alongside machines in order to get processes in a value chain more efficiently executed. Further, Makridakis claimed that the fourth industrial revolution is not all doom and gloom, as it has much to offer societies and organisations.

DeCanio (2016) and Makridakis (2017) both agreed that skills for the future world of work will be different to those that employees hold today, i.e. they will require more emotional skills. The World Economic Forum Report (2018) confirmed this, stating that the top five skills will be complex problem solving, critical thinking, creativity, people management and collaboration. Makridakis (2017) added that it is important to start training the youth and young scholars on artificial intelligence now, as this will begin to bridge the skills gaps. With all these massive changes and requirements in skills, Hecklau et al. (2016) noted that it is important for human resource teams to have or acquire the right competencies to enable and guide their organisation to successfully make the shift towards digitalisation. Lo et al. (2015) supported this view, claiming that human resource teams need to acquire more strategic skills to enable their businesses to transform to the digital era.

2.11. Conclusion

It is evident that technology continues to transform every aspect of our lives and the workplace is no different. In the past, technological advancements have led to increased success, productivity and job creation amongst humans (Autor, 2015). This was witnessed when the aeroplane was developed, when the telephone was designed and developed, when computers were created and when the internet was developed; these demanded new skills and created new industries and demand for labour. The success of all of these past events relied on how humans chose to react to such disruption, that

is, did they became hopeless and fearful or saw them as an opportunity and developed a first mover advantage? Over the decades and through all these disruptions, humans have reskilled themselves to remain relevant. The next phase of disruption within the fourth industrial revolution should be no different.

For an organisation to remain competitive it must rely on its human resource function to lead and direct practices when it comes to their greatest asset, their employees (Ulrich et al., 2013). In order to achieve this, the human resource team must ensure that their strategy is one that adopts and adheres to digital transformation and the trends around them. They also need to have the foresight to envisage how digital disruption will affect their world of work and ensure that practices are in place to support and enable such disruption. It can be further argued that disruption can take on many forms, thus it is imperative for human resource teams to have foresight into which areas digital disruption can occur in within their respective industries. It will be key for them to predict the competencies needed and start developing them now in order to support the future transformation. There are many unknowns in this space of digital disruption, but human resource teams must be strategically equipped to navigate this future and ensure their organisations remain competitive.

3. CHAPTER 3 – RESEARCH QUESTIONS

It is evident from the literature review in Chapter 2 that the fourth industrial revolution and digital disruption are upon us. An increase in artificial intelligence, machine learning, chatbots and robotics is bound to change the way in which work is done. Further, it is understood that people within the workforce will be affected in ways such as where they will work, how they will collaborate with each other, how people and machines will need to integrate to get processes and tasks done, and how managers will have to effectively manage and lead such diverse, dispersed teams.

Based on the literature, there is no clear examples regarding the role that a human resource team can play in proactively preparing an organisation for the fourth industrial revolution. However, the human resource function is key to driving strategic transformation in anticipation of the impact of digital disruption on the workforce and business at large, thus they should be influencing decisions and developing capability so as to ensure that their organisation can embrace the changes and ensure a smooth successful transition into the next era.

In light of the above, the fundamental question this research aimed to answer is:

"How should human resource departments strategically respond to anticipated digital disruption?"

The main research question was broken down into the following sub questions which were derived from the literature under review:

Research question 1: In what way is digital disruption likely to affect human resource strategies in the next three to five years?

Research question 1 aimed to gain comprehensive insights into the experts' knowledge base in order to anticipate what the impact of digital disruption will be and how human resource strategies will be affected and changed to make accommodation for future transformation. Further, it will highlight what the strategies should include and focus on now in order to prepare organisations to succeed in the future.

Research question 2: What are the competencies that human resource departments should develop now in order to manage and support digital disruption in the future?

Research question 2 aimed to determine if the identified competencies are aligned to the areas that are perceived will be impacted as per research question 1 above. It further hoped to establish if the appropriate skills will be available in the future to support the impacted areas, as this will create an opportunity for the experts to demonstrate strategic foresight.

Research question 3: How can human resource teams strategically transform themselves to better support their organisations with more value adding services?

Research question 3 aimed to understand what human resource teams should be changing within themselves in order to optimise digital disruption and enhance their service offering to employees and the organisation at large. It further aimed to assess what value they can add to their organisations in new and innovative ways by transforming themselves and becoming future fit for the fourth industrial revolution.

Research question 4: In what ways can the human resource profession strategically partner together to embrace digital disruption?

Research question 4 aimed to establish guidelines and options for human resources as a profession to draw together and share their experiences and knowledge as a collective, in order to proactively and strategically prepare themselves as well as their organisations to embrace and transition successfully into the fourth industrial revolution where digital disruption will be key.

It was expected that through these four research questions, common themes would emerge establishing guidelines that human resource departments can consider when preparing strategies to respond to anticipated digital disruption.

4. CHAPTER 4 – RESEARCH METHODOLOGY

4.1. Introduction

Research is a systematic and focused enquiry that reaches beyond commonly available information in order to acquire detailed knowledge, thus providing a basis for analysis and comment (Matthews & Ross, 2014). According to Bryman and Bell (2007) there are four key issues to doing research: it should be focused, not general; it must be systematic, i.e. there should be a structured, organised approach to the problem; it should uncover information that is not readily available; and it must provide a basis for analysis and comment.

This chapter will first describe the research methodology and design best suited for this study (Section 4.2), followed by the population, unit of analysis and sample size (Sections 4.3 to 4.5). Thereafter it will explain the measurement instrument and collection tool (Section 4.6), the data collection process (Section 4.7) and the data analysis process (Section 4.8). The last sections cover data validity and reliability (Section 4.9) and the research limitations (Section 4.10)

4.2. Research methodology and design

The objective of this research study was to explore the role of digital disruption in influencing and shaping human resource strategies. The phenomena under investigation, namely the role of digital disruption within the human resources function, remains in the infancy stage in South Africa. As not much research has been conducted previously, the research topic influenced the choice of method selected. This research study focussed on the views of experts in the field of human resources.

According to Saunders and Lewis (2012), in research there are four philosophies that the researcher can adopt, namely pragmatism, positivism, realism or interpretivism. Based on the definitions of these four philosophies, as well as the nature of this research study, interpretivism was deemed to be the best suited philosophy as it aimed to understand the phenomenon under study from the point of view of the human resource

experts, i.e. the social actors. According to Creswell (2003), this philosophy recognises that participants can have various interpretations and this will result in a high degree of subjectivity.

There are two main approaches to conducting research - qualitative and quantitative. Qualitative research is an approach that usually emphasises words rather than quantification in the collection and analysis of data. A qualitative methodology captures or discovers meaning through a research question, and encompasses approaches that are different from each other; it focuses on phenomena that occur in their natural setting and involves studying these phenomena in all of their complexity (Creswell, 2003). Conversely, quantitative studies are regarded as descriptive and inferential research that involve either identifying the characteristics of an observed phenomenon or exploring possible associations among two or more phenomena (Bryman & Bell, 2007). For this research study a qualitative approach was considered most suitable as it provided an opportunity to probe the "why", "what" and "how" related to the phenomena of digital disruption, as well as probing, examining and conducting a detailed investigation.

This research study adopted the inductive approach as it shifted from a specific to a general view. It started with observations, found patterns from these observations, created propositions, and finally explored and validated these propositions. In contrast, a deductive approach shifts from broad and generic to more specific conclusions. Seeing that this research study aimed to understand the views of digital disruption on human resources from the perspective of experts, it moved from a specific to a general view, therefore the inductive approach was best suited.

Research studies can be exploratory, descriptive or explanatory (Matthews & Ross, 2014). In exploratory research, the primary objective is to gain a better, deeper understanding of the problem in order to ensure a precise investigation. It seeks to discover various philosophies, insights, beliefs and thoughts. The exploratory research design is best suited for studies that require flexibility in order to explore all dimensions of the problem (Bryman & Bell, 2007). Zikmund, Babin, Carr and Griffin (2013) postulated that accessing academic literature and engaging with experts are the most common ways in which exploratory research is executed. By definition, therefore, this research was exploratory in nature.

4.3. Population

Silverman (2009) described a research population as a large group of people or objects who often have similar attributes or characteristics. They are the primary focus in a scientific inquiry who will gain some benefit from the study (Bryman & Bell, 2007). While the population for the study was all human resource professionals, the target sample population for this study was experts from four main categories, namely consultants: individuals who operate in a consulting capacity within the field of human resources and/or technology, and provide insights and direction to key stakeholders of various organisations; human resource executives: individuals who hold senior/executive positions in their organisations and lead the human resource strategy for their businesses; human resource technology managers: individuals who are responsible for driving and enabling the technology within the human resource portfolio; and digital disruption experts: individuals who investigate and track the technologies disrupting the human resource space.

4.4. Unit of analysis

In research, the unit of analysis refers to something that is being studied or analysed. In social research, the most common unit of analysis is an individual (Zikmund et al., 2013). In order to achieve the objectives for this research, the unit of analysis was the opinions of each human resource expert. Redman and Thangaratinam (2005) defined an expert to be someone who has relevant knowledge and experience on a particular topic.

4.5. Sampling method and size

Seeing that it is impractical for a researcher to reach every member of a population, they can select a subset from the population. This subset is referred to as the sample group, which provides the researcher with a controllable representation of the population (Matthews & Ross, 2014). This researcher adopted a probability sampling approach, as she used deliberate selection methods to choose the sample. These methods allowed each member of the sample group to have an equal opportunity of being selected to participate in the research. This approach created an unbiased process (Bryman & Bell, 2007; Matthews & Ross, 2014; Saunders & Lewis, 2012).

Of the few non-probability sampling methods that exist, a focus was placed on purposive and snowball sampling techniques, as these were deemed most appropriate for this study. The researcher has over 20 years of experience in human resources and technology and built up a significant network during this period, thus she used judgemental sampling to identify the first few sample members from the various groups. The participants targeted were those who had experience in solution design within this space, either through providing consulting services or working internally in organisations. The researcher came into contact with these targeted participants over the years by attending various professional gatherings such as conferences, forums and communities of practice, where the participants were speakers, attendees, discussion panellists or simply displaying their solutions or products.

Snowball sampling was adopted so that the first few members of the sample could identify other sample members (Saunders & Lewis, 2012). Snowball sampling is most appropriate when the sample for the study is very rare or is limited to a very small subgroup of the population (Matthews & Ross, 2014). While there is no prescribed sample size for non-probability sampling, the researcher aimed to target approximately 20 experts across the four categories. Table 2 below indicates the total number of participants who were contacted to participate in the research study. While the aim was to target at least 20 experts, a total of 31 participants were invited to participate.

Table 2: Sample for the research study

	Targeted sample
Consultant in the HR Field	11
HR Executive / Senior Manager	7
HR Technology Manager	5
Digital Disruption Expert	8
Total	**31**

4.6. Measurement instrument and development of questionnaires

A measurement instrument refers to the various methods a researcher can use to collect data during their research study. The two main types are primary and secondary data collection, where primary data collection is achieved by using observations, interviews or questionnaires. This research used primary data collection as the researcher gathered information for the first time (Agee, 2009; Matthews & Ross, 2014).

While measurement instruments can take on various forms, this research used questionnaires as the main instrument for data collection. The questionnaires were designed to seek the views of the sample population in relation to the phenomenon under investigation (Matthews & Ross, 2014). The Delphi technique was adopted to collect data and the questionnaires were designed for each of the three rounds of the technique. The questionnaires were used to gather biographical data on the participants, information about the level of work at which they currently operate, and their level of awareness and understanding of digital disruption technologies in the human resource space. The questionnaires consisted of a set of structured, open-ended and Likert scale questions that were not ambiguous or vague but easy to understand and capable of precise answers (Patton, 2002; Agee, 2009; Creswell, 2003).

After each Delphi round the researcher analysed the participants' responses and summarised their views and opinions. This input was used to create the questionnaire for the next round. The summaries from the previous rounds were shared with all participants at the start of the next Delphi round so they could reflect on the group's opinions, which ought to have influenced their responses to the next round of questions. The mapping of the questionnaire to the research objectives is presented in Table 3 below. The structure of the questionnaire was designed using open-ended questions to allow the experts to express their opinions as freely and openly as possible in order to gain deep insights into their thinking and knowledge. The three questionnaires used are presented in Appendices 9.4, 9.5 and 9.6.

Table 3: Research objectives and questionnaire mapping

Research objectives from Chapter 1	Questionnaire
Research objective 1: To gain insights into how digital disruption is likely to affect human resource strategies in the next three to five years.	**Delphi Round 1 Questionnaire** 1. In what way is digital disruption likely to affect human resource strategies in the next three to five years? 2. What, in your opinion, should human resource teams be doing differently to prepare for this? 3. What related questions would you like to ask the rest of the participants? Your questions will be included in the 2nd round questionnaire.
Research objective 2: To explore what competencies human resource departments will need to start developing now in order to manage and support digital disruption.	**Delphi Round 2 Questionnaire** 1. On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate to what extent your organisation is adopting technology across the various HR practices: a. Recruitment. b. Learning and development. c. Performance management. d. Core HR for transactional tasks like leave management, payslip viewing etc. 2. On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate the competency level of your HR team in relation to the following skills: a. The ability to manage change in relation to digital disruption. b. The ability to analyse data effectively. c. The ability to change and rewrite policies for digital inclusion. d. The ability to design learning and development strategies to embrace digital disruption. e. The ability to do organisational redesign in order to create new work structures that embrace and support digital disruption. 3. Finally, please could you give me your thoughts on each of the two following open-ended questions: a. Where are the skills shortages expected in your workforce in the next three to five years? b. What should your HR team be doing to prepare both your current employees and future employees to meet these skills shortages?
Research objective 3: To establish how HR teams can strategically transform themselves to better support their	**Delphi Round 3 Questionnaire** 1. With digital disruption complementing HR's delivery of services, how do you see the next generation HR function being different from today's model?

organisation with more value adding services.	2. By embracing digital disruption, how do you think HR can create value for organisations in new and innovative ways?
Research objective 4: To explore how the human resource profession can strategically partner to embrace digital disruption.	**Delphi Round 3 Questionnaire** 3. What should the HR profession be doing as a collective to enable themselves to optimally embrace the forthcoming digital disruptions?

4.7. Data gathering process

This research adopted the Delphi technique as the data gathering process. The Delphi technique uses experts, particularly in complex problems, to connect and organise views which require intuitive interpretation (Redman & Thangaratinam, 2005). The Delphi technique can consist of a number of rounds to collect data (Serretta, Bendixen, & Sutherland, 2011), however Strohmeier (2018) commented that a valid Delphi technique should have at least three iterations. The main purpose of the first iteration is to identify broad issues and themes related to the phenomenon under study, while all subsequent rounds are more detailed and specific (Redman & Thangaratinam, 2005; Seretta et al., 2011).

This research adopted a three round Delphi technique approach, which is a methodological effort to ascertain a comprehensive data set for analysis. In the first Delphi iteration of data collection, the researcher used a structured questionnaire which was used to gather biographic data from the participants. This consisted of open-ended questions related to the phenomenon under investigation, which were posted online to the experts to seek their opinions as thought leaders in the field. The researcher then analysed the responses by sorting and categorising the data, and thereafter searched for themes. These responses, in the form of themes, were then edited and circulated back to the panel of experts for review as the outputs from the first round of the Delphi process. This allowed all participants to view the comments from other experts as input into their next round of answers. The responses were also used by the researcher to create the questions for the next round.

The second phase of the data collection utilised the second questionnaire, which used the themes that emerged from round one. It contained some Likert scale questions followed by open-ended questions. This allowed the researcher to focus on a few themes from round one and probe further based on the responses received from the participants. Upon completion of round two, the researcher analysed the responses by sorting and categorising the data, after which she searched for themes. These responses in the form of themes were then edited and circulated back to the panel of experts for review as the outputs from the second round of the Delphi process. This allowed all the participants to view the comments from other experts as input into their answers. The responses from round two were also used by the researcher to create the questions for the last round.

The last phase of the data collection process involved the third structured questionnaire presented to the participants as Delphi round three. The researcher narrowed the themes from round two to be more focussed. The participants had a chance to review the thoughts and views of other experts from round two and provided their final input into the phenomenon under investigation by responding to the questions in the third round. Upon completion of round three, the researcher analysed the responses by sorting and categorising the data, following which she searched for themes. These responses in the form of themes were then edited and circulated back to the panel of experts for review as the outputs from the third and final round of the Delphi process.

A pilot study was conducted with five participants using all three questionnaires in order to ensure the questionnaires were clear and there was no ambiguity. Most importantly, the pilot study yielded insights required for a successful research output. The participants from the pilot study included human resource managers, human resource business partners, and human resource consultants. The pilot group reviewed and provided feedback on the welcome message, the consent letter and the three initial proposed questionnaires. Despite the questionnaires for round two and three being dependent on the themes that emerged from round one, the researcher had designed preliminary questionnaires. Feedback received from the pilot group were incorporated into the various documents before the actual data collection process commenced.

4.8. Data analysis approach

While quantitative research generates numeric data, qualitative research generates text data for analysis (Matthews & Ross, 2014; Saunders & Lewis, 2012). Patton (2002) and Braun and Clarke (2006) recommended thematic analysis as a method for analysing qualitative data, which involves formalised steps of organising, coding (data reduction), searching for themes, and modelling and interpreting data (Guest, MacQueen, & Namey, 2011). Organising involves the researcher getting familiar with the data across all phases, before arranging them into a meaningful manner and reading them over and over to become acquainted with the content in relation to the phenomenon under study. Coding involves applying some kind of technique, which is defined by the researcher, to reduce the text to that which is related to the research questions and aims (Braun & Clarke, 2006). These codes are arranged into themes and categories which are then modelled into interpretations that the researcher uses to illustrate findings and make recommendations (Ezzy, 2002; Guest et al., 2011).

The responses for each round were captured into a word document and every respondent was assigned with an identifier to ensure confidentiality and anonymity. Each response was analysed using the various phases of thematic analysis (Braun & Clarke, 2006, p. 87). Table 4 below explains the process followed in each phase of the thematic analysis.

