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The Preparedness of Employees for the New World of Work in the Fourth Industrial Revolution: Evidence from South Africa

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Abstract

The Fourth Industrial Revolution has become popular around the globe and in almost every industry. Thus, it is set to influence every aspect of business. While previous theoretical and empirical work documents trends of industrial revolution, the preparedness of employees for the new world of work in the Fourth Industrial Revolution remains unchartered territory. Hence, the purpose of this paper is to explore the preparedness of employees for the new world of work in the Fourth Industrial Revolution with eThekwini Municipality in South Africa serving as a case study. The qualitative research methodology was selected as a preferred approach because it reinforces an understanding and interpretation of the meaning as well as the intentions underlying human interactions. A cross-sectional research design was used in the study. A final sample size used for the study consisted of 10 respondents within the municipality. The findings of the study indicated that both the organisation and its workforce are not adequately prepared for the Fourth Industrial Revolution. The research findings provide the leadership and management of the eThekwini Municipality in South Africa with an understanding of the Fourth Industrial Revolution and the importance of preparing employees for the new world of work.

Keywords: *Fourth Industrial Revolution; Robotics; Internet of Things; preparedness of Employees; South Africa; eThekwini Municipality*

Introduction

As the world evolves in terms of technology, most organisations change too. For organisations to be competitive, both locally and internationally, Sutcliffe and Bannister (2020) states they need to keep up with the period of rapid transition, the Fourth Industrial Revolution. This raises important questions regarding how post-school education and training should prepare the workforce for the new work environment so that they can survive in the days of robotics, automation, artificial intelligence, and connectivity (Ashford, Caza & Reid, 2018). The Fourth Industrial Revolution is defined as a world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives (Kumar, 2018). The speed and measure of the changes brought by the Fourth Industrial Revolution cannot be ignored. These changes bring about shifts in power, wealth and knowledge. Only if one become knowledgeable about these changes and the speed at which this is occurring, can ensure that these advances in knowledge and technology reach everyone and benefit all (Hirschi, 2018). Importantly, organisations and education systems need to also change to ensure global competitiveness. According to Reddy and Govender (2019), most strategies and policies of organisations in South Africa are not in line with the Fourth Industrial Revolution. Hence, there is nothing in place regarding how the organisation may prepare its employees for the new world of work in the Fourth Industrial Revolution. Understandably, there are concerns that autonomous machines are increasingly taking over tasks that humans have always performed, leaving many jobless. However, it seems more likely that many new jobs can be created if the power of data is harnessed and used in a meaningful way.

The X-generation, baby-boomers and traditionalists are fixated on the old ways and they are uncomfortable with the new way of doing things, thus, they never want to evolve with technology (Liu, 2018). The Y-generation and millennials get bored as a result of the old systems, thus resulting in a high staff turnover rate. Therefore, it is clear that if the study is not conducted, the organisations may not be able to align its processes with the Fourth Industrial Revolution concepts in order to prepare its employees for the new world of work. In addition, if the study is not conducted, it may result in having employees with no capacity to cope with the new technology, thus resulting in low productivity and high costs or wasteful expenditures (Xu, David & Kim, 2018). The organisations may also fail to retain skills. The results of the paper provide the organisations with an in-depth knowledge and understanding of the Fourth Industrial Revolution as well as the importance of preparing employees for the new world of work.

The organisations in South Africa largely operate under old processes when it comes to technology (Reddy & Govender, 2019). It is evident that only 30 per cent of employees in South Africa have access to technology and the remaining 70 per cent make use of manual inputs and paper. It is clear from the above facts that if the study is not conducted, the organisation under the study may not be able to align its processes with the Fourth Industrial Revolution concepts. This may result in negative effects, including but not limited to, having employees with no capacity to cope with new technology, thus resulting in low productivity and high costs or wasteful expenditures. The municipality may fail to retain skills which may affect service delivery and may not attract the right skills for it to survive. There is a need to conduct a study to determine the employees' preparedness for the new world of work in the Fourth Industrial Revolution with the eThekwini Municipality in South Africa serving as a case study. This gives an assumption that the organisation leaders, managers and employees are not prepared to work in the new world of work in the Fourth Industrial Revolution. If the study is not conducted, it must be noted that the organisations may not be able to achieve its 2030 vision, service delivery can be affected causing negative impacts to the communities serviced and employees may not be capacitated to cope with the advanced technologies of the new world of work in the Fourth Industrial Revolution. The objectives of the study are to determine the understanding of the

new world of work in the Fourth Industrial Revolution, and to discover the extent to which employees are prepared for the new world of work in The Fourth Industrial Revolution.