Table 4: Phases of thematic analysis

Phases	Description of the Process
1. Familiarising yourself with the data	Reading and rereading the data. Capturing the initial thoughts and ideas.
2. Generating initial codes	Creating codes for interesting features of the data in a systematic approach across all data sets and collating data relevant to each code.
3. Searching for themes	This step is the start of the interpretive analysis of the collated codes. Relevant data extracts are sorted (combined or split) according to overarching themes.
4. Reviewing themes	A deeper review of identified themes follows where the researcher needs to question whether to combine, refine, separate, or discard initial themes. Data within themes should cohere together meaningfully, while there should be clear and identifiable distinctions between themes.
5. Defining and naming themes	The researcher needs to provide theme names and clear working definitions that capture the essence of each theme in a concise manner. Themes are also referred to as constructs.
6. Producing the report	Finally, the researcher needs to transform his/her analysis into an interpretable piece of writing by using vivid and compelling extract examples that relate to the themes, research questions, and literature. These are used to generate a report for analysis.

Source: Braun and Clarke (2006, p. 87)

By adopting this process the researcher could analyse the data collected from each round of the Delphi questionnaires. All raw data were captured and collated by questionnaire on a Word document while the participants' identities were kept anonymous and confidential. The researcher then read through the responses for each question and created codes that were written down on post-it notes. These codes were grouped together by being placed on flip chart paper to create themes. Themes were then given a particular name and referred to as a construct. The frequency represented the number of times a code appeared within a construct. Then, based on their frequency, the themes were ranked in descending order. In the feedback to the participants after

each round of the Delphi questionnaires, a summary of the analysis was provided. This included the rank, construct, frequency and summarised comments. For the Likert scale questions in the Delphi round two questionnaire, the data were analysed using mean scores across two segment groups, namely the HR executives and technology managers, and the HR consultants and digital disruption experts. (See Appendices 9.5, 9.6 and 9.7 for the feedback analyses shared with the participants.) The analysis from each round also assisted with designing and generating the questions for the next rounds of Delphi questionnaires.

4.9. Data validity and reliability

In quantitative studies the reliability and validity of the measurement instrument is crucial, whereas in qualitative studies it is the trustworthiness of the measurement instrument that is vital (Zikmund et al., 2013). Trustworthiness of data encompasses issues such as credibility, dependability, transferability and conformability (Guest et al., 2011). In order to ensure credibility the researcher used well-recognised, appropriate research methods. Further, tactics were employed to help ensure honesty in the participants' responses and iterative questioning in data collection dialogues (Creswell, 2010). A detailed description of the phenomenon under scrutiny will be provided. Dependability will also be addressed through well-documented, detailed processes, which will enable the research to be repeated in the future (Patton, 2002). Transferability is achieved through the provision of all background data, which includes a detailed description of the phenomenon as well as the context for the study, thus allowing comparisons to be made (Ezzy, 2002). To ensure conformability, the researcher clearly documents all beliefs, assumptions and acknowledgements of any shortcomings in the research (Patton, 2002; Creswell, 2003).

4.10. Research limitations

The key limitations of the scope and research methodology are as follows:

- Research that is qualitative and exploratory in nature is essentially preliminary as it explores concepts and ideas. For this reason, it needs to be extended to a quantitative research that will generate more dependable results (Saunders & Lewis, 2012).

- Due to the use of non-probability sampling, only a few experts were invited to participate in the research as time and money were limited. As the researcher relied on the views of a small sample of experts, their views cannot serve as the views of the larger population that is all human resource executives, human resource technology managers or human resource consultants, therefore the study's findings cannot achieve scientific generalisation (Saunders & Lewis, 2012).
- The use of judgemental and snowball sampling negatively affects the validity of data (Saunders & Lewis, 2012).
- As this was an exploratory research study, research bias may exist as such a research method is subjective and primarily reflects the views of the researcher (Saunders & Lewis, 2012).
- Even though many people were targeted and approached to participate in the research, the researcher could not guarantee maximum participation in the surveys due to the time required for them to share their insights and the multiple rounds of data collection.
- Not all the industries within South Africa were represented by the participants.

5. CHAPTER 5 – RESULTS

5.1. Introduction

Chapter 5 details the results of the research study as per the research questions set out in Chapter 3. This section explains the findings as per the analysis of data that were gathered using the online surveys. The data were collected from experts in the human resources field using the Delphi technique, which included three rounds of questionnaires. The questionnaires were designed against a consistency matrix and mapped against the research objectives and questions. The consistency matrix ensured tight alignment between the literature review, research questions, data collection methods and data analysis techniques.

5.2. Description of the sample

In order to ensure a diversity of views, the researcher segmented the sample population into four categories of experts, i.e. consultants, human resource executives, human resource technology managers and digital disruption experts.

Judgemental sampling was initially used by the researcher to identity 10 experts across the various categories. Thereafter snowball sampling was used, where the first few members in the sample identified other sample members. Finally, a targeted sample of experts was identified who were invited to participant in the three Delphi rounds. These participants, who held senior executive positions, were from various industries including financial services, automotive, FMCG, auditing and consulting. A total of 25 participants completed the Delphi round one questionnaire, 20 completed the Delphi round two questionnaire, and 20 completed the Delphi round three questionnaire. Table 5 below details the participant representation across the four different categories for each of the Delphi rounds.

Table 5: Participants for each round across the four categories

	Participants Delphi Round 1	Participants Delphi Round 2	Participants Delphi Round 3
Consultant in the HR Field	9	7	7
HR Executive / Senior Manager	6	5	5
HR Technology Manager	5	5	5
Digital Disruption Expert	5	3	3
Total	**25**	**20**	**20**

5.3. Presentation of results

A total of nine questions were asked using three rounds of Delphi questionnaires, i.e. three questions per round. These were a combination of open-ended as well as Likert scale questions. (Refer to Table 6 below for the mapping of the various questions used in each of the three rounds of Delphi.) The results will be presented below as per each question used during the three rounds of Delphi data collection. The various questionnaires used in all three Delphi rounds will be analysed and the findings will be explained using tables and text. Certain tables will indicate a rank, which shows the descending order of importance. Rank was determined by frequency, which indicates the number of times that a theme was mentioned or appeared; construct represents the overarching theme, where similar codes are grouped together; and summarised comments refers to the verbatim text of the participants, which provides a high level explanation and meaning for a particular construct.

Table 6: Questions asked during each Delphi round

Delphi Round	Questions Asked
Delphi Round One Questionnaire (Refer to Appendix 9.4 for the actual questionnaire)	1. In what way is digital disruption likely to affect human resource strategies in the next three to five years? 2. What in your opinion should human resource teams be doing differently to prepare for this? 3. What related questions would you like to ask the rest of the participants? Your questions will be included in the 2nd round questionnaire.
Delphi Round Two Questionnaire (Refer to Appendix 9.5 for the actual questionnaire)	1. On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate to what extent your organisation is adopting technology across the various HR practices: a. Recruitment. b. Learning and development. c. Performance management. d. Core HR for transactional tasks like leave management, payslip viewing etc. 2. On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate the competency level of your HR team in relation to the following skills: a. The ability to manage change in relation to digital disruption. b. The ability to analyse data effectively. c. The ability to change and rewrite policies for digital inclusion. d. The ability to design learning and development strategies to embrace digital disruption. e. The ability to do organisational redesign in order to create new work structures that embrace and support digital disruption. 3. Finally, please could you give me your thoughts on each of the two following open-ended questions: a. Where are the skills shortages expected in your workforce in the next three to five years? b. What should your HR team be doing to prepare both your current employees and future employees to meet these skills shortages?
Delphi Round Three Questionnaire (Refer to Appendix 9.6 for the actual questionnaire)	1. With digital disruption complimenting the HR delivery of services, how do you see the next generation HR function being different from today's model? 2. By embracing digital disruption how do you think HR can create value for organisations in new and innovative ways?

	3. What should the HR profession be doing as a collective to enable themselves to optimally embrace the forthcoming digital disruptions?

5.4. Results for Delphi round one

Question 1: In what way do you think digital disruption is likely to affect human resource strategies in the next three to five years?

The table below indicates the areas within human resources that the participants believe are most likely to be impacted by digital disruption in the next three to five years. In order to arrive at this table, which summarises the opinions and views of all the expert participants, the researcher familiarised herself with the participants' responses by reading and re-reading all the text. Codes were then applied to phrases of the text. The researcher then grouped similar codes into themes which were renamed constructs. Frequency refers to the number of times a construct was mentioned by the participants, while rank represents the descending order based on frequency. The summary represents a brief explanation for each construct. This table was used at the beginning of Delphi round two to provide feedback to the participants on the summarised views of all experts for question one from Delphi round one.

Table 7: Areas within Human Resources that digital disruption is likely to affect

Rank	Construct	Frequency	Summarised comments
1	Learning and Development	25	HR needs new skills to operate in the new world of work. They also need to develop the workforce to have more technical skills. Learning content must be made available in real time for just in time learning. Increase in gamification and learning will become more social. Need skills for new ways of leading and managing hybrid teams of both humans and machines.
2	Work Structures	18	There will be more flexible work structures, an increase in virtual and dispersed teams and flat non-hierarchical structures. Employment contracts will be more project- and skills-based and demand for permanent roles will

			decrease. This requires new HR policies and strategies.
3	Automation of Tasks	13	More repetitive tasks will be automated. Both blue and white colour roles will be at risk. This creates an opportunity for HR to do more value adding tasks.
4	Data and Analytics	12	Need more big data and analytics for more powerful decision making. AI needs data to run effectively. Must have inclusive data sets for decision making and recruitment. Data security and privacy will become key. Data will be used to predict employee behaviour. Data quality will be of paramount importance.
5	Recruitment	11	Recruitment will be done via mass screening; audio and nerve sensing technology will add personality traits and behaviours into the selection process. More social media platforms will be used to select candidates. Recruitment profiles within HR will change. Machines will do first round interviews whilst humans will do negotiations. When recruiting watch out for biases created through AI.
6	Performance Management	8	Performance will be enhanced through digital engagement. Organisations must manage performance combined with machines and humans. Performance management will become more agile and frequent. Skills gaps will be picked up much faster.
6	Rewards & Recognition	8	Demand for customised highly individualised remuneration packages and rewards. Top digital skills will be more in demand and difficult to retain. Will require new reward policies.
7	Increase Social Cohesion	7	Need to find a balance between what is automated and what remains face-to-face. Careful not to remove all human interactions. Employees want to still experience humanness in organisation. Ensure work and private life balance.

As per the participants, the top four areas within human resources that will be most impacted by digital disruption are learning and development, work structures, automation of tasks, as well as data and analytics. These will be discussed in greater detail below.

5.4.1 Learning and development

According to everyone in the sample group, it is anticipated that learning and development within human resources will be most impacted by the looming digital disruption. The sample group believe that human resource teams need to upskill themselves on technology and its role within the human resource function. They need to be able to better understand what capabilities these technologies offer and further how to optimise the system capabilities to add value to the organisation. They also believe that human resource teams must be able to identify the key skills needed in order for the organisation to embrace digital disruption and devise a plan for how to develop these skills and capabilities within the workforce.

Digital disruption will further impact the manner in which employees are trained and share knowledge. Emerging technologies for learning and development will change the traditional face-to-face and classroom gathering training methodologies to more virtual and online learning and development methodologies. It is further anticipated that learning through social collaboration and using gaming technologies and techniques will increase. As a result of the fast pace of change and the demand for instant knowledge and answers, learning content needs to be made available just in time and accessed anytime, anywhere on multiple devices.

The participants also believe that the competencies of current leaders in organisations will change. Due to an increase in geographically dispersed teams as well as hybrid teams consisting of both humans and machines who share the execution of processes, a new breed of leadership skills will be required. Leaders must be more agile in their approach, must manage resources based on achieving outputs, and must be able to deal with accountability when a process shared between humans and machines is not successfully executed.

5.4.2 Work structures

The participants anticipate that current work structures will be the second most impacted area through digital disruption. Emerging technologies will bring about more flexibility regarding where employees work from as well as their working hours. Participants expect that employees and teams will become more geographically dispersed, breaking down

global borders. As a result this will link to the new leadership skills required as teams will now be required to work across time zones. Co-ordinating and managing outputs for improved quality and on time delivery will become more challenging. Non-hierarchical team structures will begin to emerge.

The gig-economy will grow and employees will seek to take on multiple roles at various organisations at the same time or project-based employment at a single organisation for a period of time. This will result in a decrease in demand for permanent jobs. The anticipated changes in work structures brought about by digital disruption will dictate a revolution in organisational policies and strategies regarding how people are employed, the employment contract itself, how people are rewarded and the benefits offered.

5.4.3 Automation of tasks

The sample group anticipated that the automation of tasks will be the third most impacted area by digital disruption. While it is believed by many that lower paying jobs that are highly repetitive will be most susceptible to automation, the participants were of the belief that even jobs occupied by knowledge workers can and will be at risk. These could be roles occupied by financial, legal and medical specialists, to name just a few.

Human resource teams will also find themselves in the midst of such automation as highly transactional repetitive tasks will be automated. This creates an opportunity for them to offer more value adding services to organisations and to become more strategic in terms of growth and advancement. Participants believe that human resource teams must plan now to upskill and reskill resources within their departments who are in jobs that will be impacted by automation. By doing so they will reduce the risk of retrenchments and close the gaps for required skills in the future.

5.4.4 Data and analytics

The sample group believes that the area of data and analytics will be the fourth highest impacted area through digital disruption. New systems will create and generate more data within organisations, however the power of that data lies in how they are analysed and interpreted into meaningful insights that can be used for more effective decision

making. With an increase in data storage and consumption, the participants are of the view that the data architecture which determines how the data are arranged, processed and prepared for analytics will become of utmost significance. Further, the quality of the data will become of paramount importance.

The sample group anticipates that artificial intelligence will increasingly disrupt and transform both the human resources function and organisations at large. In order for artificial intelligence to run and operate effectively it needs access to data. In fact, the larger the volumes of data sets, the more accurate the outputs become. This will demand more inclusive data sets for decision making, especially in the recruitment of employees. Further, artificial intelligence can use data sets to predict employee behaviour, such as readiness for a promotion or the likelihood of someone leaving the organisation. This means that the data need to be of an excellent quality. Data security and privacy will also become key, hence access to data must be carefully defined using security roles, which must be constantly managed and monitored.

Besides the seven areas mentioned in the table above, other key points were also raised a few times which are worth taking note of. These are explained below:

a) *HR's ability to reform policies taking into account the changes that digital disruption will bring about*

It was mentioned that digital disruption will demand a reform of organisational policies. While existing policies focus on work structures and practices of the past, this will no longer suffice or motivate the workforce in the digital era. Policies that involve issues such as where employees are based physically and even working hours will change as employees demand more flexibility. The manner in which teams and organisations are managed on performance and outcomes will also need to be more agile, and rewards will need to be more personalised and not only financial.

b) *HR's ability to understand employee behavioural changes as well as organisational culture changes*

The sample group are of the opinion that digital disruption will bring about a change in employee behaviour; people will become less social and human resource teams will reduce their face-to-face interactions with employees. Teams will become more virtual and see each other less, and managers will need to find ways to manage resources' time and outputs when they are not visible. All of this brings about a change in human behaviour, which will impact on the organisation's culture. Employees may at first become threatened by automation and find ways and means to protect their jobs. Such fear can lead to individuals making bad decisions, which again impacts the organisational culture. Human resource teams must be able to understand the impact and changes on both human behaviour and the organisational culture in order to prepare adequately for this.

c) New industry players will spring up overnight and start-ups will be quick, agile and technologically driven

Emerging technologies have the power to give rise to new business. Often these new start-ups are prone to technology and are agile in their approach and thinking. As such, they are quick to make decisions and changes and adapt rapidly in order to be successful. New industry players with this DNA can be a massive threat to larger, older organisations that cannot change and respond to such threats in a nimble manner. The market share of traditional older organisations will then be at risk of shrinking.

After seeking to gain insights into the areas that the sample group thought will be most impacted by digital disruption in the next three to five years, the researcher aimed to understand what human resource teams should be prioritising and where they should focus their energies in order to prepare their organisations for the anticipated digital disruption. This was achieved in question 2 of the Delphi questionnaire for round 1.

Question 2: What, in your opinion, should human resource teams be doing differently to prepare their departments and organisations for this digital disruption?

The table below indicates the tasks that human resource teams should focus on as their top priorities in order to prepare their departments and organisations to embrace digital disruption. In order to arrive at this table which summarises the opinions and views of all the expert participants, the researcher familiarised herself with the participants responses by reading and re-reading all the text. Then codes where applied to phrases of texts to obtain constructs, frequencies and summarised comments. This table was used at the beginning of Delphi round two to feedback to the participants the summarised views of all experts for question two from Delphi round one.

Table 8: Top priorities for human resources to prepare themselves and their organisations for the looming digital disruption

Rank	Construct	Frequency	Summarised Comments
1	Developing skills	15	They should focus on developing digital skills across HR teams and the broader organisation. Teach the employees to unlearn in order to relearn and continuously learning. Revolutionise training strategies to accommodate digital disruption as well as new technologies and ways of learning.
2	Manage change and lead transformation	13	Pro-actively embrace and manage change, became change fit. Manage and define a new culture that digital disruption brings about. Think about changes across HR practices and redefine strategies.
3	Become more customer centric	6	Get closer to the internal customers, understand your business intimately and your external customers. Place people back in the centre of the HR function. Bring back the humanness.
4	Change operating models	5	Influence a change in organisation and HR operating models to embrace technology. Move from traditional models to digital enabled models and flattened reporting structures. Transform from

			empowered leaders to empowered self-led employee structures.
5	Understand and embrace technology	4	Have an in-depth knowledge of the technology advances. HR should leverage technology in their function and prioritise HR systems if not already in place.
5	Improved use of data	4	Structure, organise and manage data more effectively. Analyse data for better informed decision making. It is the basis for everything else.

The top four tasks identified as high priority focus areas were developing skills, managing change and leading transformation, becoming more customer centric and change operating models. These will be discussed in greater detail below.

5.4.5 Developing skills

The area that the sample group thought was most important for human resource teams to focus on was developing skills. The teams should prioritise developing skills at two levels, namely in the human resource teams themselves and then for all employees across the organisation. The participants cited that it is of utmost importance for human resource teams to focus on developing their own skills and competencies in order to adequately prepare for digital disruption. This focus should be on gaining more and deeper insights into technology that supports the human resource function and their business. In order to optimise the functionality of such technology, a human resources team needs to fully understand its capabilities and map these to the business requirements. Further, they need to understand data analytics in order to translate the information from the human resource systems into insights that can be used to consult with business in order to become valuable partners with strategic intent. The human resource team should be at the forefront of the latest technologies; they should actively engage with their business leaders, digital leaders and strategy officers, amongst others, to understand what the likely disruptors to their industries will be, as well as the likely response of the organisation to these disruptors.