Literature Review

Biswas (2019) states that the world of work is changing and in the centre of the 4IR. There is no doubt that businesses are affected by the rapid pace at which technology is growing. The internet of things, artificial intelligence, and automation are transforming how businesses operate (Shahroom & Hussin, 2018). The line between physical, digital, and biological spheres is becoming increasingly blurred which makes it crucial for business leaders to assess the opportunities, risks, skills, and wider societal implications brought about by this transformation. According to Gallardo-Gallardo (2018), the Fourth Industrial Revolution radically change the way people work and live. The Fourth Industrial Revolution is rising out of the Third Revolution but is considered a new era rather than a continuation because of the explosiveness of its development and the disruptiveness of its technologies. Peters (2019) indicates that the new age is distinguished by the speed of technological breakthroughs, the magnitude of the scope and the tremendous impact of the new systems. Manavalan and Jayakrishna (2019) states that the internet plays a key role in new and advanced technological developments, as the platform for Artificial Intelligence (AI) allows the development of services with important implications for the continuous development of a trusted internet. AI has an impact in changing how organisations operate today. Aerobatics is one of the South African organisations which has evolved to accommodate the Fourth Industrial Revolution through its technologies (Wang & Siau, 2019). The previous three industrial revolutions have been defined by the technological advances such as steam engines, electricity, and computers (Piccarozzi, Aquilani & Gatti, 2018).

Sousa and Rocha (2019) indicate that the employment scene is changing at a very fast pace and it is important to be aware and understand these changes. Companies can no longer afford the luxury of waiting to see what happens. Wichmann, Eisenbart and Gericke (2019) state that ten years ago, it was not easy to share one's information with everybody as easy as it happens today. The role of social media is playing a pivotal role in people lives, and they are so much more comfortable about it. Access to information through sharing and communication, build communities and shapes personal experiences (Webb, 2019). These new behaviours are spreading across organisations, and by doing so, they are forced to make changes. Big data like the cloud, the internet of things, robots, automation, videos and collaboration platforms are changing the way employees think, live and work (Fareri, Fantoni, Chiarello, Coli & Binda, 2020). The cloud puts the power of technology into the hands of employees. Software and robots are compelling management of the organisation to redesign the jobs of humans to match up with these robots and software (Horváth & Szabó, 2019). Recent research Almeida, Santos and Monteiro (2020) has found that by 2020, millennials are expected to make up about 50 per cent of the workforce, and by 2025 this number is projected to be 75 per cent. The key fact about millennials is not the fact that they might bring new methods, designs, ethics or styles of working, it is that there are going to be so many of them (Li, Bonn & Ye, 2019).

Brougham and Haar (2018) state that preparing for the next major economic disruption requires forward-thinking and strategic analysis to determine the best technology that benefit everyone, not only investors and shareholders. Along the same line, Kazekami (2020) alludes that even those who did not believe in the 4IR reality, thinking that it may replace lives and jobs with robots, realise the difference technology has made for the benefit of human beings. Meetings, workshops, training sessions and even conferences and product launches can be done virtually without anyone having to leave the comfort of their home. Platforms and apps like Stock, Obenaus, Kunz and Kohl (2018) have a common language, enabling teams to stay connected without being in the same office. It played a very critical role during the COVID-19 pandemic. The literature review above provided insight into the fundamental issues on

the Fourth Industrial Revolution. As industrial revolutions have moved from the mechanisation of production in the First Industrial Revolution, to the mass production in the second, and then to the automation of production in the third, the standards of living for most people around the world have greatly improved (Lee, Yun, Pyka, Won, Kodama, Schiuma & Zhao, 2018). Undoubtedly, the capability of advancing technology coming forth from the latest industrial revolution has the potential to make even greater improvements in every aspect of human lives than the first three industrial revolutions summed together.