Next, human resource teams need to focus on developing skills amongst employees across the business. They need to create more awareness about disruptive technologies and the disruption that such digitisation can create within their businesses and industries.

They should further develop basic technical skills across all employees and encourage employees to find ways to continuously develop themselves and gain new knowledge. It was also stated that the way in which the human resource teams offer training to employees should change as well, i.e. more online training should be made available compared to traditional classroom training.

5.4.6 Managing change and leading transformation

Human resource teams should themselves proactively embrace and manage change and became change fit. Thereafter, they need to prepare their organisation to do the same. A big part of this transformation is to manage and define the new culture that digital disruption brings about. This demands not only an elementary change initiative but also a significant culture shift, as digital disruption will bring about massive reforms across various elements like organisational policies and organisational structures, as well as products and services that are designed and developed for customers. This will require human resource teams to begin to think about changes across the various human resource practices and to redefine strategies.

5.4.7 Becoming more customer centric

Many participants stated that there should be a relentless focus on client centricity as this will become key to gaining competitive advantage. Human resource teams need the ability to flex and scale to meet client demand, which will be crucial in order for the function to remain relevant. Further, they must gain a solid understanding of their market and stay abreast of workforce trends. They should focus on developing long term, sustainable relationships by collaborating with clients and developing advanced workforce solutions. While disruption has the potential to create more distance between people, it is imperative for human resource teams to focus on placing people back at the centre of equation.

There needs to be a focus on clients both internally and externally. While clients all seek to receive highly individualised personalised solutions to their requirements, technology is automating processes and freeing humans up to create and offer those highly personalised experiences. Human resource teams should be exploiting this model and then encouraging the business do the same. Customers no longer want a generic

solution, thus new ways to optimise technology must be sought in order to create unique solutions for customers. If this approach is not adopted by human resource teams, they will become irrelevant to their businesses; if they do not assist their organisations, they too will become obsolete and irrelevant to their customers.

5.4.8 Change operating models

Human resource teams should co-create strategies for future fit organisations by being involved in discussions on digital disruptors, a digital strategy, and the digital transformation of the organisation and how this is likely to affect the work, workers and the workplace. Human resource teams should work closely with IT teams to relook the systems in place for workers and the typical HR practices. Human resource teams should ensure that they themselves are upskilled/reskilled to be digitally fluent and comfortable to work with and adopt technologies. Lastly, human resource teams should challenge themselves to think differently about people practices and to think outside the compliance policies and practices, e.g. what should personalised remuneration look like, why are total cost to company packages with compulsory medical aid packages still in use, how can personalised performance management practices be incorporated, how can career experiences be created, are flexible work practices truly in place (work is done at the time and place of the employees' choice), how will the organisation engage with and manage off-balance sheet workers?

Besides the six high priority focus areas mentioned in the table above, other key points were also raised a few times which are worth taking note of. These are explained below:

a) *HR teams should understand the biases that artificial intelligence can bring about when doing recruitment*

Thought must be given to the ethical standards that digital disruption may affect. In order for artificial intelligence to function it requires pre-programmed algorithms that are written and developed by humans. This creates opportunities for unconscious biases to exist within the algorithms that may be displayed in the output of the algorithm that are not fair and objective in the process they are executing. Further, in order for artificial intelligence to generate results that have high validity, it is dependent on data sets; the larger the data set, the more valid the artificial intelligence output. Such an example may exist in

recruitment within the South African context when pre-screening candidates using artificial intelligence algorithms. For example, a previously disadvantaged candidate who is not adequately represented in a data set that the AI algorithm uses during the recruitment process may be a suitable person for the job, but is not advanced to the next step of the recruitment process because the algorithm could not identify them as suitable from the data set it accessed to shortlist the candidates. It is key, therefore, that human resource teams be aware of and monitor such biases.

b) They should understand complexity and adaptive systems in more detail

The concept of digital disruption needs to be deconstructed in terms of meaning and implications. Human resource teams also need to unlearn old redundant ways of working, including redundant theories, mental models and mind-sets. Human resource teams need a better understanding of complexity and complex adaptive systems so they can begin to consider how and where they add value. Human resource teams also need an entirely new skill set to navigate organisations in this new world.

c) Respondents made comments around the role of government in preparing for digital disruption

A few participants believed that government has a significant role to play in preparing the economy for the looming digital disruption in the workplace. They should also ensure that universities and schools are teaching the correct skills to the future workforce in order to ensure that skills gaps for the fourth industrial revolution are limited. It was also cited that digital disruption should perhaps influence policies. If a business understands how to adequately prepare itself to embrace anticipated digital disruption, they may be able to lend a helping and teaching hand to the government and public sector.

5.5. Results for Delphi round two

After gaining insights into the areas that the sample group thinks will be most impacted by digital disruption in the next three to five years, as well as how human resource teams should be prioritising and where they should focus their energies in order to prepare their organisations for the anticipated digital disruption, the researcher's next aim was to gain insights into the competencies the human resource teams should start developing now

in order to manage and support digital disruption in the near future. This was achieved through the Delphi questionnaire for round two. All the participants' responses from Delphi round one were summarised and shared with the participants at the start of round two. This was done so the participants could reflect on the responses from all other experts before providing input into the questions in Delphi round two.

From Delphi round one it was evident that four human resource practices will be highly impacted by digital disruption, i.e. recruitment, learning and development, performance management and transactional HR processes, which the researcher refers to as core HR. Using a Likert scale, participants had to rate on a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, how many of these practices are automated within their organisation or their clients' organisations.

Question 1: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate to what extent your organisation/your clients' organisations are adopting technology across the various HR practices

These were the collective responses from all 20 participants. The researcher grouped the HR Executives and HR Technology Managers together (10 participants in total for this group) and then grouped the HR Consultants and Digital Disruption Experts together (10 participants in total for this group). The table below shows the mean score for each HR practice across the two groups.

Table 9: Summarised mean scores for the two groups for human resource practices that are automated

HR Practice	HR Executives & HR Technology Managers - Mean Ratings	HR Consultants & Digital Disruption Experts - Mean Ratings
Recruitment	5.5	6.0
Learning & Development	6.5	6.8
Performance Management	5.5	6.2
Core HR	8.1	8.3

The table above shows the mean scores for the two groups across the four human resource practices. There is alignment between how the two groups view the degree to which each practice is automated. Further, from Delphi round one it was seen that learning and development will be the area within human resource that is most impacted, and it scores highly as being automated to a great extent. This means that organisations are indeed focusing on automating the right human resource practices. Despite having a view of the average scoring across these practices, the researcher thought it was also important to gain insights into how each participant rated these four practices. Table 10 below is used to illustrate each score. The row "scale" represents the rating from 1 to 10 and the row "frequency" indicates how many participates rated this practice on this scale. Column "mean" is the mean score for that practice.

Table 10: Detailed mean scores, for HR executives and HR technology managers, for human resource practices that are automated

	HR Executives and HR Technology Managers – Frequency = 10											Mean
Recruitment	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**5.5**
	Frequency	-	1	1	-	4	1	1	2	-	-	
Learning & Development	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**6.5**
	Frequency	-	-	1	1	1	1	2	4	-	-	
Performance Management	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**5.5**
	Frequency	1	-	-	2	2	1	2	2	-	-	
Core HR	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**8.1**
	Frequency	-	-	-	-	2	-	1	1	4	2	

From the table above it is evident that eight of the participants are working at organisations which have automated these four practices to an extent that is equal to or higher than the mean, while two of the participants are working at organisations which have automated these practices below the mean score. This is indicative that there are still some organisations that have not yet caught onto digital disruption and many of their human resource practices are still extremely manual. It is encouraging to see that seven of the participants are working at organisations that have their core transactional human resource practices highly automated, with two of these organisations being fully automated in this area. Further encouragement can be found in the practice that is anticipated to be most impacted by digital disruption, namely learning and development, where seven of the participants are at organisations that have automated this practice to an extent that is equal to or above the mean score.

Table 11: Detailed mean scores, for HR consultants and digital disruption experts, for human resource practices that are automated

	HR Consultants & Digital Disruption Experts – Frequency = 10											Mean
Recruitment	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**6.0**
	Frequency	-	-	-	2	4	1	-	2	1	-	
Learning & Development	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**6.8**
	Frequency	-	-	-	-	1	4	2	2	1	-	
Performance Management	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**6.2**
	Frequency	-	-	1	1	2	1	2	3	-	-	
Core HR	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**8.3**
	Frequency	-	-	-	1	-	-	1	3	1	4	

From the table above it is clear that a fair amount of automation is being used across the various HR practices, with core HR having the most automation while recruitment and performance management have the least. The HR Consultants and Digital Disruption Experts groups rate that the recruitment practice is fairly automated, with some clients enjoying highly automated practices in this area while almost half of the participants claim that their clients have automated this practice below the mean. Approximately half of the participants claim that their clients have automated the learning and development practices above the group's average. This is rather encouraging, as from Delphi round one we know that the sample group rates learning and development as the human resource practice to be most impacted by digital disruption. This implies that many of the clients are well aware of future disruption and are preparing for this adequately. Approximately half of the participants rate that their clients have automated performance management practices above the groups' average, while many rate that their clients have highly automated core human resource practices.

Question 2: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate the competency level of your HR team/your clients' HR teams in relation to the following skills.

These were the collective responses from all 20 participants. Again, the researcher grouped the HR Executives and HR Technology Managers together (10 participants in total for this group) and the HR Consultants and Digital Disruption Experts together (10 participants in total for this group). The table below shows the mean score for each human resource competency across the two groups.

Table 12: Summarised mean scores for the two groups for human resource competencies

HR Competency	HR Executives & HR Technology Managers - Mean Ratings	HR Consultants & Digital Disruption Experts - Mean Ratings
Ability to manage change	4.8	3.0
Ability to analyse data	5.1	3.5
Ability to change and rewrite policies	5.0	2.7
Ability to design learning & development policies	5.1	3.4
Ability to do organisation redesign	4.7	2.9

From the table above it is evident that the mean ratings between the two groups differ; the HR Executives and Technology Managers rated themselves as having a competency level of between 40% and 50% across all five HR dimensions, while the HR Consultants and Digital Disruption Expert group rated the HR teams as having a competency level of between 20% and 35% across all five HR dimensions. These low ratings from both groups pose a concern and challenge for the successful adoption of and transition to digital disruption within organisations.

Despite having a view on the average scoring of competencies across these five HR dimensions, the researcher thought it was also important to gain insights into how each participant rated these competencies. Table 13 below is used to illustrate each score. The row “scale” represents the rating from 1 to 10, the row “frequency” indicates how many participants rated this practice on this scale, and the column “mean” is the mean score for that practice.

Table 13: Detailed mean scores, for HR executives and HR technology managers, for human resource competencies

	HR Executives and HR Technology Managers – Frequency = 10											Mean
Ability to manage change	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**4.8**
	Frequency	1	1	-	1	5	1	-	-	-	1	
Ability to analyse data	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**5.1**
	Frequency	1	2	-	-	3	1	1	1	1	-	
Ability to change and rewrite policies	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**5.0**
	Frequency	1	1	-	1	3	2	1	1	-	-	
Ability to design learning & development strategies	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**5.1**
	Frequency	1	1	2	-	-	2	2	2	-	-	
Ability to do organisation redesign	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**4.7**
	Frequency	1	-	3	1	2	1	1	1	-	-	

As per the table above, the ability to manage change and to do an organisation redesign was rated the lowest, while the group rated the ability to analyse data, change and rewrite policies, and design learning and development strategies as being average with a mean score of five. It is apparent, therefore, that there are participants who believe that their organisation has very low competencies in these key dimensions, while just one participant believes their human resource team is excellent in managing change and has a high ability to analyse data.

Table 14: Detailed mean scores, for HR consultants and digital disruption experts, for human resource practices that are automated

	HR Consultants & Digital Disruption Experts – Frequency = 10											Mean
Ability to manage change	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**3.0**
	Frequency	2	3	2	1	2	-	-	-	-	-	
Ability to analyse data	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**3.5**
	Frequency	2	2	1	2	1	2	-	-	-	-	
Ability to change and rewrite policies	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**2.7**
	Frequency	3	2	3	1	-	-	1	-	-	-	
Ability to design learning & development strategies	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**3.4**
	Frequency	3	2	2	-	-	2	-	1	-	-	
Ability to do organisation redesign	Scale	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**2.9**
	Frequency	4	1	3	-	1	-	-	1	-	-	

From the table above it is evident that the human resource competencies across all five dimensions received low mean scores of between 2.7 and 3.5. This implies that the HR Consultants and Digital Disruption Experts group believe that there is a lack of skill in their clients' human resource teams for these dimensions. From the groups' ratings it is evident that only one participant rates their clients' ability as being high to design learning and development strategies and to do an organisation redesign. The average ratings for each dimension from the two tables above all indicate large differences between how the two groups, namely the HR Executives and Technology Managers group and the HR Consultants and Digital Disruption Experts group, rate these five competencies.

After gaining insights into the competencies the human resource teams should start developing now in order to manage and support digital disruption in the near future, the researcher aimed to get a deeper understanding of the skills shortages expected in the workforce over the next three to five years. Further, the researcher wished to understand how organisations can adequately prepare their current and future workforce to overcome this shortage. This was achieved in questions 3a and 3b of the Delphi questionnaire for round two.

Question 3: Finally, please could you give me your thoughts on each of the two following open-ended questions:

3a. Where are the skills shortages expected in your workforce/clients' workforce in the next three to five years?

The table below indicates the number of times a particular theme was mentioned. In order to arrive at this table which summarises the opinions and views of all the expert participants, the researcher familiarised herself with the participants responses by reading and re-reading all the text. Then codes where applied to phrases of texts to obtain constructs, frequencies and summarised comments. This table was used at the beginning of Delphi round three to give the participants feedback on the summarised views of all experts for question three a) from Delphi round two.

Table 15: Skills shortages expected in the workforce over the next three to five years

Rank	Construct	Frequency	Summarised Comments
1	Complex problem solving	12	With this skill we will be able to solve near-impossible problems. In a fast changing world, problems are starting to evolve. We need to develop the mental elasticity to solve problems we have never seen before.
2	People management	8	We need more equipped leaders who can manage diverse teams including a hybrid of people and machines and those who are more agile.
2	Analytical skills	8	A key feature of the fourth industrial revolution is that mass standardisation is being replaced with mass customisation. We will also need the ability to use data effectively through intense analysis.
3	AI and Robotics programmers	7	Technical skills needed to be able to manage and use disruptive technologies to enhance business strategies. Digital skills sets needed to manage product and services online for a hyper-personalised platform driven business.

4	Creativity	6	The ability to design for bespoke customer requirements.
5	Change and culture management	5	Not only do we need to manage change through digital transformation, but an organisational culture transformation is also required.
5	EQ	5	We need to develop intense emotional intelligence skills in humans as this is what will differentiate them from the machines and give them a competitive edge in the organisation.
6	Critical thinking	4	The ability to think at a more complex level to resolve problems at an eco-system level and not in an individualistic manner.
7	Customer centricity	3	We need to have an intense ability to look for ways to help customers and this means we need to step into the minds of users. We need to think about what they value and what their fears and dislikes are. Your company's edge will rely on this information to develop new products.

The table above illustrates that the four most critical skills shortages across industries as anticipated by the sample group will be complex problem solving, people management, analytical skills, and artificial intelligence and robotics programmers. As business structures and customer demands become more complex and systems of work become more complicated, the ability to solve complex problems will become key. Further, the ability to apply judgement and to make quick decisions which are calculated will give organisations their competitive edge. With teams comprising of both machines and humans, effective management of outputs across hybrid teams will become imperative. Accountability amongst all team members, including machines, will become of paramount importance.

3b. What should your HR team/clients' HR team be doing to prepare both your current employees and future employees to meet these skills shortages?

The table below indicates what can be done to develop current and future employees in order to close the anticipated skills gaps for the future. This table was used at the beginning of Delphi round three to feedback to the participants the summarised views of all experts for question 3b) from Delphi round two.

Table 16: Potential initiatives to close the future skills gaps

Current Employees	• Create opportunities for employees for develop a growth and continuous learning mind-set. • Encourage online training and gamification initiatives to promote skills required in the future. • Expose employee to the core concepts of digital transformation by using virtual learning. • Learning programmes internally should immediately shift from the big compliance focus as it currently is, to a digital competency building focus. • Organisation policies need to change to encourage and reward innovation and digital disruption in our ways of work.
Future Employees	• Create innovation circles that promote digital disruption. • Develop university partnerships to advise and inform curricula design for future skills shortages. • Promote graduate programmes that target the development of skills needed for the future. • Host webinars and events to educate students and promote the skills needed to support digital disruption. • Host hackathons to promote the skills needed to support digital disruption.

Current employees

The sample group believes that the best way to develop current employees within an organisation is to help business leaders develop the ability to plan accurately for what skills will be needed and when, then find ways to obtain these skills either through developing existing employees or acquiring new employees who possess these skills. The next aim is to retain them, as such skills will be in high demand across various industries. Further, it was mentioned that human resource teams should create radically new employment and work models that will encourage cross pollination of skills and ideas and not restrict employees to a single functional area or business segment. Current employees should also be exposed to the core concepts of digital transformation by using virtual and online learning, thus encouraging and fostering employees to create a growth and continuous learning mind-set. However, it was cautioned that with open learning platforms and categories, human resource teams must curate content and learning experiences to cover these skills shortages in the context of individuals' job roles. Organisations must create an environment for their employees to build the skills that they anticipate will be in short supply; experiential learning can play a big role. This can also be achieved through the promotion of online training and gamification initiatives,

which stimulate learning at scale to help employees acquire the new skills required in the future. Internal learning programmes should also immediately shift from a compliance focus to a digital competency building focus, while organisational policies need to change to encourage and reward employees for innovation and digital disruption ideas in everyday work routines.

Future employees

The sample group believes that taking future employees into consideration is a good way to proactively prepare to close upcoming skills gaps. They recommend that organisations encourage innovation through innovation circles and related interventions to get outside-in innovation going, with a view to driving a relentless focus on client service and higher purpose. This can help organisations bridge the skills gap and reduce youth unemployment and unemployment in general. It is imperative for organisations to create university partnerships and interventions to advise on and design courses for future skills shortages. They should particularly focus on graduate programmes that target the development of skills required in the future. Hosting webinars and events where these skills are being taught currently, becoming involved in community programmes and hosting hackathons to promote the skills required and attract new employees that have these skills are also useful ideas. Organisations thus need to create innovative ways to generate ideas and not stick to their traditional approaches. They must further develop the ability to create evolving plans for the imagined workforce of the future and the skills required, conduct an internal and market place skills audit, and then develop a plan to build, buy or borrow these skills. Human resource teams must play a vital role in leading this and thus add strategic value to the growth of their organisations.

5.6. Results for Delphi round three

After gaining insights into the level of automation of human resource practices, the competencies that human resource teams should start developing now in order to manage and support digital disruption in the near future, and what focus should be placed on current employees and future employees to adequately equip organisations for the fourth industrial revolution, the researcher's next aim was to gain insights into how human resource teams can strategically transform themselves to better support their

organisations with more value adding services. This was achieved through the Delphi questionnaire for round three. All the participants' responses from Delphi round two were summarised and shared with participants at the start of round three. This was done so the participants could reflect on the responses from all the other experts before providing input to the questions in Delphi round three.

Question 1: With digital disruption complementing the HR delivery of services, how do you see the next generation HR function being different from today's model?

The table below indicates the number of times a particular theme was mentioned. In order to arrive at this table which summarises the opinions and views of all the expert participants, the researcher familiarised herself with the participants responses by reading and re-reading all the text. Then codes where applied to phrases of texts to obtain constructs, frequencies and summarised comments. This table was used to provide feedback to the participants as the summarised views of all experts for question one from Delphi round three.

Table 17: Functional focus for the next generation human resource model

Rank	Construct	Frequency	Summarised Comments
1	More strategic enablement	17	Future HR teams will focus on becoming more strategic partners and business enablers who earned their seat around the executive table. Transactional processes will be automated, reducing the size of HR teams and administrative skills. They will become more proactive and less reactive in their solutions to business.
2	Increased digitised solutions to drive self-service	15	More transactional repetitive HR processes will be automated. This will result in highly individualised personal solutions for employees. More self-driven solutions. Managers will become more active in people management as systems enable these processes.

3	Focus on specialised HR skills, less generalised skills	12	HR teams will become less generalised in their skills set as systems will automate these general tasks and processes. Teams will focus on more specialised skills like culture, employee engagement, organisational design, and learning and development.
4	Data driven HR	11	HR teams will rely on data in order to make more informed decisions. They will acquire and develop more analytical skills in order to interpret the data. They will also use this data for predictive analytics in order to provide for proactive business solutions. More involved in trend analysis to solve problems.
5	Reduced face-to-face employee engagement	6	As teams become more dispersed and virtual, and as processes are automated, the need for face-to-face interactions with employees will reduce. HR teams will become more hands-off. Where interactions are required, employees will be referred to chatbots for resolution and a human will be the last resort.

The table above lists the five ways, as viewed by the sample group, in which the current human resource teams of today will change and transform themselves and their operations. These are discussed in detail below.

5.6.1 More strategic enablement

Human resource teams will become less transactional and more strategic in their approach. As they increase their business acumen and gain more insights into how their business operates in order to be competitive and profitable, they will be included in strategic discussions and will guide and contribute to the overall organisational strategy. This will earn them their rightful seat at the table. They will also help their organisations remain relevant and competitive by enabling the talented workforce they have. They will remove the highly manual intensive administrative processes, allowing them to become strategic business partners. Finally, they will provide more proactive than reactive support to the business.

5.6.2 Increased digitised solutions to drive self-service

Human resource teams will automate most of the transactional processes across all practices, and will seek to digitalise all administration and repetitive tasks through investment in technology. This will free them up to focus on strategic business enablement, while processes will become more transparent through digitalisation. While automating these processes, a more self-service driven approach will be achieved with both employees and managers. As a result, line managers will take more accountability and responsibility for managing their teams, while human resource teams will use such technology to drive guidance and frameworks for all these processes. Automation will allow for agile flexible work requirements and employees will take ownership and drive their own learning and development requirements while defining their career paths.

5.6.3 Focus on specialised human resource skills, less generalised skills

Human resource teams will become smaller but more specialised in their skill sets; general human resource skills will be automated and replaced with technology. Specialised skills will include competencies in driving and embedding culture, change management and transformation, learning and development, organisational design, human behaviour trends, data analytics and analysis. These specialised skills were also mentioned in Delphi round 1 and rated in Delphi round 2. Human resources teams will use artificial intelligence and augmented reality to assist them with scenario planning and problem solving.

5.6.4 Data driven human resources

Human resource teams will become more data centric in their approach to decision making. With more processes being automated and larger data sets becoming available, teams will be able to do more analysis and turn this data into information and insights for problem solving. They will also now be able to make more accurate decisions while using data to predict future behaviours of employees and the impact on the organisation, and take proactive steps where necessary. This will enable them to make quantifiable arguments and increase their credibility when involved in strategic debates and discussions. This will mean that human resource teams need more data analytics skills.

5.6.5 Reduced face-to-face employee engagement

By automating transactional tasks and creating more self-driven user platforms and solutions, it is anticipated that human resource teams will reduce their face-to-face interactions with employees. With teams also becoming more dispersed and virtual, the human element may be removed and human resource teams may become more hands-off. Issues which will require personal attention may be routed and directed first to chatbots for resolution, with humans being the last point of resolution. While this approach is quicker and reduces time to resolve queries while maintaining consistency in the responses provided for similar questions, the sample group cautioned that this can lead to an increase in unionised environments, i.e. employees who feel they are not getting sufficient attention from their human resource teams might turn to unions to assist them resolve their people related matters. This can cause and create more problems for an organisation.

Question 2: By embracing digital disruption, how do you think HR can create value for organisations in new and innovative ways?

The table below indicates the number of times a particular theme was mentioned. In order to arrive at this table which summarises the opinions and views of all the expert participants, the researcher familiarised herself with the participants responses by reading and re-reading all the text. Then codes where applied to phrases of texts to obtain constructs, frequencies and summarised comments. This table was used to provide feedback to the participants as the summarised views of all experts for question two from Delphi round three.

Table 18: New innovative ways in which human resources can add value to an organisation

Rank	Construct	Frequency	Summarised Comments
1	Show greater return on investment	13	HR can now use technology to do recruitment in a shorter time, more globally and with a higher degree of accuracy. They can match candidates more closely to a job, reduce turnover and increase retention and job fit. Training initiatives can also be aligned more closely to the need with better

			data in place. Costs are reduced by automating manual processes.
2	Highly personalised individualised solutions	11	HR can replace standard processes with standard data models to offer employees more flexible processes that suit their work requirements and needs. Can also offer more mobile applications for ease of use and completing various HR tasks.
3	Use of predictive analytics	8	The use of more technology, data and artificial intelligence in HR practices will allow for capability in predicting employee behaviour and requirements. Predictive analytics can support HR teams to proactively identify problems and solutions.
4	New hybrid teams	7	With the integration of machines into the workplace, HR teams have the ability to design innovative models to blend outputs of machines and humans to create more competitive advantages for an organisation. Such opportunities never existed on this scale and magnitude before.
5	Real time data	5	With systems storing much more data, and if this data are designed and architected correctly across multiple systems, the opportunity for real time data in decision making is prime. Further, data and content for learning can be easily accessed on the job to support problems and queries in real time.

The table above lists the five ways, as viewed by the sample group, in which the human resource teams can add value in new and innovative ways to their organisations by using and embracing digital disruption. These are unpacked and discussed in detail below.

5.6.6 Better return on investment

With technology in place, human resource teams can produce better return on investment models and calculations, which they often struggled to do in the past. Costs for the use of technology to automate human resource processes across various practices will decrease, allowing for more automation of manual processes. This will

certainly reduce the costs and expenses that human resource teams currently carry. With virtual teams being promoted through technology, work that can be performed remotely or offsite could be done by talented employees from other parts of the world without the added cost of relocation. Recruitment practices can become more agile, flexible and quick, further offering a higher degree of accuracy in matching a candidate to a job. This will increase retention and reduce turnover.

Technology will also allow for concentrated personalised learning and development opportunities for employees. Now, instead of human resource teams anticipating what training employees need, more targeted individualised training can be sourced based on individual needs which will ensure high returns on training budgets. Employees can also be more easily connected with initiatives that drive creativity and innovation. The focus must be on teaching employees “how to learn” and not “what to learn” as the option for MOOCs (massive open online courses) become more of a mega trend. Human resource teams can also use data to do scenario planning with more accurate cost benefit analyses as a result.

5.6.7 Highly personalised individualised solutions

With the use of technology within human resources, employees can be offered more personalised individualised solutions from a work-centric perspective. This can be achieved by replacing standard processes with standard data models to offer employees more flexible processes that suit their work requirements and needs. These solutions can be made with the increased use of mobile applications that offer ease of use, anytime and anywhere, for the employees. This will ensure an improved employee experience and drive increased engagement, enabling human resource teams to become custodians of people and put humans back at the centre of solution design. This is certainly bound to transform the narrative of work, the workforce and organisations as workplaces.

By embracing digital disruption, human resource teams can create value for their organisations by introducing different types of talent models, such as the gig-economy, reduced fixed term employment and crowdsourcing, to name just a few. Further value can be created for organisations by considering whether work should be done onsite or offsite, and developing a connected workplace through, for example, the Internet of

Things, collaboration communication tools, and so on. The redesign of work, workforce and workplace inevitably leads to the transformation of new ways of working, engaging, managing, flexible work arrangements, personalised rewards and customised career experience. Human resource teams must also identify and create jobs that do not exist currently.

5.6.8 Use of predictive analytics

Human resource teams can now generate rich insights about the workforce, which can be used by leaders to make more informed, data-driven decisions about the workforce. A connected workplace could also provide human resource teams with predictive analytics and easy, more secure access to information. With the increased use of artificial intelligence and data sets, more accurate predictions can be made regarding employee requirements and behaviours. As such, human resource teams can now proactively diagnosis potential employee-related problems for the organisation and design suitable, accurate solutions.

5.6.9 New hybrid teams

With the introduction of automation and machines into the workplace, human resource teams now have to manage the integration of hybrid teams. Such teams have both machines and humans completing tasks and processes to ensure productivity and outputs for an organisation. Human resource teams have to drive collaboration of these hybrid teams to ensure the machines and humans work collectively to achieve a common goal and not against each other. This requires them to use technology in process efficiency to augment employee capability, and that they coexist and work together to harness optimal results. This demands that new work models and rewards strategies be put in place, i.e. human resource teams must shift from being process designers to experience architects for these hybrid teams, including the line manager.

5.6.10 Real time data

As technology becomes more prevalent in organisations, more data are created and stored. Often these data sets for human resources are stored across multiple systems and need to be brought together for more effective, accurate decision making. This empirical data can be used for real decision making as and where events occur. It further

reduces the need for leaders to apply judgement and subjectivity, especially where data exist and are readily available for timeous decision making. This speeds up the decision making process and offers more agile approaches. Data for on the job learning support can also be made available, allowing employees to make more accurate decisions when placed in a situation where customers require immediate solutions or answers.

After gaining insights into how human resource teams can strategically transform themselves to better support their organisation with more value adding services, the researcher's next objective was to gain insights into how human resources as a profession can collectively partner to share experiences and knowledge in an attempt to better support their organisation and industries with digital disruption. This was achieved through question three.

Question 3: What should the HR profession be doing as a collective to enable themselves to optimally embrace the forthcoming digital disruptions?

The table below indicates the two main ways in which the sample group thought that the human resource profession can collectively optimally embrace digital disruption. In order to arrive at this table which summarises the opinions and views of all the expert participants, the researcher familiarised herself with the participants responses by reading and re-reading all the text. Then codes where applied to phrases of texts to obtain constructs, frequencies and summarised comments. This table was used to provide feedback to the participants as the summarised views of all experts for question three from Delphi round three.

Table 19: Collective engagement areas for human resources as a profession to optimise digital disruption

Learning and upskilling	• HR professionals need to read more. They need to gain a greater understanding of what is happening within their industry and global trends. • They need to become more tech savvy, get invested in technology and understand data and analytics. • They need to gain greater business acumen in order to better support their business. • They need to stop playing the victim and wait for permission to innovate; go out and learn the new trends, become

	knowledgeable and implement solutions that will add value to the business. • Learn and understand what customer trends are in their industry and globally. • They require continuous development and a growth mind-set.
Collaborate and share	• HR professionals need to collaborate and share more with each other as they learn and acquire new knowledge or gain new insights through experience. • They can leverage existing forums or create new communities of practices or similar platforms where such learning and sharing can be encouraged. • Standard generic processes should be created and shared amongst the profession for input and reuse. This can include learning content as well, such as health and safety and HIV courses. • Those professionals who are ahead of the curve when it comes to digital disruption must share their experiences and help those behind them in the journey to succeed and prevent repeating mistakes. • The HR profession should conduct more research in the space of digital disruption in the context of South Africa and use the findings to assist them to create appropriate strategies.

5.7. Conclusion

The results of the questionnaires used during the three rounds of Delphi were discussed in this chapter. As each of the questions were assessed and analysed, emerging themes in the form of constructs were supported by the existing literature on digital disruption as per Chapter 2. Furthermore, new themes, insights and findings emerged that supported and contributed to the phenomena under investigation. In the following chapter, the results and research findings from this chapter will be discussed in more detail and a proposed framework to guide human resource teams to strategically respond to the anticipated digital disruption will be presented.

6. CHAPTER 6 – DISCUSSION OF RESULTS

6.1. Introduction

In Chapter 6, the research findings are discussed in detail in the context of the literature presented in Chapter 2. The insights gained through this research study are compared and contrasted with the literature arguments in an attempt to answer the research questions presented in Chapter 3. The research findings enhance the understanding of the main aim of this investigation, namely: **How should human resource departments strategically respond to anticipated digital disruption?**

In order to address the overarching aim of this investigation, four research questions were answered using three rounds of Delphi questions. Refer to Table 3 in Chapter 4 for a recap of the research questions and Delphi questionnaires.

6.2. Discussion of results for research question one

Research question 1: In what way is digital disruption likely to affect human resource strategies in the next three to five years?

The aim of research question one was to gain comprehensive insights into the experts' knowledge base in order to anticipate what the impact of digital disruption will be and how human resource strategies will be affected and changed to make accommodation for future transformations. Further, it should highlight what the human resource strategies should include and focus on now in order to prepare organisations to succeed in the future.

6.2.1 HR strategic focus on areas impacted by digital disruption

The areas identified by the participants to be impacted by digital disruption was very much aligned to the literature review as per Chapter 2. Refer to Table 7 in Chapter 5, for the summary of the main areas that human resource teams anticipate to be impacted by digital disruption. The data were analysed using frequency and based on this the

constructs were ranked. Eight constructs were ranked, with the highest construct being 'learning and development' with a frequency of 25. This indicated that every participant felt this was an area that is very likely to be impacted by digital disruption. Due to an increase in virtual teams and a geographically dispersed workforce, the participants believed that technology will be able to provide just in time learning, increase collaboration and sharing amongst teams, and improve team performance and outputs while making the learning process more social.

This view was supported by Gilson et al. (2015) and Reyt and Wiesenfeld (2015), who believed that automated learning material made available just in time will stimulate team learning and collaboration amongst virtual teams. Further, Stone et al. (2015) and Brown and Charlier (2013) emphasised the cost reduction in implementation and optimisation of learning management systems which automate administrative tasks for learning and development, while virtual classroom facilities allow for trainers to reach geographically distributed employees remotely and facilitate training, allowing employees to always remain skilled and knowledgeable. Haas, Criscuolo and George (2015) agreed that with online collaboration technologies, organisations can allow employees to share and discuss problems, find solutions and resolve business problems. They added that such capabilities allow employees to improve and grow their own competencies through knowledge sharing that is more frequent and easier to enable.

The second highest construct to be impacted by digital disruption is work structures which had a frequency of 18. The participants believed that in the future, employees will demand different work structures and more flexible work arrangements. Structures are anticipated to be flat and non-hierarchical, whereas employment contracts will be more project-based where employees will prefer to work on multiple projects for various employers concurrently. This will allow them to focus on their core competencies while adding value at multiple organisations. This view is supported by the literature in Chapter 2, where Ulrich et al. (2013) and Colbert et al. (2016) stated that employees will demand flexibility in the workplace in order to gain more enrichment and fulfilment in the value they offer organisations through their specialised skills. Stone et al. (2015) further noted that the use of technology will make such flexible demands easier as tracking employee performance and outputs can be managed and aligned to rewards across multiple geographies. The participants in this research further added that this will demand a rethink of organisational human resource policies and strategies. This finding extends

the literature in Chapter 2. The research participants suggested that human resource teams must be able to change their policies and strategies to support and promote these anticipated work structures, as they are very unique and different to the current work structures across many organisations today.

The third highest construct was the automation of human resource tasks, which had a frequency of 13. The participants anticipated that all transactional tasks that are highly manual and deemed repetitive can be easily automated, freeing up skilled human resource teams to provide a more strategic service to the business through value added tasks. Ulrich et al. (2013) and Stone et al. (2015) postulated that one of the many benefits that an organisation can realise when integrating digital disruptive technologies within its human resource value chain is an increase in human resource productivity and efficiencies. As human resource teams start to make the shift from having strategies that are focused on transactional tasks to ones that are more strategically focussed, they will begin to emphasise adding more value to the organisation. This will allow them to be viewed as credible advisors and business partners (Ulrich et al., 2013; Lo et al., 2015).

The fourth highest construct to be impacted by digital disruption was data and analytics, which had a frequency of 12. The research participants believed that the increased amount of data that will exist within human resources will increase exponentially as more technology is incorporated into the function. Disparate systems will be integrated creating a more holistic view of the data, which will provide more opportunities for better analytics to be generated from the data in order to make more informed decisions. However, the participants cautioned that the data sets must be more inclusive of our diversity in South Africa, that data quality must be of paramount importance, and that security and data privacy will be key. They believe this big data will enable human resource teams to predict employee behaviours and produce proactive initiatives and decision making. Hovy et al. (2016) supported this view, adding that the quality of data and the manner in which it is modelled is of paramount importance. According to Stone et al. (2015), organisations will use their data to produce patterns and create business intelligence for more effective decision making and actions. If used optimally, predictive analytics can provide the foundation for organisations to outperform their competitors through innovation and disruption (Gans, 2016). Brougham and Haar (2017) stressed that information security and privacy is of grave concern for an organisation that must ensure that all employee and customer information is adequately safe guarded and encrypted.