Human Capital Theory

Human capital theory relates to the investment in employees through employing physical means such as technology and machinery (Wright & Constantin, 2021). The prime aim is to stimulate efficiency and productivity by offering employees training that cover the technological issues considering the rise of Fourth Industrial Revolution in different workplaces. In this case, human capital theory focuses on improving both the technological infrastructure and employee competencies to copy with Fourth Industrial Revolution. According to Rodokanakis (2021), human capital includes means for improving human qualities which can affect financial output and productivity. In other words, organisations are expected to invest in human capital through harnessing technological infrastructure and expertise to full embrace the Fourth Industrial Revolution. Hence, human capital theory helps to measure the preparedness of employees in terms of the required skillsets, knowledge, values, and abilities to operate technological infrastructure. Libanova, Makarova & Sarioglo (2020) state that employees are seen as assets and then humans.

Data & Methodology

The qualitative research approach was selected because this approach reinforces an understanding and interpretation of meaning as well as the intentions underlying human interaction. This approach is suitable for this study, as it allows for an in-depth investigation of a problem in one or more real-life settings. The study will adopt a case study research design to provide an in-depth study of the research problem in question. In this study, the target population was 600. Purposive sampling was used to identify the target population, as it consisted of executive and senior levels of management of the organisation who are responsible for the drafting and approval of strategies and policies for the entire organisation. The final sample size which will be used for the study is ten. The sample consists of a city manager, three deputy city managers, two heads of clusters, two deputy heads and two senior managers. Interviews were used to collect data from the participants. The researcher chose interviews to collect data in order obtain insights into the data collected. This allowed a flexible and interactive approach to provide clarity regarding some responses as well as follow-up questions to obtain detailed feedback. To ensure that the responses in the interview were trustworthy, a voice recorder was used to ensure accuracy and recurring patterns were identified during the data collection process. Thematic analysis was utilised in this study, as it is widely used in qualitative research and has been appreciated in the same way as a grounded theory. In terms of ethical consideration, an informed consent form was signed by each participant, as it was important that the respondents made an informed decision to participate in the study.

Results and Discussion

The interview was carried out to all 10 respondents and all 10 agreed and signed consent forms. However, the 10th respondent got in a critical situation, which prevented him from attending an interview. This resulted in conducting interview to 9 participants, timing also prevented the researcher to find replacement of the 10th participant. One of the objectives of this paper is to determine the

eThekwini Municipality's understanding of the new world of work in the Fourth Industrial Revolution. To establish the eThekwini Municipality employees' understanding of the 4IR, nine participants were requested to articulate their understanding of the 4IR. The results indicate that research participants clearly understood the 4IR. Instead, they demonstrated an understanding of the possible impact of the 4IR. The results shows that a clear understanding of the 4IR, articulating it as the ongoing automation of traditional manufacturing and industrial practices using modern technology, through the internet of things. One of the response from that participant was quoted verbatim: *4IR is a technological era characterised by the use of robotics, automation and a whole lot of new technologies to do what otherwise have been called manual jobs.*

4IR Relevance to eThekwini is that the city is rated amongst the best cities in the world and therefore its technology and digital status must remain competitive to be comparable and competitive with the rest of the world. Another response was quoted verbatim: *In terms of my understanding, I think it refers to the new way of doing things. I think there will be a lot of technological changes that will be witnessed when the 4IR kicks in, and these changes will be primarily everywhere. When I say everywhere, I mean the effects of the change will be felt in the marketplace.*

They will be felt in businesses and felt by individuals in things that they do on a day-to-day basis. There will be an aggression in automation of things.

The 4IR will affect everyone. So, eThekwini Municipality will not be in isolation. It will also feel the effects of the 4IR. So, it would be relevant for the municipality that they adapt now to change and adapt to this way of doing things.

The second objective of this paper is to understand the extent in which employees of the eThekwini Municipality are prepared for the new world of work in the Fourth Industrial Revolution. To establish the eThekwini Municipality employees' preparedness for the new world of work because of the 4IR, participants were requested to articulate their views on their readiness for the new of work. The results indicate that the participants felt that both the organisation and its workforce are not adequately prepared for the Fourth Industrial Revolution. The findings also shows that eThekwini is still very much inclined to doing things the traditional way. Issues of productivity or the concept of productivity is somehow translated to seeing the employees in the office as opposed to looking at the outputs. This is a clear indication that there was poor preparedness in terms of moving forward with the times because the current situation requires organisational agility. This necessitates that people need to adapt to change and should be comfortable with the workforce using other means to work. They further observed that there are units that are resistant to this concept of people working from home. The results show that the eThekwini Municipality was embarking on a journey of being a smart city in which all the available technology to make an impact is used. The results indicate that there were serious infrastructure challenges which include lack of availability of optic fibre to enable internet connections. One of the participants was quoted verbatim:

I am not aware of any plan or strategy. I would say that from my observation in terms of how the effects of COVID have been handled, one would say there isn't much preparedness from the municipality. I would say eThekwini is still very much inclined in doing things the traditional way.

For some units, it still difficult to have employees to work from home. Issues of productivity or the concept of productivity is somehow translated to seeing the employee in the office as opposed to looking at the outputs. I would say that to me shows that there isn't any preparedness in terms of moving forward with the times, because right now the situation we are in, is to a certain degree forces one to move with the times .I think what is most important is that the team members should be made aware of the coming change. It is important that one keeps up to date and align their skills with whatever will remain and needed in the workforce. It is important that I make sure that

they are aware of the effects of the 4IR and particularly the effects on their personal careers. Another response was quoted verbatim: *Deploy intelligent automation tools to complement human workers to free up employees' time to concentrate on more stimulating and value-adding tasks. Invest in digital training and skill building programmes augmented by industry experts. Embed high-impact cultural traits (e.g., innovation, integrity, flexibility, etc.) into performance management programmes to instil these behaviours in managers and employees.*

Adopt, update, and strengthen policies to mitigate adverse social and economic consequences of automation and AI - such as the displacement of workers in some lower-skilled jobs, and widening social inequality. Embark on a huge change management and education drive, identifying digital threats to employees, digital capabilities that the municipality possesses, and any digital gaps that exist. Educate and train municipal employees in the new complexities involved in running a municipality in the 4IR era.

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Regarding the question relating to the workforce preparedness for the new world of work, all the results shows that there was a need for the organisation to ascertain the required tools that are going to be utilised because of the 4IR. Secondly, the city's ability to allocate the necessary resources for the acquisition of those tools, and the necessary resources for the familiarisation and acclimatisation thereof were a critical consideration for success. However, the results indicated that the recent experience with COVID19, propelled the organisation into virtual business engagements. These engagements became possible because the city was able to provide the required resources, although they were not adequate due to the sheer size of the organisation, but it was a good yardstick of what is possible. There are people that were made to stay at home, as the city could not afford to give them the tools of the trade. It therefore defeats the purpose, and they would only be able to use these devices if they were present in the office. Unfortunately, going into the office was not possible in some instances because of the social distancing requirements. The respondents further noticed that during this period was the city's lack of preparedness to adapt to the new conditions. There is a need for employee upskilling and re-skilling, where employees need to be in a situation where they are taught about the systems that they are using, their capability and capacity thereof and the dangers and risks associated with them. For instance, the city once had an internal meeting through Microsoft Teams which unauthorised participants attended. This raised security questions regarding how the city would protect the organisation's information.

The results indicate that a mindset shift was required, as the city is not a business that 'goes with the flow'. The pandemic situation has forced some respondents to start thinking about the input costs in any situation. As a business, a measurement and evaluation of the effectiveness of the application of the technological resources such as the consumption of the money that have invested, and then to derive the desired benefit. There must be value attached to the output. In addition, the

findings indicate that it was important to change the paradigm in employees, and to ensure that the organisation is always conscious that it is not simply about the staff. It is about the benefit to the system and the end-user of what is being generated in the value chain. The benefit is that if the workforce work through a smart city project, it then forces the organisation to work smart and forces the employees to not unnecessarily expand the energy available, but to consider better and more effective ways of delivering a service. The 4IR provides the eThekwini Municipality with an opportunity to reduce the physical input which might be unnecessary.

Discussion

The findings of the study indicated that both the organisation and its workforce are not adequately prepared for the Fourth Industrial Revolution. The results were in congruence with a study conducted by Reddy and Govender (2019) on governance towards digitalisation at eThekwini Metropolitan Municipality which revealed that there was limited digitalisation and poor support from the national government. The examination of employee preparedness for the new world of work revealed that the 4IR could create new opportunities. Due to innovations in work and co-working spaces, global interconnectivity will likely provide a unique opportunity for the youth across the globe to bypass barriers to entry into traditional employment. The results further revealed that technological advancements require the active support and development of employees through change management programmes. The results were in line with a study carried out by Kumar (2018) on the 4th Industrial revolution in South Africa which found that both private and public organisations need to develop the capabilities in the areas of science, technology and innovation. In addition, research findings showed that there is growing emphasis on continuous and lifelong learning to help employees adapt and participate in the changing landscape of work. The findings contracted Horváth and Szabó (2019) who conducted a study on driving forces on 4th Industrial Revolution and found that multinational enterprises and big organisations have higher driving forces and lower barriers to industry 4.0 than small and medium-sized companies.