The fifth highest construct that participants felt digital disruption is most likely to impact was recruitment, with a frequency of 11. The participants believed that through the use of technology, recruitment will be done via mass screening, while audio and nerve sensing technology will add personality traits and behaviours into the selection process. More social media platforms will be used to select candidates and the recruitment profiles within the human resource team will change. Machines will do the first round of interviews whilst humans will do the negotiations. They cautioned that when using technology for recruiting, HR should watch out for biases created through AI. This view is supported by the literature in Chapter 2, where it is argued that repetitive tasks for recruitment can be automated making mass recruitment quicker and cheaper (Badger, Kaminsky & Behrend, 2014; Stone et al., 2015). Despite the automation of recruitment processes, human interventions will be required in extensive negotiations and to convince the right candidate to accept the offer (Stone, Lukaszewski, Stone-Romero & Johnson, 2013; Dineen & Allen, 2013). Paradoxically, the more you use the technology, the more you can invest in the human side of the job (Badger et al., 2014). Colbert et al. (2016), Lo et al. (2015) and Dulebohn and Johnson (2013) stressed that the automation of integrated technology into the recruitment process is compulsory if human resource teams want to adapt to this changing world of work.

The remaining constructs included performance management (frequency 8), rewards and recognition (frequency 8) and increased social cohesion (frequency 7). Participants believed that performance will be enhanced through digital engagement and managers must be able to manage organisation performance combined with machines and humans. Through the use of technology, performance management reviews will become more agile and frequent, thus enabling skills gaps to be picked up much faster. Ulrich et al. (2015) and Chui, Manyika and Miremadi (2015) supported this view by stating that goals between machines and humans must be clearly stipulated and carefully managed. Stone et al. (2015) and Colbert et al. (2016) further stressed that technology will help managers to identify skills gaps immediately and allow for the right mechanisms and measures to be put in place that help employees close these gaps. There will be a demand by employees for customised, highly individualised remuneration packages and rewards, while top digital skills will be more in demand and difficult to retain. This will require new reward policies in organisations, as perks and benefits are very important to employees (Ulrich et al., 2013). By giving employees options and the opportunity to choose the benefits that matter most to them, employers can ensure that they are spending money in the right places. This can help smaller companies compete while

boosting retention and engagement for businesses of any size (Colbert et al., 2016; Lo et al., 2015).

However, while the research findings indicate a need for increased automation and reduced manual, time-consuming processes, they caution that there is a need to find a balance between which processes are automated and which remain face-to-face. Driving social cohesion in a digital automated world is of paramount importance, therefore one must be careful not to remove all human interactions as employees still want to experience humanness in their organisations. This view is strengthened by the literature in Chapter 2, where Utesheva et al. (2016) and Tyworth (2014) stated that from a cultural perspective, the human resource team needs to ensure that employees remain emotionally included and connected as they depend on a sense of belonging and being in control. This implies the strengthening of human relationships and engagement via face-to-face interaction and not solely via technology, thus creating opportunities that will encourage human collaboration and emotional connection, resulting in stronger relationships and improved wellness amongst the workforce (Mazmanian, Orlikowski & Yates, 2013). This will enable employees to embrace the new organisational culture which promotes human interaction and wellbeing while working in conjunction with the machines (Gilson et al., 2015; Butts, Becker & Boswell, 2015; Strohmeier, 2018).

6.2.2 Strategic top priorities for human resources to prepare themselves and their organisations for the looming digital disruption

After determining which areas will be impacted by digital disruption, it was imperative to understand what the participants felt should become the top priorities for human resource teams to focus on in order to support and be able to embrace the impacted areas successfully. The research findings listed six top priorities and the data were analysed and ranked according to frequency for each priority. Refer to Table 8 in Chapter 5. These priorities included the ability to: develop skills amongst employees (frequency 15); manage and lead the change transformation journey in the organisation (frequency 13); become more customer centric to both internal and external customers (frequency 6); have the desire and ability to change their operating models to become relevant in the future world of work (frequency 5); understand and embrace technology (frequency 4); and have the ability to structure and interpret data more meaningfully (frequency 4).

The research findings showed that to develop skills amongst employees, human resource teams should focus on developing digital skills across both the HR teams and the broader organisation, yet employees need to unlearn old skills in order to learn new skills. There is thus a need to revolutionise training strategies to accommodate digital disruption, as well as new technologies and ways of learning. This view is supported by Accenture (2018), where they encourage organisations and individuals to adopt a growth mind-set and create a culture where learning is a way of life. Prioritising skills for development is also key, with Colbert et al. (2016) noting that human resource teams must identify skills needed in the future and focus on developing and enhancing these. From the research findings the next priority is to manage and lead the change transformation journey in the organisation, which human resource teams need to actively embrace in order to make their organisations and teams became change fit. They should thus manage and define a new culture that digital disruption will bring about, while thinking about changes across human resources practices and redefining strategies.

The research findings further concluded that to become more customer centric to both internal and external customers, human resource teams need to increase their business acumen. This can be done by getting closer to their internal customers, understanding their business intimately, and having a deep understanding and appreciation for their external customers. There is a strong need to place people back in the centre of the human resource function, thus bringing back the humanity. Human resource teams should have the desire and ability to change their operating models to become relevant in the future world of work. This requires them to influence a change in organisation and HR operating models to embrace technology, which demands a move from traditional models to digital enabled models and flattened reporting structures. This will allow them to transform from empowered leaders to empowered self-led employee structures. Further, the findings indicate that it is imperative for human resource teams to understand and embrace technology and have the ability to structure and interpret data more meaningfully. This means they should have an in-depth knowledge of the technology advances within the human resource discipline as well as their organisation at large. Human resource teams should leverage technology within their function and prioritise HR systems if not already in place. They must be able to structure, organise and manage data more effectively in order to analyse the data for better informed decision making, as this is the basis for everything else.

6.2.3 Conclusive findings for research question one

The research findings concluded that there are eight areas that are anticipated to be highly impacted by digital disruption; learning and development, work structures, automation of human resource tasks, data and analytics, recruitment, performance management, rewards and recognition, and increased social inclusion. Seven out of the eight areas were strongly supported by the literature in Chapter 2, while work structures extends the literature reviewed. Further, the findings indicate that there are six top priorities for human resource teams to focus on in order to ensure they are adequately equipped and skilled to address the areas that will be highly impacted through digital disruption. These priorities included the ability to develop skills amongst employees, to manage and lead the change transformation journey in the organisation, to become more customer centric to both internal and external customers, to have the desire and ability to change their operating models to become relevant in the future world of work, to understand and embrace technology and to have the ability to structure and interpret data more meaningfully. Table 20 below provides a summary of the results for research question 1.

Table 20: Summary of the results for research question 1

Areas impacted by digital disruption in next three to five years	**Top priorities for the human resource teams**
Learning and development	Developing skills
Work structures	Manage change and lead transformation
Automation of tasks	Become more custom centric
Data and analytics	Change operating models
Recruitment	Understand and embrace technology
Performance management	Improved use of data
Reward and recognition	
Increased social cohesion	

6.3. Discussion of results for research question two

Research question 2: What are the competencies that human resource departments should develop now in order to manage and support digital disruption in the future?

The aim of research question two was to determine if the listed competencies are aligned to the areas that are perceived will be impacted as per research question one above. It should further establish if the appropriate skills needed in the future will be available to support the impacted areas. This question was designed to create an opportunity for the experts to demonstrate strategic foresight.

6.3.1 Automation of human resource practices

As per the literature in Chapter 2, Stone et al. (2015) and Ulrich et al. (2013) claimed that the automation of human resource practices is crucial as it will eliminate manual tasks that absorb resources and time, and limit human resources teams from focusing on more value adding activities. Lo et al. (2015) and Strohmeier (2018) stressed that if human resource practices are automated, it will allow human resources teams to focus on strategic capability building, empowering them to become more credible with the business as they shift from transactional to strategic tasks. However, upon analysis of the data, the research findings showed that in relation to automation of the four human resources practices, not all participants in the sample group rated their organisations or clients' organisations as having these practices automated to a large extent. Refer to Table 6 in Chapter 5 for the summarised mean scores of these four practices. Refer to tables 10 and 11 in Chapter 5 for the detailed scoring of each participant. The research findings show that from all the practices core HR practices are automated to the largest extent, however some organisations are still doing core HR practices manually. This implies that the capturing and application of employee leave is still paper-based, utilising resources that can be better used in other more value adding human resource activities. Other practices such as performance management, learning and development, as well as recruitment were given a range of ratings on the degree to which organisations have these automated. In order for organisations to enjoy the complete value of digital disruption, such as artificial intelligence, big data analytics and predictive analytics, they require automated processes and data stored on platforms. Organisations that have not yet started automating human resource practices will not benefit from the value that

digital disruption can add; the greater the degree of automation across practices, the bigger the benefits.

6.3.2 Strategic human resource competencies

From research question 1, six top priorities were identified that human resource teams need to focus on. Refer to Table 8 in Chapter 5 for these top priorities. The participants were asked in the second survey used in Delphi round two to rate the competencies of their human resource teams against five dimensions in order to determine how equipped they are to handle these priorities. The sample group was divided into two groups, namely the human resource executives and human resource technology managers (group 1), and the human resource consultants and digital disruption experts (group 2). The research findings showed that both groups rated these five dimensions with very low scores, with group 1 rating themselves slightly higher than group 2. Refer to Table 12 in Chapter 5 for the summarised mean scores of these 2 groups. Refer to tables 13 and 14 in Chapter 5 for the detail ratings of each participant. It is quite concerning that these competencies received low ratings, as they will play a vital role in the successful adoption of, and transition to, digitalisation in an organisation. Autor (2015) and Colbert et al. (2016) claimed that human resource teams have a mammoth task to prepare the workforce for the future. In order to be able to achieve this task they require the right skills and competencies. Lo et al. (2015) supported this view, claiming that strategic human resource competencies allow HR teams to align human resource strategies to business strategies. If the human resource teams do not have the right competencies to lead this transformation, they will be unable to support or influence their businesses accordingly. This will result in them remaining transactional human resource operators as opposed to successfully shifting to becoming strategic, value adding business partners (Ulrich et al., 2013).

As per the key findings of research question one, the top four areas anticipated to be impacted by digital disruption are learning and development, work structures, automation of tasks, and data analytics. These competencies across the five HR dimensions are critical in order to prepare the organisation for looming disruption. Further, the key findings from research question one indicate that this sample group rated developing skills, managing change and transformation, becoming more customer centric and change operating models as the top four priorities for the human resource teams. The competencies rated above are also required to ensure these priorities are successful,

yet having such low ratings across these competencies implies that the human resource teams are not sufficiently skilled to support these priority areas, and are thus unable to guide and adequately prepare their organisations. It must therefore become a high priority to develop these competencies as a matter of urgency.

6.3.3 *Preparing for skills shortages*

As customers both internal and external to the organisation start to demand highly personalised individualised solutions, analytics will become key in order to better understand their requirements and design solutions accordingly. Organisations already have huge volumes of data, but the ability to analyse and convert them into meaningful insights is lacking. The skills to be able to do this are vital if an organisation wishes to outperform their competitors. Lastly, with a massive focus on artificial intelligence and automation through robots across all industries, the uptake of these functions will be increased. This will result in a high demand for these skills, yet there is currently an inadequate supply. As more organisations seek to create platform business solutions and use big data to analyse consumer behaviour in order to design customised solutions, the talent war will continue for artificial intelligence and robotic programmers skills. Colbert et al. (2016) supported the view that skills in the fourth industrial revolution will be scarce in certain key areas, so human resource teams must create innovation spaces for employees to gain those skills now. Employees may be eager to learn, but need the platforms and opportunities to do so.

The research findings indicate that it is important to create mechanisms and initiatives to start identifying the skills that will be in short supply in the future world of work. Table 15 in Chapter 5 list the nine skills expected to be in short supply for the fourth industrial revolution. Once an organisation has ascertained what the skills gaps will be, they can look at closing those by developing their current employees and then looking at developing the necessary skills in potential future employees. Makridakis (2017), Lo et al. (2015) and Colbert et al. (2016) all supported this view, stressing that it is critical for the human resource teams to understand how technology will disrupt the industries in which their organisations operate, determine the skills needed, and begin to prepare for the skills needed in the future. It is important to realise that those skills will not be readily available in the future, hence engagement with various stakeholders, both internal and external, will be key. According to Makridakis (2017), it is important to place a focus on developing AI and robotics skills amongst young people. In South Africa this will require

engagement with schools and universities to ensure the right curricula are taught in order to adequately prepare the youth for their rightful place in the future of work. The research findings further indicated ways in which the human resource teams can start now to prepare for the anticipated skills gaps. Refer to table 16 in Chapter 5 for this detail.

6.3.4 Conclusive findings for research question two

The research findings concluded that across the four human resource practices, core HR is automated to a great extent, while learning and development, performance management and recruitment are automated to an average extent. While a few organisations have automated all four practices to a great extent, some have not yet started the journey at all. It is important for organisations to realise the need to commence the automation of human resources practices in order for them to remain relevant and strategic partners to their organisations. Further, those organisations that are ahead in the process must help by sharing their learnings with those organisations that have just started or are yet to start.

The research findings further concluded that certain key competencies in human resource teams are critical in order for them to support and assist their organisations to make a successful shift into the future world of work. These competencies include the ability to manage change, analyse data, change and rewrite policies, design learning and development policies for the future of work, and undertake an organisation redesign. It was established that the current levels of competence amongst human resource teams across these five dimensions are very low, which poses a huge risk for human resources when it comes to leading the transformation journey within their organisations.

Lastly, the findings indicated the following skills shortages in organisations for the future of work: complex problem solving; people management; analytical thinking; AI and robot programmers; creativity, change and culture management; emotional intelligence; critical thinking; and customer centricity. In order to prepare for these skills shortages, the sample group recommended innovative ways for human resources teams to develop these skills amongst their current and future potential employees. These include introducing digital learning platforms, changing organisational policies to encourage and promote learning and innovation, and exposing employees to digital transformation concepts. For future employees it was suggested that webinars be hosted, digital

hackathons be encouraged, and universities be engaged to influence the curricula and promote digital graduate programmes. Table 21 below provides a summary of the results for research question 2.

Table 21: Summary of the results for research question 2

Automation of HR practices Rating 1 - 10	**HR competency to manage digital disruption Rating 1 - 10**	**Skills shortages expected in the workforce in the next three to five years**	**How should HR close the skills gaps?**
Recruitment Mean = 5.75	*Ability to manage change* Mean = 3.9	Complex problem solving	***Current employees***
Learning & development Mean = 6.65	Ability to analysis data Mean = 4.3	People management	Create learning opportunities. Encourage self-driven learning. Promote gamification. Encourage and reward learning and innovation. Change policies to promote learning.
Performance management Mean = 5.85	*Ability to change & rewrite policies* Mean = 3.85	Analytical skills	
Core HR Mean = 8.2	*Ability to design learning & development policies* Mean = 4.25	AI and robotic programmers	
	Ability to do organisational redesign Mean = 3.8	Creativity	***Future employees***
		Change and culture management	Create innovation circles. Develop university partnerships. Host webinars and digital hacks. Promote graduate programmes for digital skills.
		Emotional intelligence (EQ)	
		Critical thinking	
		Customer centricity	

6.4. Discussion of results for research question three

Research question 3: How can human resource teams strategically transform themselves to better support their organisations with more value adding services?

Research question three aimed to understand what human resource teams should be changing within themselves by optimising digital disruption to enhance their service offering to employees and the organisation at large. It further aimed to understand what value they can add to their organisation through new and innovative ways by transforming themselves and becoming future fit for the fourth industrial revolution.

6.4.1 Preparing the next generation of human resources

The participants identified five functional focus areas that they believe will be different in the human resource model from today's model. Refer to Table 17 in Chapter 5 for the five functional focus areas. The participants were confident that by incorporating technology into the human resource function, the next generation of human resource models will offer: more strategic enablement; increased digitalised solutions that will drive self-service offerings to employees and managers; a deeper focus on specialised human resource skills and less focus on generalised human resource skills; a data-driven decision making human resource team; and reduced face-to-face employee engagement. The first four of the five focus areas are supported by the literature in Chapter 2, whilst the last focus area contradicts it.

The research findings show that the future human resource teams will focus on becoming more strategic partners and business enablers who earn their seat around the executive table. Transactional processes will be automated, reducing the size of human resource teams and administrative skills, enabling them to become more proactive in their solutions to business. They will also be able to develop more strategic capabilities as the system will be able to automate more generalised human resource skills. Teams will focus on more specialised skills such as culture development, employee engagement, organisational design, as well as learning and development. These views were supported by Lo et al. (2016), Stone et al. (2015) and Ulrich et al. (2013), who stressed that building strategic capability for human resource teams is imperative if they are to lead and influence organisational growth and transformation in the fourth industrial

revolution. Ulrich et al. (2012) added that human resource teams need a voice at the boardroom table, but in order to achieve that they need to become credible strategic partners. If they are bogged down with time consuming, transactional, low value adding tasks they will never be able to build and demonstrate strategic high value adding capability. By automating transactional tasks they create capacity to operate at a strategic level.

The research findings further indicate that the next generation human resource models will offer increased digitised solutions that will enable self-service amongst employees and managers. More transactional repetitive human resource processes will be automated, resulting in highly individualised personal solutions for employees that are more self-driven solutions. Managers will become more active in people management as systems will enable these processes, and human resource teams will rely on data in order to make more informed decisions. They will also acquire and develop more analytical skills in order to interpret the data, which they will use for predictive analytics in order to provide proactive business solutions. Trend analysis will be increasingly utilised to solve problems. The above views were supported by Stone et al. (2015), Colbert et al. (2016) and Strohmeier (2018), who concurred that it is imperative for human resources to digitise their transactional processes in order to ensure that employees have access to fundamental processes. Further, they added that automated processes allow managers to take ownership of the day-to-day management of employees. This empowers both employees and managers to own and direct their transactional core human resource processes.

The last focus area of the research findings show that the next generation human resource models will result in reduced face-to-face employee engagement. As teams become more dispersed and virtual, and as processes are automated, the need for face-to-face interactions with employees will reduce and human resource teams will become more hands-off. Where interactions are required, employees will be referred to chatbots for resolution and a human will be the last resort. This view contradicts what the literature recommends in Chapter 2, however. From a cultural perspective, the human resource team needs to ensure that employees remain emotionally included and connected as they depend on a sense of belonging and being in control (Utesheva et al., 2016; Tyworth, 2014). This implies the strengthening of human relationships and engagement via face-to-face interactions and not solely via technology, creating opportunities that will

encourage human collaboration and emotional connection, resulting in stronger relationships and improved wellness amongst the workforce (Mazmanian, Orlikowski & Yates, 2013). This will enable employees to embrace the new organisational culture which promotes human interaction and wellbeing while working in conjunction with the machines (Gilson et al., 2015; Butts, Becker & Boswell, 2015; Strohmeier, 2018). In the South African context, reducing human interactions with employees could be catastrophic, as highly automated human resource processes and fewer face-to-face interactions will direct employees to unions, increasing the number of unionised environments. Employees will turn more and more to unions to help resolve human problems. It is therefore key for human resource teams to find a balance between what they wish to do for their organisations and how much digitalisation is feasible. This includes a balance between human and machine work and engagement, and will be driven by the culture they wish to create.

6.4.2 Adding organisational value through human resources

From the research findings the participants identified five new innovative ways that the human resource teams can add value to an organisation by optimising digital disruption. Refer to Table 18 in Chapter 5 for the detail. These include the ability to: show greater return on investment; offer more highly personalised individualised solutions; use predictive analytics; offer organisations hybrid teams that include both machines and humans; and make employee data available in real time for decision making. The findings suggest that human resource teams will be able to show greater return on investment, for example by automating the recruitment process they can use technology to do recruitment in a shorter time, more globally, and with a higher degree of accuracy; they can match candidates more closely to the job; and they can reduce turnover and increase retention and job fit. Future training initiatives can also be aligned more closely to employees' needs with better data in place, and costs can be reduced by automating manual processes and driving efficiencies. This view was supported by Ulrich et al. (2013) and Stone at al. (2015), who emphasised the value of automated human resource transactions and the benefits they offer, which can demonstrate return on investment.

Another conclusion from the findings was that the participants believed that with the use of technology, human resource teams can offer their employees and line managers more personalised employment benefit options. This can be achieved by replacing standard processes with standard data models to offer employees more flexible processes that

suit their work requirements and needs. This means that data models can be adapted to employees' unique requirements, yet remain within the benefits framework of the organisation. This will allow for better control of benefit management, yet satisfy employees' need for customised solutions. Further, they can offer employees more mobile applications for ease of use and to complete various human resource tasks. This means that employees do not need to be in an office to access applications. Colbert et al. (2016) and Stone et al. (2015) supported this view by suggesting that using technology and frameworks allows organisations to drive initialised employee benefits and customised employment contracts. The system is then able to manage and control all these variations without being manually intensive for human resource teams. Such personalised solutions also have the potential to increase employee engagement and commitment.

The research findings further concluded that the next generation of human resource teams will add more value to their organisations with the use of predictive analytics, i.e. the increased use of technology, data and artificial intelligence embedded in human resource practices will allow them to better predict employee behaviours and requirements. Predictive analytics can thus support human resource teams to proactively identify problems and create solutions in advance. Stone at el. (2005) agreed that implementing systems into human resource practices will increase the data accumulated on employees, while Hovy et al. (2017) and Brougham and Haar (2017) suggested that once data exist within an ecosystem, the potential to turn that into insights is limitless, making the ability of predicting future behaviour possible. Such predictive analytical capabilities will allow organisations to gain a competitive advantage in many ways, including in relation to their employees.

The introduction of hybrid teams will also add innovative value to organisations. With the integration of machines into the workplace, human resource teams will have the ability to design innovative models to blend outputs of machines and humans to create additional competitive advantages. Such opportunities never existed on this scale before; the key for human resource teams is to find a suitable blend of capabilities between machines and humans to optimise the value chains in which they operate. This view was supported by Accenture (2018), which claims that it is not a question of machines substituting humans, but rather how their capabilities will complement each other. Colbert (2016) and Markakis (2017) strengthened this view by adding that humans have unique skill sets, and it is for human resource teams to understand this uniqueness

and complement it with machines. They stressed that it is important to develop skills in humans that cannot be replicated by machines, but rather complement them.

Lastly, the research findings showed that the ability to access and use data in real time will be another way in which human resource teams can add immense value to their organisations. With systems storing much more data, if this data are designed and architected correctly across multiple systems, the opportunity to use real time data in decision making will be significant. Further, data and content for learning can be easily accessed on the job to support problems and queries in real time. Stone et al. (2005) and Strohmeier (2018) both argued that real time data that is credible and accurate will increase the speed of the decision making process in a more quantifiable and objective way. More informed decision making will thus grant human resource teams the credibility they deserve and seek at a strategic level (Ulrich, 2013).

6.4.3 Conclusive findings of research question three

From the research findings it can be concluded that there will be a next generation human resource model that is different from the current model. The next generation model that optimises technology to digitise the human resource value chain will offer more strategic enablement, increased digitalised solutions that will drive self-service offerings to employees and managers, a deeper focus on specialised human resource skills and less focus on generalised human resource skills, a data-driven decision making human resource team, and reduced face-to-face employee engagement. The first four changes are supported by the literature in Chapter 2 while the last change contradicts it. Further, by using technology to automate processes, human resource teams can find new and innovation ways to add value to their organisation. These include the ability to show greater return on investment, offer more highly personalised individualised solutions, use predictive analytics, offer hybrid teams that include both machines and humans, and make employee data available in real time for decision making. Table 22 below provides a summary of the results for research question 3.

Table 22: Summary of the results for research question 3

What does the next generation HR function look like?	New innovative ways for HR to add value to the organisation using digital disruption
More strategic enablement	Show greater return on investment
Increased digitised solutions to drive self-service	Highly personalised individualised solutions
Focus on specialised HR skills	Use of predictive analytics
Data-driven HR	New hybrid teams – humans and machines
Reduced face-to-face employee engagement	Real time data

6.5. Discussion of results for research question four

Research question 4: In what ways can the human resource profession strategically partner together to embrace digital disruption?

Research question four aimed to establish guidelines and options for human resources as a profession to draw together and share their experiences and knowledge as a collective, in order to proactively and strategically prepare themselves as well as their organisations to embrace and transition successfully into the fourth industrial revolution where digital disruption will be key.

6.5.1 Human resources as a profession ensuring success during digital disruption

From the research findings the participants identified two key ways in which human resources as a profession can work together to ensure success during the inevitable digital disruption. The first is to learn and upskill themselves in order to remain relevant in the future world of work; by reading and learning more they will gain insights into market trends and understand how such trends will impact their industries, and more especially their organisations. Not only should they focus on learning about the emerging technologies, but they also need to gain greater business acumen. This will place them in a unique position to comprehend the impact of technology on their businesses. This view was supported by Hecklau et al. (2016), who claimed that in order for human resources to develop competencies for the fourth industrial revolution they must have an understanding of the economic, social, technical, environmental, political and legal

environments. According to Stone et al. (2015), they must become more technologically savvy as well as understand data and analytics.

The second way in which the human resources profession can work together is through collaborating and sharing. Those professionals who have already started this journey in digital disruption should share their learnings and experiences with those who have not yet started or have just started on their automation journey. These learnings are immensely valuable as they save time and cost while ensuring success as previous mistakes can be avoided. By leveraging each other's experiences a wealth of collective new knowledge will be created that can move the profession forward, while at the same time helping organisations advance. The profession can also commence its own research in this field to create findings that can guide their decisions and improve their strategies. Hecklau et al. (2015) explained that creating the right competencies to support and implement emerging technology is vital. By conducting specific research, human resource teams can understand what competencies they will need for the future world of work. Lo et al. (2015) added that the ability to identity and develop strategic competencies is imperative if human resources wants to gain credibility, while Ulrich et al. (2013) noted that human resources need to operate at a level that adds more value to the organisation and should not be stuck in the transactional focus of tasks.

6.5.2 Conclusive findings for research question four

From the research findings it can be concluded that there is a need for greater collaboration amongst all human resource professionals across various industries. While some platforms do exist, little sharing takes place. If greater learning is encouraged, the profession will be able to help each other gain faster traction in the adoption and use of technology within human resource practices. This can be achieved by more experienced human resource professionals, who might be early adopters and incorporated technology into their practices, to help those professionals just starting or who have not yet started on their journey of automation. It can be further concluded that the profession at large needs to read much more in order to remain informed and stay abreast of trends. They should also conduct more research in the field of digital disruption in order to influence and guide their thinking and approach. Table 23 below provides a summary of the results for research question 4.

Table 23: Summary of the results for research question 4

What can HR as a profession do to embrace digital disruption?
Learning and upskilling • Read more • Become tech savvy • Gain greater business acumen • Become more knowledgeable • Drive innovation • Implement solutions • Develop a growth mind-set
Collaborate and share • Share generic processes • Conduct more research in digital disruption • Those ahead of curve help those just starting • Create new communities of practice to encourage knowledge transfer

6.6. Summary of results across all four research questions

It is evident from the summary in Table 24 below that on one hand there is alignment between some findings of this research and the literature review in Chapter 2, whilst on the other there is some misalignment between what the human resource teams want to achieve versus their current skills and competencies. From the analysis it is evident that the sample group is aligned to the areas that will be impacted by digital disruption, as per the literature review in Chapter 2. In one instance, however, the sample group extended the literature by adding that redefining organisational human resource policies and strategies will also be an area highly impacted by digital disruption.

The sample group further identified key priorities that human resource teams should focus on now in order to prepare their organisations for the future world of work in which digital disruption will be significant. However, while human resource teams understand the impact of digital disruption, few of them have automated their human resource practices to a great extent. Some organisations do not even have their core basic human resource practices automated, implying that high levels of manual interventions are required in these organisations. Other human resource practices like learning and development, performance management and recruitment are still done manually in some organisations, while others have automated them to an average extent. Automating

these human resource practices is the starting point for human resource teams to leverage technology and prepare for digital disruption; until this is done they will be unable to move to more advanced features that digital disruption offers, such as the use of artificial intelligence, big data for analytics and predictive analytics.

What is even more concerning is that the participants rated the competency levels of their human resource teams or clients' human resource teams below average across five dimensions, despite the top priority areas identified by the sample group requiring these competencies in order to be successful. Human resource teams thus need to build these competencies and automate the basic human resource practices first in order to focus on achieving their top priorities. The critical skills identified by the sample group are very aligned to those the World Economic Forum (2016) listed as key skills. Five out of the seven skills identified by the group are aligned to the WEF, while they extended this list to include two new skills they deem as being critical in the South African context, namely artificial and robotic programmers as well as change and culture management. The group mentioned some practical ways to close these skills gaps for the future, while explaining that a lifelong learning culture is key, as is driving the use of digital learning platforms to deliver learning solutions.

The participants see future human resource teams as being strategic enablers to business, optimising platforms for self-service and using data to drive decision making. However, to be able to achieve this they need automated human resource practices and the right skills, both of which are lacking in some organisations as per the data. The ways the participants identified as being able to add value and drive innovation in their organisations are aligned to the literature in Chapter 2, including personalised individualised solutions (Colbert et al., 2016), the use of predictive analytics (Hovy et al., 2016; Gans, 2016), real time data (Stone et al, 2015; Strohmeier, 2018) and new hybrid teams (Accenture, 2018; Autor, 2015; World Economic Forum, 2018).

Lastly, the group felt that learning and upskilling, as well as collaborating and sharing, are key for the human resource profession to be successful in preparing their organisations for the future of work. This is critical, as from the data it was evident that some human resource professionals are ahead of the curve in terms of preparing their organisations or clients' organisations to embrace and prepare for digital disruption. They

can certainly share their experiences and learning in order to assist other organisations that are just starting on this journey, enabling them to be more successful.

6.7. Conclusion

Chapter 6 provided the conclusive findings of the research questions and showed how these findings either extended or supported the literature in Chapter 2. These findings, together with the literature review in Chapter 2, were used by the researcher to create recommendations and conclusions, which are set out in the next chapter.

Table 24: Summary of research study results

Areas impacted by digital disruption in next three to five years	**Top priorities for human resource teams**	**Automation of HR practices Rating 1 - 10**	**HR competency to manage digital disruption Rating 1 - 10**	**Skills shortages expected in the workforce in the next three to five years**	**How should HR close the skills gaps?**	**What does the next generation HR function look like?**	**New innovative ways for HR to add value to the organisation using digital disruption**	**What can HR as a profession do to embrace digital disruption?**
Learning & development	Developing skills	*Recruitment* Mean = 5.75	*Ability to manage change* Mean = 3.9	Complex problem solving	***Current employees*** Create learning opportunities. Encourage self-driven learning. Promote gamification. Encourage and reward learning and innovation. Change policies to promote learning.	More strategic enablement	Show greater return on investment	***Learning & Upskilling*** Read more, Become tech savvy. Gain greater business acumen. Become more knowledgeable. Drive innovation. Implement solutions. Develop a growth mind-set.
Work structures	Manage change and lead transformation	*Learning & development* Mean = 6.65	Ability to analysis data Mean = 4.3	People management		Increased digitised solutions to drive self – service	Highly personalised individualised solutions	
Automation of tasks	Become more customer-centric	*Performance management* Mean = 5.85	*Ability to change & rewrite policies* Mean = 3.85	Analytical skills		Focus on specialised HR skills less generalised skills	Use of predictive analytics	
Data and analytics	Change operating models	*Core HR* Mean = 8.2	*Ability to design learning & development policies* Mean = 4.25	AI and robotic programmers		Data driven HR	New hybrid teams – humans and machines	

Recruitment	Understand and embrace technology		*Ability to do organisational redesign* Mean = 3.8	Creativity	***Future employees*** Create innovation circles. Develop university partnerships. Host webinars and digital hacks. Promote graduate programmes for digital skills.	Reduced face-to-face employee engagement	Real time data	***Collaborate & share*** Share generic processes. Conduct more research in digital disruption. Those ahead of curve help those just starting. Create new communities of practice to encourage knowledge transfer.
Performance management	Improved use of data			Change and culture management				
				Emotional intelligence (EQ)				
				Critical thinking				
				Customer centricity				

7. CHAPTER 7 – CONCLUSION

"The best way to predict the future is to create it." (Adapted from Drucker, 1993)

7.1. Introduction

Business and individuals are experiencing the fastest technological change ever with the dawn of the fourth industrial revolution. According to the literature review and research findings, business and individuals have two choices with this disruption; they can either ignore it and become irrelevant, or adapt by learning and changing in order to thrive. If the choice is to ignore it the result could will be catastrophic as we will leave companies behind. As per the findings of this research, this creates a great opportunity for human resource teams as they can play a significant role in creating this future and being part of a company and larger country solution. The key questions are: Are human resource teams up for the challenge, and will the human resource fraternity take up this challenge and make a huge difference at this critical time in the world of work?

As this research highlights, digital disruption promises to change the way organisations recruit, develop and engage employees. In fact, artificial intelligence and the data it captures and utilises to perform various tasks has the ability to transform the human resource function from a transactional afterthought to a value adding business partner that assists with organisational growth. The research findings anticipate that with the fourth industrial revolution, most human resource solutions will be highly automated, with employers investing in various human resource practices, retaining the best people, and ensuring thriving relationships between employers and employees.

7.2. Research findings

The research concluded that human resource executives, consultants and experts agree that automation is happening at a rapid pace. The top eight areas they anticipate to be highly impacted by digital disruption in the next three to five years include learning and development, work structures, automation of human resource tasks, data and analytics, recruitment, performance management, rewards and recognition, and increased social inclusion. Further, the findings indicate that there are six priorities for human resource

teams to focus on in order to ensure they are adequately equipped to manage the areas that will be most impacted by digital disruption. These priorities include the ability to develop skills amongst employees and themselves, to manage and lead the change transformation journey in the organisation, to become more customer centric to both internal and external customers, to have the desire and ability to change their operating models to become relevant in the future world of work, to understand and embrace technology, and to have the ability to structure and interpret data more meaningfully.

From the research findings it can be concluded that in order for human resource teams to effectively support these areas of disruption, they need to first develop the right skills and competencies amongst themselves. They then need to come together as a profession to collaborate better and help each other to more effectively transition into the future world of work. Lastly, they will need to support and guide their organisations effectively to adapt to digital disruption and make a successful shift into the future world of work. These suggestions are discussed in detail in the sub-sections below.

7.2.1 Human resource teams getting themselves ready for digital disruption

This research study concluded that human resource teams currently do not have the right competencies and capabilities to help their organisations make a smooth and successful transition into the anticipated digital disruption era. It was clear from the eight areas to be impacted by digital disruption and the top six priorities listed as key focus areas that human resource teams need to first equip themselves to better guide the organisation for the transformation into the future world of work. Human resource teams need to focus on building their ability to manage change as this is a key competency required to assist the organisation in the digitalisation era. They further need to enhance their ability to analyse data as this is a key differentiator in decision making. The demands by employees in the new world of work will require human resource teams to be able to change and rewrite policies to adapt to a more flexible and agile workforce. As a result of learning being synonymous with the future of world, the human resource teams must be able to redesign learning and development policies that will support and promote continuous learning and a growth mind-set. Lastly, the research findings outlined that as a result of digital disruption there is a need for human resource teams to be able to do organisational design more effectively, as new operating models will emerge in human resources as a function and organisations in general.

Once human resource teams develop these capabilities and embrace and use more technologies to digitalise their processes, they will be equipped to add more value and innovation to their organisation. The research findings conclude that they will be able to show greater returns on investment, offer highly personalised individualised solutions to employees, be able to use data and analytics to predict future events and employee behaviours and requirements, be able to optimise the use of hybrid teams, and support employees to better work alongside machines, enhancing process optimisation and driving improved productivity for the organisation. Lastly, they will be able to offer more credible and timeous decision making through the use of accurate, real time data.

The research findings further conclude that if a human resource team builds the right skills and competencies and optimises the right technology, they will develop the next generation human resource function. This new generation of thinking and operations will allow human resource teams to offer more strategic enablement to their organisation and business leaders. They will further be able to offer their employees improved digitised solutions, which will drive self-service and equip employees and line managers to more effectively develop and enhance their relationships and outputs. This study also concluded that human resource teams will shift from focusing on generalised skills and capabilities, as these will be automated, to more specific human resource skills. Human resource teams will further become more data driven and analytical, enhancing their decision-making process. Lastly, this research concluded that human resource teams will become less engaged with their employees, reducing their face-to-face interactions. This research indicates that as human resource teams are at various levels of maturity in adopting digitalisation, they all have something to teach and learn from each other as a profession. By sharing information, the human resource function across industries will become more quickly and adequately equipped to help their organisation make the transition into the future world of work.