The findings indicated that there was a big reluctance to accept technological advancement within the eThekwini Municipality due to the fear of job losses that may occur because of these advancements. A study carried out by Li, Bonn and Ye (2019) on artificial intelligence and robotics awareness and its impact on turnover intention revealed that AI and robotics awareness were significantly associated with employee turnover intention. Brougham and Haar (2018) studied employees' perceptions smart technology, artificial intelligence, robotics, and algorithms and found that employees feel unappreciated and undervalued when employers actively explore today's advanced technological options for human labor. The results revealed that while technology is enabling people to become more productive than ever before, it is also making businesses more at risk from security threats from the perspective of cybersecurity. The results were confirmed by Horváth and Szabó (2019) who conducted a study on driving forces on 4th Industrial Revolution and found that management desire to increase control and enable real-time performance measurement is a significant driving force behind Industry 4.0. The research indicated that there is a great need for the reskilling and upskilling of employees within the eThekwini Municipality to ensure an inclusive environment that provides for the needs of all its employees. There are available initiatives that can be employed by the eThekwini Municipality to improve the preparedness of the employees and the organisation for the 4IR.

The study found that most of the participants were satisfied with their managers, and that most of the respondents demonstrated enough understanding of the 4IR and the associated challenges related to digitisation. The findings contracted Horváth and Szabó (2019) who conducted a study on driving forces on 4th Industrial Revolution and found that multinational enterprises and big organisations have higher driving forces and lower barriers to industry 4.0 than small and medium-sized companies. The

research participants further explained that the 4IR captures the idea of the confluence of new technologies and their cumulative impact on our world. The research results indicated that there were concerns relating to the fact that artificial intelligence could produce a medical diagnosis from an x-ray faster than a radiologist with pinpoint accuracy. The research results indicated that there is a great concern that digitisation may contribute to an increase in unemployment as most services become automated. Stardom.

Conclusions and Recommendations

This study sought to evaluate the eThekwini Municipality employees' preparedness for the new world of work in the 4IR. The study found that whilst most employees understood the concept of the 4IR and its associated benefits and risks, the organisation and employees were not ready for the 4IR. The findings indicated that employee skills and knowledge in the digital era require strong attention, in terms of reskilling and upskilling. The findings further revealed that employees were not aware of any organisational digital strategy or employee development initiatives linked to the 4IR. Thus, the organisation and employees were not well prepared in terms of the utilisation and security risks associated with organisational advancements. These findings suggest that the eThekwini Municipality should have programmes and strategies in place that are designed to ensure that the organisation maintains its competitive edge through appropriate technologically aligned employee and organisational development initiatives.

The study provides the leadership and management of the eThekwini Municipality with an understanding of the Fourth Industrial Revolution and the importance of preparing employees for the new world of work. Recommendations will assist in strategy and policy review as well as the drafting of the employees' developmental plan in line with the new world of work in the Fourth Industrial Revolution. Employees will benefit, as they will be capacitated so that they are able to work with advanced technologies and understand how the new world of work operates. This may further improve productivity in the organisation. The study was limited, single organisation, to the eThekwini Municipality's executive and senior management levels, as they had the right information regarding the topic of this study. Thus, the results represented the employees for the eThekwini Municipality, therefore the results cannot be generalised to other organisations unless they share the same setting.

Implications of the Study

The eThekwini Municipality needs to have a change in management to embrace the 4IR and receive services that are driven by technology which can respond to the needs of employees. The city's leadership needs to plan for 4IR with a view to implement. This approach transcends from the planning phase and move into implementation. The organisation needs to consider the upskilling and reskilling of employees to avoid redundancies in skills sets. There is a serious need to capacitate employees so that people can move from using physical applications to working in the context of the new virtual environments. If the city can make these things as practical as possible, even employees that are not "sophisticated" would understand how to technological tools. The eThekwini Municipality needs to be able to advise the workforce that they can translate what they do in their private capacity into things that they can do in the workplace. These programmes should be designed to raise awareness of the future skills and competencies requirements driven and impacted by technological advancements.

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