7.2.2 Human resources preparing together as a profession

This research concluded that it is imperative that the human resource profession come together to share their learning and experiences through increased collaboration in order to prepare for the future world of work. More can be achieved if the profession joins together to share their learnings and insights, as opposed to each team individually trying to conquer the anticipated digital disruption. This research study concluded that the profession will experience great gains if human resource teams can learn and upskill

themselves further, and then come together to collaborate and share these learnings and skills.

From a learning and upskilling perspective, this research study concluded that human resource teams need to read more and stay abreast of trends in their professions in order to gain a better understanding of what is happening within their industries as well as global trends. Further, they need to become more tech savvy by investing in technology trends and transformation, as well as in understanding data and analytics. The research also concluded that the human resource profession needs to gain greater business acumen in order to better support their organisations. It further highlighted that the human resource profession needs to stop playing the victim and waiting for permission to innovate, but instead needs to go out and learn the new trends, become knowledgeable, and implement solutions that will add value to their business. Further, the research concluded that the human resource profession needs to place greater emphasis on learning and understanding what the customer trends are in their industry, both locally and globally, and adopt a customer centric approach for their solutions. According to this research study's findings, in order to achieve these shifts, the human resource profession needs to acknowledge that they require continuous development and a growth mind-set.

Another finding of this research study, which is the second main area that the human resource profession needs to focus on, is the need for increased collaboration and sharing. This requires human resource teams to collaborate and share more amongst each other as they learn and acquire new knowledge or gain new insights through experience. The research findings concluded that they can leverage existing forums or create new communities of practice where such learning and sharing can be encouraged. Standard generic processes should be created and shared amongst the profession for input and reuse. This can include learning content as well, for example health and safety or HIV online training courses. According to the research findings, the greatest value from sharing will be achieved when those professionals who are ahead of the curve when it comes to digital disruption share their experiences and help those behind them in the journey. This will reduce the repetition of errors, allowing for greater success in a shorter period of time. Lastly, this research study concluded that the human resource profession should conduct more research in the space of digital disruption in

the context of South Africa, and use the findings to assist them to create appropriate strategies.

Once the human resource professionals have managed to equip themselves adequately as well as collaborated and shared as a profession collectively, they then need to support their business to transition into this future world of work.

7.2.3 Human resources preparing their organisation for the transition

The research findings concluded that some organisations have automated their human resource practices to a large extent, while there are still organisations that have not yet or have just started automation. The researcher thus recommends that human resource teams within organisations start to automate their processes to a great extent, as this forms the basis for digital disruption. By automating these processes, human resource teams will be able to offer all the value adding services that digitalisation has to offer. This will allow them to innovate and play the role of a strategic enabler, demanding the credibility from business leaders that the function deserves.

The researcher also concluded that organisations will start to experience skills shortages in the digital era. The top skills that are anticipated to be in short supply for the future world of work are complex problem solving, people management, analytical skills, creativity, AI and robotic programmers, creativity, change and culture management, critical thinking and customer centricity. As custodians of the workforce it is the role of human resource teams to have the capability to identify these skills shortages and be able to put plans and initiatives in place in order to minimise the risks of these skills shortages. Human resource teams must therefore focus on innovative initiatives for both current and future employees to prepare for these skills shortages, enabling them to proactively close the skills gaps.

7.3. Preparing for digital disruption

The key findings from this research suggest that in order to guarantee a successful transformation and embrace of the digital industrial revolution, human resource teams

need to ensure that the rate of learning is higher than the rate of change. This applies to both human resource teams as well as the organisation at large. The challenge for both individuals and organisations, however, is that the rate of unlearning needs to be higher than the rate of change, and the rate of re-learning needs to be higher than the rate of unlearning in order to survive. The research further suggests that when building skills and learning for the future, the focus should not be on building skills in individuals and teams that can be replaced by machines, but rather on building skills that machines cannot replace, such as emotive and social human behavioural skills. This view is supported by the World Economic Forum report (2018), which states that the top five skills needed by individuals to survive and thrive in the fourth industrial revolution are complex problem solving, critical thinking, creativity, people management and collaboration. This will enable placing people into jobs that will add more value in areas that cannot be replaced by machines. Furthermore, this will create the ability to drive complex co-ordination between machines and humans, which will become key in automated hybrid team structures.

Makridakis (2017) is confident that artificial intelligence will not replace humans in the workplace, arguing that it is not all doom and gloom for society and organisations. DeCanio (2016) agreed, adding that it is a matter of finding the perfect blend between robots and humans, and asking if it is a matter of complementing each other or substituting one for the other. An Accenture report (2018) referred to the ability of humans running alongside machines in order to raise efficiencies and improve productivity, yet in order to successfully create a hybrid team, Hecklau et al. (2016) postulated that it is imperative for human resource teams to have the right competencies. This view is supported by the research study findings, which further add that human resource teams must also have the ability to scan the macro environment and completely understand and be able to identify the emerging challenges of technology in the fourth industrial revolution. This understanding should include economic, social, technical, environmental, political and legal challenges.

The World Economic Forum's latest report (2018) stated that digital disruption brings ground for optimism and negativity. By 2025 almost 50% of the world's jobs are susceptible to automation, however this anticipated disruption will create almost 130 million jobs globally, of which 70 million will be existing jobs. This means that digital disruption will bring about millions of new jobs, creating the opportunity for more

employment and transitioning the workforce into higher order thinking jobs. The challenge remains for human resource teams to identify what jobs will be susceptible to automation, which new jobs will be required, and how they can develop and prepare people for the new jobs in the future world of work. Below are two proposed frameworks, which were developed from the research findings and literature review, to help human resource teams with the mammoth task of preparing themselves and their organisations for the future world of work

7.4. Proposed frameworks

Any new human resource strategy must be integrated with the chosen organisational strategy so as to ensure alignment and enablement. For this reason, the level of digitalisation that a human resource team choses to adopt in their practices and processes will be determined by the level of digitalisation their organisation choses to adopt. Thus there will be two dimensions that a human resource team within an organisation will need to consider when defining their human resource strategy for the business. The one dimension will be the level of digitalisation across the organisation, i.e. how much technology the organisation wishes to include into their processes and to what extent such processes will be automated. The other dimension is the level of focus that an organisation wishes to place on their employees. The level of employee focus can be low or high and will determine the level of employee engagement. It is assumed that the higher the level of employee focus the higher the level of employee engagement, and vice versa. Figure 3 below graphically represents these two dimensions with a brief description of each of the four quadrants.

High level of digitalisation across the organisation	Work is where we automate as much as possible in order to drive productivity and efficiency. **1**	Work is where we find the perfect balance between high digitalisation and high focus on people and levels of engagement. **2**
Low level of digitalisation across the organisation	Work is where we focus on getting the job done at the lowest possible cost to gain the highest margins. **3**	Work is where we nurture and grow people, low automation and high levels of people engagement. **4**
	Low Employee Focus	**High Employee Focus**

Figure 3: Organisational framework for level of digitalisation and employee focus

Based on the above framework, which quadrant the human resource teams find their organisational strategy to be will influence their human resource strategy in terms of digital disruption. Further, how much employee engagement the organisation wishes to achieve will also determine how much automation is embedded into its human resource practices. Based on this, human resource teams can use Figure 4 below to determine what their strategic imperatives should be. Human resource teams that find their organisations operating at high levels of digitalisation across the organisation, that is quadrants one and two from Figure 3 above, should adopt the guidelines and priority areas below for the short and long term focus for both internal and external stakeholders.

Human resource teams that find themselves supporting organisations with a strategic focus on a high level of digitalisation should have a human resource strategy that supports, aligns and enables this organisational strategy. For such a human resource strategy, Figure 4 below outlines the findings of this research study to enable and support an organisational strategy that drives digitalisation. This figure was informed by the eight areas anticipated to be highly impacted by digital disruption in the next three to five years and the top six priority areas. Refer to Table 7 and Table 8 in Chapter 5. The figure below looks at two dimensions, namely a short or long term view and a focus on internal and external stakeholders. The research findings are then placed in the various quadrants to specify the key tasks, taking the two dimensions into account. At the centre of Figure 4

are the key focus areas where human resource teams should first get their house in order before trying to support the wider organisation.

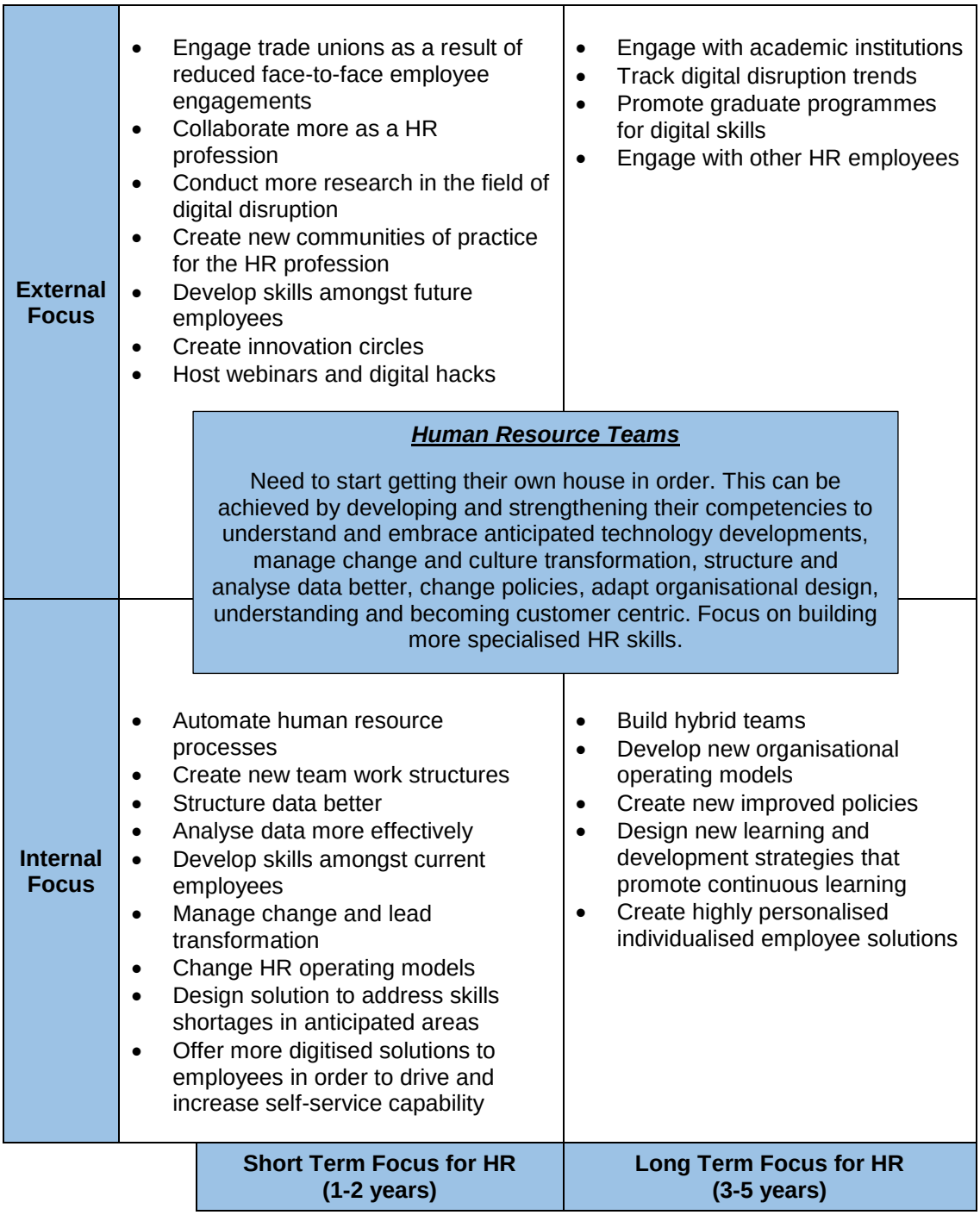

Figure 4: Human resource strategic imperatives in response to anticipated digital disruption

With a short term internal focus, the research suggests that human resource teams should automate the various human resource practices that will be the foundation for more advanced strategic business partnerships. Refer to Table 9 in Chapter 5. Further, the research suggests that human resource teams should create new work structures; structure, organise and analyse data better; change operating models; and manage, change and lead transformation. Refer to table 8 in Chapter 5. They further need to develop skills that are anticipated to be in short supply in the fourth industrial revolution. Refer to Table 15 in Chapter 5. With an internal focus they need to define ways to develop these skills amongst their current employees. Refer to Table 16 in Chapter 5.

With a short term focus on external stakeholders, the research findings suggest that with an anticipated reduction in face-to-face employee engagement, organisations face the risk of employees turning to more unions for that human interaction and experience. Thus human resource teams should, where necessary and appropriate, engage the relevant unions in order to share their plans for process automation and the value it will offer. Refer to section 5.6.5 and 6.4.1 for more details on this research findings. The research also recommends that the human resource function should gather together and collaborate more as a profession as they prepare themselves and their organisations for the fourth industrial revolution. They should also conduct more research in the field of digital disruption and share their findings amongst the profession, as well as create new communities of practice for the human resource profession. Refer to Table 19 in Chapter 5 for the detail. Finally, they should create strategies to develop skills amongst future employees by starting innovation circles and hosting webinars and digital hacks. Refer to Table 16 in Chapter 5.

With a long term focus on internal stakeholders, the research findings suggest that human resource teams should start to develop and build hybrid teams where humans are able to work alongside machines to ensure higher levels of productivity for an organisation. Refer to Table 18 in Chapter 5. They also need to develop new operating models for their functional teams as well as the organisation at large. Refer to Table 8 in Chapter 5. Further, the research findings suggest that human resource teams need to define new policies that are aligned with the future world of work and meets the demands of employees. Finally, human resource teams must develop new and innovative ways to encourage and support learning amongst employees.

With a long term focus on external stakeholders, the research findings suggest that human resource teams need to engage academic institutions to assist with defining curricula for developing skills that will be in short supply for the fourth industrial revolution. Refer to Table 15 in Chapter 5. Further, they need to track digital trends and promote graduate programmes to develop digital skills for the future. Refer to Table 16 in Chapter 5.

If human resource teams are able to adopt the above framework into their strategy, the research findings suggest that they will become more credible, strategic partners and will be able to add value to their organisations in new and innovative ways. Refer to Table 18 in Chapter 5. Further, they will emerge as modelling the next generation human resource team, which promises to operate very differently from current human resource teams. Refer to Table 17 in Chapter 5 for the detail of this next generation human resource team.

7.5. Implications for business and the human resource teams

The impact on business and human resource teams will be significant if both wish to remain competitive and add value to their customers. For business, the looming digital disruption will really transform and change their business products, operations and models, thus they will need to make some strategic decisions regarding how to digitalise in order to meet their customer demands. Once they understand how their business operations will be disrupted, it is imperative that they have a view of the skills and resources they will need from a human capital perspective. Thereafter they will need to develop or acquire these new skills in order to meet customer demands and remain relevant. Failure to transform may result in organisations becoming obsolete and irrelevant to their consumers.

The impact on human resource teams will also be immense. If the human resource teams do not adequately change their strategies to become more technologically advanced and automated, they will become insignificant to their organisations. Further, if they do not reskill and equip themselves with the right competencies, they will not be able to play the role of a true strategic business partner to their business leaders. This will compromise the credibility of human resources as a function in an organisation. For

this reason, in order for human resources to thrive in the future world of work and remain relevant, they need to engage technology by becoming familiar with its capabilities, understand digital disruption and its impact on the human resource function, and transform their strategies to embrace this anticipated disruption in a more organised and structured approach.

7.6. Limitations

The key limitations of this research are:

- Research that is qualitative and exploratory in nature is essentially preliminary as it explores concepts and ideas. Thus this research needs to be extended to a quantitative research that will generate more dependable results (Saunders & Lewis, 2012).
- Only a few experts were invited to participate in the research as the researcher's time and money was limited. As the researcher relied on the views of a small sample of experts, their views cannot serve as the views of the larger population, i.e. all human resource executives, human resource technology managers or human resource consultants, therefore its findings cannot achieve scientific generalisation (Saunders & Lewis, 2012).
- The use of judgemental and snowball sampling negatively affects the validity of data (Saunders & Lewis, 2012).
- As this was an exploratory research study, research bias may exist as such a research method is subjective and primarily reflects the views of the researcher (Saunders & Lewis, 2012).
- Even though many people were targeted and approached to participate in the research, the researcher could not guarantee maximum participation in the surveys due to the time required for them to share their insights and the multiple rounds of data collection.
- Not all the industries within South Africa were represented by the participants.

7.7. Suggestions for future research

This research study only focused on the views of human resource experts from the private business sector across a few industries. It could thus be valuable to extend this

research by focusing on the views of employees and how they see the future of jobs and their careers in this ever changing world of work. This may assist human resource teams to help prepare employees for the fourth industrial revolution. The outputs can be compared to the findings of this research study in order to define a comprehensive approach for how human resource teams can strategically prepare for the anticipated digital disruption.

Another opportunity exists for a study to be conducted to determine an organisation's readiness to adopt and embrace the fourth industrial revolution. This study could focus on how ready and equipped organisations are to transform their business operations, products and models. A key focus should be on the skills and competencies of their workforce to handle the demands of the fourth industrial revolution. The study can further evaluate the change and cultural transformation readiness plans and strategies in order for organisations to make a successful transition into the future world of work.

A further recommendation for future studies is the role of government and the private business sector in embracing and preparing for the fourth industrial revolution. This study can focus on how the private sector can lead in the investment required to explore and research the future world of work for the South African economy, and share those learnings and findings with government. Such learnings can assist government to develop appropriate policies to support the successful transition of the economy through the fourth industrial revolution. Further learnings can be shared with the education sector to prepare appropriate and relevant curricula for scholars and students, so that the right skills and competencies can be developed from an early age.

7.8. Conclusion

Digital disruption has the potential to make human resource teams more human, innovative and strategic. While it can create both huge excitement and fear across the human resource function, the choice is up to the human resources teams to adapt to digital disruption and flourish, or ignore the trends and become obsolete and irrelevant. Over the years we have witnessed the evolution of the human resource function, shifting from a traditional department that focuses on the manual execution of transactional tasks like the recruitment, retirement and benefits management of all employees, to having the

opportunity to be a business partner to support business transformation through developing advanced human resource practices that leverage strategy and operating models using talent, culture and leadership capabilities. However, technology disruption is challenging the human resource function to design strategies that deliver a different value proposition - one that includes digital disruption, better serves employees and customers, and delivers value to all shareholders both internally and externally.

Now is the time for human resource teams to play a leading role in transforming their organisations for the future world of work, however they first need to equip themselves with the right skills and capabilities, before getting a better understanding of technology and the changes it will bring to the human resource function. The rapid advancement in technology requires human resources to develop a growth mind-set, demanding continuous learning and upskilling in key areas. Human resource professionals are required to come together as a profession to research more around digital disruption and share their learnings and understandings so as to avoid previously experienced mistakes which can be costly and time consuming. Human resources teams will then have the ability to guide and lead their organisations into the future world of work by identifying and developing skills for the future and managing the change and culture transformation required. While technology will disrupt most jobs it will not completely replace all of them.

It is an exciting time as the next generation of human resource teams emerges with more strategic business enablement, real time data and predictive analytics. The choice to make the strategic shift to enable a digitalised value chain is not a matter of if, but rather a matter of when. The time is now for such a decision in order for human resources to remain relevant in any organisation.

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9. APPENDICES

9.1 Participation welcome message (Email)

Dear Colleague

Thank you for your interest and willingness to participate in this research study. I am finalising an MBA at the Gordon Institute of Business Science and I am currently completing the compulsory research which is in partial fulfilment of the degree. The purpose of this study is to determine: ***How will human resource experts be influenced by digital disruption when creating human resource strategies?*** Your expert opinion is crucial to the success of this study.

Within this study, ***digital disruption*** is defined as a phenomena that brings about change when business models and technologies alter the value proposition of current and already existing goods and services on the market as a response to developments in the information technology space. These changes could significantly affect the way work is conducted and the long term success of the organisation. Embedded within this definition of digital disruption lies artificial intelligence, machine learning, robotics, chatbots and predictive analytics etc.

The technique adopted to collect data will be the Delphi Technique which is a widely used research method to process expert knowledge about anticipated futures. It seeks to obtain areas of consensus and disagreement from a group of experts through a series of structured questionnaires. This study will utilise three rounds of questionnaires consisting of two to three open ended questions, per round, which will be conducted online during June and July 2018. As an expert you are encouraged to provide as much detail as possible in your answers to these questions. All responses will be analysed and emerging themes from each round will be reported back to the participants at the start of the next round. These themes may influence your thinking around the next set of questions.

This study uses snowball sampling so you are also encouraged to share the details of other suitable individuals who could contribute to the success of this study. On completion of the study I will provide you with the findings of this research. Should you require any further clarity or need more information please do not hesitate to contact me. I will be sending out the first round of questions in the next few days. Thanking you in advance for your contribution.

Mrs Vinolia Singh
MBA Student – Gordon Institute of Business Science
Contact Number: 0836478869; Email address: vsingh@ih.co.za

9.2 Recap on purpose and approach (online survey)

The purpose of this study is to determine: *How will human resource experts be influenced by digital disruption when creating human resource strategies?* Your expert opinion is crucial to the success of this study so please provide as much information as possible in your responses to the questions.

Within this study digital disruption is defined as a phenomena that brings about change when business models and technologies alter the value proposition of current and already existing goods and services on the market as a response to developments in the information technology space. These changes could significantly affect the way work is conducted and the long term success of the organisation. Embedded within this definition of digital disruption lies artificial intelligence, machine learning, robotics, chatbots and predictive analytics etc. When responding to the questions please think of it from a HR perspective, and how you think digital disruption is going to impact the HR department and how should the HR department proactively prepare for this disruption.

All responses will be analysed after each round and emerging themes from each round will be reported back to all participants at the start of the next round. These themes may influence your thinking around the next set of questions.

Please can you provide all responses for round 1 by Friday 6 July 2018 at 20h00.

9.3 Consent letter

I am currently a student at the Gordon Institute of Business Science and this compulsory research study is in partial fulfilment of my MBA degree. You have been invited to participate in this study that aims to investigate how human resource experts will be influenced by digital disruption when creating human resource strategies. There will be three rounds of online questionnaires and each round will require 15-20 minutes of your time. The insights gained through the questionnaires will help me to better understand how digital disruption will impact the workplace and how human resource departments can proactively prepare for this. I will share the results, at the end of this year, with the participants who complete all three rounds.

Your participation in the research study is voluntary and you may withdraw from the study at any time with no negative consequences. Your answers will be kept confidential. Your responses will be anonymous as only aggregated data will be reported at every stage. By completing the questionnaires, you will be giving your consent to participating. You can contact the researcher Vinolia Singh, or the supervisor Prof. Margie Sutherland if you have any uncertainties or concerns that relate to the study and/or the items in the questionnaire.

Researcher Details:

Vinolia Singh

vsingh@ih.co.za

0834678869

Supervisor Details:

Prof. Margie Sutherland

sutherlandm@gibs.co.za

9.4 Delphi round one questionnaire

Demographic information

This information is necessary for effective data analysis. Please note that your information will be kept confidential, and when information is shared with other participants, it will be done so only in an aggregated form without sharing any of your personal information.

1. What is your name and surname?
   Please enter your full name. This is for record keeping only, and will not be shared with the panel or in the research report.

2. Please state your job title/designation and the organisation that you work for.
   This information may be useful when discussing results. Please note that confidentiality will be maintained at all times.

Job Title	
Name of Organisation	

3. What is your area of expertise?
   Please select the option that is most appropriate to you.

☐Consultant in the HR field

☐HR Executive / Senior Manager

☐HR Technology Manager

☐Digital Disruption Expert

☐Other: | |

Question 1: In what way do you think digital disruption is likely to affect human resource strategies in the next three to five years? Please share as many thoughts as possible.

Question 2: What, in your opinion, should human resource teams be doing differently to prepare their departments and organisations for this digital disruption?

Question 3: What related questions would you like to ask the rest of the participants? Your questions could be included in the second round questionnaire.

Thank you for your time and input. I will analyse all responses and send out the consolidated feedback from Round 1 together with the questions for Round 2 within the next 2 to 3 weeks.

9.5 Delphi round two questionnaire

Dear Colleague

Many thanks for your time and input into Round 1 of the Delphi study into ***the anticipated effects of digital disruption on HR strategies***. I really do appreciate all your insights. The 25 participants who successfully completed the survey were from the following job categories:

Consultant in the HR Field	9
HR Executive / Senior Manager	6
HR Technology Manager	5
Digital Disruption Expert	5
Total	***25***

These participants were from various industries including financial services, automotive industry, FMCG, Auditing and Consulting.

As promised here are the themes that emerged from your responses:

Question 1: In what way do you think digital disruption is likely to affect human resource strategies in the next three to five years?

The table below indicates the number of times the themes were mentioned.

Rank	Construct	Frequency	Summarised Comments
1	Learning and Development	25	HR needs new skills to operate in the new world of work. They also need to develop the workforce to have more technical skills. Learning content must be made available in real time for just in time learning. Increase in gamification and learning will become more social. Need skills for new ways of leading and managing hybrid teams of both humans and machines.
2	Work Structures	18	There will be more flexible work structures, increase in virtual and dispersed teams and flat non-hierarchical structures. Employment contracts will be more project and skills based

			and demand for permanent roles will decrease. This requires new HR policies and strategies.
3	Automation of Tasks	13	More repetitive tasks will be automated. Both blue and white colour roles will be at risk. This creates an opportunity for HR to do more value adding tasks.
4	Data and Analytics	12	Need more big data and analytics for more powerful decision making. AI needs data to run effectively. Must have inclusive data sets for decision making and recruitment. Data security and privacy will become key. Data will be used to predict employee behaviour. Data quality will be of paramount importance.
5	Recruitment	11	Recruitment will be done via mass screening, audio and nerve sensing technology will add personality traits and behaviours into the selection process. More social media platforms will be used to select candidates. Recruitment profiles within HR will change. Machines will do first round interviews whilst humans will do negotiations. When recruiting watch out for biases created through AI.
6	Performance Management	8	Performance will be enhanced through digital engagement. Must manage performance combined with machines and humans. It will become more agile and frequent. Skills gaps will be picked up much faster.
6	Rewards and Recognition	8	Demand for customised highly individualised remuneration packages and rewards. Top digital skills will be in more demand, difficult to retain. Will require new reward policies.
7	Increase Social Cohesion	7	Need to find a balance between what is automated and what remains face to face. Careful not to remove all human interactions. Employees want to still experience humanness in organisation. Ensure work and private life balance.

Other key points raised a few times which are worth taking note of:

- HR's ability to reform policies taking into account the changes that digital disruption will bring about.
- HR's ability to understand employee behavioural changes as well as organisational culture changes.

- New industry players will spring up overnight and start-ups will be quick, agile and technologically driven.

Question 2: What, in your opinion, should human resource teams be doing differently to prepare their departments and organisations for this digital disruption?

The table below indicates the number of times the most mentioned themes appeared.

Rank	Construct	Frequency	Summarised Comments
1	Developing skills	15	They should focus on developing digital skills across HR teams and the broader organisation. Teach the employees to unlearn in order to relearn and continuously learning. Revolutionise training strategies to accommodate digital disruption as well as new technologies and ways of learning.
2	Manage change and lead transformation	13	Pro-actively embrace and manage change, became change fit. Manage and define a new culture that digital disruption brings about. Think about changes across HR practices and redefine strategies.
3	Become more customer centric	6	Get closer to the internal customers, understand your business intimately and your external customers. Place people back in the centre of the HR function. Bring back the humanness.
4	Change operating models	5	Influence a change in organisation and HR operating models to embrace technology. Move from traditional models to digital enabled models and flattened reporting structures. Transform from empowered leaders to empowered self-led employee structures.
5	Understand and embrace technology	4	Have an in-depth knowledge of the technology advances. HR should leverage technology in their function and prioritise HR systems if not already in place.
5	Data	4	Structure, organise and manage data more effectively. Analyse data for

			better informed decision making. It is the basis for everything else.

Other comments were:

- HR teams should understand the biases AI can bring about when doing recruitment.
- They should understand complexity and adaptive systems in more detail.
- Many respondents made comments around the role of government in preparing for digital disruption.

Delphi Round 2 Questionnaire (Used for HR Executives and HR Technology Managers)

Having now been exposed to the groups' responses from round 1, please could you answer the questions below. It will take about 8 to 10 minutes to complete. Kindly complete your responses by Wednesday 1 August 2018 at 20H00.

Question 1: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate to what extent your organisation is adopting technology across the various HR practices.

1.1 Recruitment

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

1.2 Learning and Development

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

1.3 Performance Management

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

1.4 Core HR for transactional tasks like leave management, payslip viewing etc.

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

Question 2: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate the competency level of your HR team in relation to the following skills.

2.1 The ability to manage change in relation to digital disruption

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.2 The ability to analyse data effectively

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.3 The ability to change and rewrite policies for digital inclusion

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.4 The ability to design learning and development strategies to embrace digital disruption

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.5 The ability to do organisational redesign in order to create new work structures that embrace and support digital disruption

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

Question 3: Finally, please could you give me your thoughts on each of the two following open-ended questions:

3a. Where are the skills shortages expected in your workforce in the next three to five years?

3b. What should your HR team be doing to prepare both your current employees and future employees to meet these skills shortages?

Delphi Round 2 Questionnaire (Used for Consultants in the HR field and Digital Disruption Experts)

Having now been exposed to the groups' responses from round 1, please could you answer the questions below. It will take about 8 to 10 minutes to complete. Kindly complete your responses by Wednesday 1 August 2018 at 20H00.

Question 1: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate to what extent your clients' organisations are adopting technology across the various HR practices.

1.1 Recruitment

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

1.2 Learning and Development

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

1.3 Performance Management

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

1.4 Core HR for transactional tasks like leave management, payslip viewing etc.

Not at all **To a great extent**

1	2	3	4	5	6	7	8	9	10

Question 2: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate the competency level of your clients' HR teams in relation to the following skill:

2.1 The ability to manage change in relation to digital disruption

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.2 The ability to analyse data effectively

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.3 The ability to change and rewrite policies for digital inclusion

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.4 The ability to design learning and development strategies to embrace digital disruption

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

2.5 The ability to do organisational redesign in order to create new work structures that embrace and support digital disruption

Not at all To a great extent

1	2	3	4	5	6	7	8	9	10

Question 3: Finally, please could you give me your thoughts on each of the two following open-ended questions:

3a. What skills shortages are expected in your clients' workforce in the next three to five years?

3b. What should their HR team be doing to prepare both their current employees and future employees to meet these skill shortages?

I look forward to your answers and will once again send you the results within a week or two after having received them, so that you can assess your input against all the other responses.

Many thanks for being part of the expert panel.

Kind regards,

Vinolia Singh

9.6 Delphi round three questionnaire

Dear Colleague

Many thanks for your time and input into Round 2 of the Delphi study into ***the anticipated effects of digital disruption on HR strategies***. I really do appreciate all your insights. The 20 participants who successfully completed the survey for round 2 were from the following job categories:

Consultant in the HR Field	6
HR Executive / Senior Manager	5
HR Technology Manager	5
Digital Disruption Expert	4
Total	***20***

These participants were from various industries including financial services, automotive industry, FMCG, Auditing and Consulting.

As promised here are the results and themes that emerged from your responses in round 2:

Delphi Round 2

Question 1: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate to what extent your organisation/ your clients' are adopting technology across the various HR practices.

These were the collective responses from all 20 participants. I grouped the HR Executives and HR Technology Managers together (10 participants in total for this group) and then grouped the HR Consultants and Digital Disruption Experts together (10 participants in total for this group). The table below shows the mean score for each HR practice.

HR Practice	HR Executives & HR Technology Managers - Mean Ratings	HR Consultants & Digital Disruption Experts - Mean Ratings
Recruitment	5.5	6.0
Learning & Development	6.5	6.8
Performance Management	5.5	6.2
Core HR	8.1	8.3

From the table above it is clear that a fair amount of automation is being used across the various HR practices with core HR having the most automation while recruitment and performance management having the least.

Question 2: On a scale of 1 to 10, with 1 being not at all and 10 being to a great extent, please rate the competency level of your HR team/your clients' HR teams in relation to the following skills.

These were the collective responses from all 20 participants. I grouped the HR Executives and HR Technology Managers together (10 participants in total for this group) and then grouped the HR Consultants and Digital Disruption Experts together (10 participants in total for this group). The table below shows the mean score for each HR competency.

HR Competency	HR Executives & HR Technology Managers - Mean Ratings	HR Consultants & Digital Disruption Experts - Mean Ratings
Ability to manage change	4.8	3.0
Ability to analyse data	5.1	3.5
Ability to change and rewrite policies	5.0	2.7
Ability to design learning & development policies	5.1	3.4
Ability to do organisation redesign	4.7	2.9

From the table above it is evident that the mean ratings between the 2 groups differ with the HR Executives and Technology Managers claiming to have a higher level of competency across the 5 HR dimensions compared to the HR Consultants and Digital Disruption Experts who rate the HR teams to have a lower level of competency.

Question 3: Finally, please could you give me your thoughts on each of the two following open-ended questions:

3a. Where are the skills shortages expected in your workforce/clients' workforce in the next three to five years?

The table below indicates the number of times a particular theme was mentioned.

Rank	Construct	Frequency	Summarised Comments
1	Complex problem solving	12	With this skill we will be able to solve near-impossible problems. In a fast changing world, problems starting to evolve. We need to develop the mental elasticity to solve problems we never seen before.
2	People management	8	We need more equipped leaders who can manage diverse teams including a hybrid of people and machines and those who are more agile.
2	Analytical skills	8	A key feature of the fourth industrial revolution is that mass standardisation is being replaced with

			mass customisation. We will also need the ability to use data effectively through intense analysis.
3	AI and Robotics programmers	7	Technical skills needed to be able to manage and use disruptive technologies to enhance business strategies. Digital skills sets needed to manage product and services online for a hyper-personalised platform driven business.
4	Creativity	6	The ability to design for bespoke customer requirements.
5	Change and culture management	5	Not only do we need to manage change through digital transformation but also the organisational culture transformation that is required.
5	EQ	5	We need to develop intense emotional intelligence skills in humans as this is what will differentiate them from the machines and give them a competitive edge in the organisation.
6	Critical thinking	4	The ability to think at a more complex level to resolve problems at an eco-system level and not at an individualistic manner.
7	Customer centricity	3	We need to have an intense ability to look for ways to help customers and this means we need to step into the minds of users. We need to think what they value, what their fears and dislikes is. Your company's edge will rely on this information to develop new products.

3b. What should your HR team/clients' HR team be doing to prepare both your current employees and future employees to meet these skills shortages?

Current Employees	• Create opportunities for employees for develop a growth and continuous learning mind-set. • Encourage online training and gamification initiatives to promote skills required in the future. • Expose employee to the core concepts of digital transformation by using virtual learning. • Learning programmes internally should immediately shift from the big compliance focus as it currently is, to a digital competency building focus.

	• Organisation policies need to change to encourage and reward innovation and digital disruption in our ways of work.
Future Employees	• Create innovation circles that promote digital disruption. • Develop university partnerships to advise and inform curricula design for future skills shortages. • Promote graduate programs that target the development of skills needed for the future. • Host webinars and events to educate students and promote the skills needed to support digital disruption. • Host hackathons to promote the skills needed to support digital disruption.

Delphi round three questionnaire

Having now been exposed to the groups' responses from round 1 and 2, please could you answer the questions below. Kindly provide a minimum of 3 points for each question. It will take about 8 to 10 minutes to complete. Kindly complete your responses by Friday 24th August 2018 at 20H00.

Question 1: With digital disruption complementing the HR delivery of services, how do you see the next generation HR function being different from today's model?

Question 2: By embracing digital disruption, how do you think HR can create value for organisations in new and innovative ways?

Question 3: What should the HR profession be doing as a collective to enable themselves to optimally embrace the forthcoming digital disruptions?

I look forward to your answers and will once again send you the results within a week or two after having received them, so that you can assess your input against all the other responses.

Many thanks for being part of the expert panel and participating in this research study.

Kind regards

Vinolia Singh

9.7 Ethical clearance

Gordon Institute of Business Science
University of Pretoria

18 June 2018

Vinolia Singh

Dear Vinolia

Please be advised that your application for Ethical Clearance has been approved.

You are therefore allowed to continue collecting your data.

Please note that approval is granted based on the methodology and research instruments provided in the application. If there is any deviation change or addition to the research method or tools, a supplementary application for approval must be obtained.

We wish you everything of the best for the rest of the project.

Kind Regards

GIBS MBA Research Ethical Clearance Committee

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