Frankenstein and the Fourth Industrial Revolution (4IR): Ethics and Human Rights Considerations

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Abstract

The "Fourth Industrial Revolution" (4IR) is an expression, which is now used to frame and assess the impact of emergent technologies in the 21st century. The rapidity and quantity of changes that are occurring will result in socio-economic and also political upheavals as there are likely to be increasing shifts in power dynamics, wealth acquisition, and information. This is clearly a foremost transformation in society, and especially the IT worldview demands appropriate ethical insights, actions and sanction. If we are conversant about the vicissitudes and the rate of their occurrence, society will be better placed to try to ensure that advances in technology will benefit all stakeholders. How organisations are likely to respond to the 4IR and its ethical challenges, especially human rights', is critical. It is certain that management in for example a hotel will need to understand and consider which technologies may affect them and whether there are opportunities or threats to be faced through the 4IR. Drawing on scholarship in an extensive range of disciplines, this article examines the 4IR and how it will impact on human rights and be accommodated within existing legal frameworks pertaining to labour issues. The study has been based on an interpretivistic paradigm which is phenomenological, and in which reality is socially constructed, and thus consists of multiple realities. There is thus a hermeneutic and subjective understanding and interpretation of texts. Epistemologically considered, knowledge is viewed as subjective and relative, and many truths and 'knowledges' exist depending on one's perspective and social context. Axiologically then, this conceptual literature study is valuable as it reflects human subjectivities relating to and deliberating upon the foremost features of the 4IR and the various challenges posed by both ethical and human rights perspectives.

Keywords: Technology, automation, human rights, 4IR, skills.

Introduction

The novel *Frankenstein* written by Mary Shelley in 1818 provides us with a lens through which to scrutinize scientific innovation.

> Victor Frankenstein is a rich Genevan who shows great promise in scientific
> research. After his mother's death, he somehow figures out how to endow

> dead flesh with life, but the being he makes is nightmarishly ugly, so he abandons it. In the wilderness, it manages to educate itself, becoming an astute thinker but also coming to resent its creator…We all know that Frankenstein is the doctor and his creation is the monster, but to some extent it's the doctor himself who's made monstrous by his inability to take responsibility for what he's wrought… Soon enough, the man-made monster begins to take revenge on Frankenstein by lashing out at his loved ones, a process that only accelerates after the scientist fails to meet the creature's (relatively civil) demands. Before long, almost everyone is dead, everything's on fire, and Frankenstein and his creature are chasing each other across the Arctic on sleds… The book's subtitle—The Modern Prometheus—also contains an important mythological clue: Prometheus brings fire to the mortals and unleashes dire consequences in the process, granting them the ability to burn down the world. (Brogan, 2017).

Throughout history, and the previous industrial revolutions, technology has continuously been the *avantgarde* for human progress. There is no doubting that it has created new opportunities and while 4IR will bring it opportunities and continue to grow in the future, there is a strong indication that those who benefit will be few-and-far between.

The Fourth Industrial Revolution (4IR) is part and parcel of a movement that is redefining the fundamental meaning of social and economic activity in a 'Frankensteinian' sense. It is obliging organisations and academics to re-evaluate the relationship between employers and their employees. The 4IR will exert pressure on control and modes of governance in organisations. The literature suggests that the basic responsibilities of businesses require that they consider the legal and social justice aspects of employee rights as they seek to align their practices with emerging global trends. Like each of the industrial revolutions preceding it, 4IR brings opportunities and also threats for individuals and industries in which they operate. The world is currently in a Fourth Industrial Revolution which is a technological revolution that will essentially and progressively alter the way we live, and work. The scale, scope and complexity of this revolution is clearly unlike all prior revolutions and there will be increasing ambiguity, volatility, chaos, disruptive innovation and uncertainty.

Today computer technology is progressing at very high speed and has breached all facets of society and human activity and so society is and will be subjected to fundamental changes. For example, the organization of the public sector, manufacturing as well as the sphere of private enterprises will not escape the changes and such a transition to the new paradigm will take at least one or two generations (Weiler, 2017).

In 2017, Klaus Schwab the founder and executive chairman of the World Economic Forum acknowledged the advent of the Fourth Industrial Revolution (4IR), which is characterized by an amalgamation of technologies that alter the lines between the physical, digital, and biological spheres. • Compared to previous industrial revolutions, the current one is evolving at an exponential rather than a linear pace, with potentially significant impacts on work, services, education and leisure (van der Woude, 2019). Schwab asserts that: "We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academic and civil society" (Schwab, 2015).

Research method

This study was motivated by the deficiency of literature about 4IR and its likely human impacts in a South African context. As an exploratory study, the researcher was concerned in investigating how South Africa should face up to 4IR risks, so as to limit the severity of the 4IR impact.

The primary objective of this study was therefore to investigate the risks to South African labour and industry. To address this objective, a number of secondary objectives were formulated and can be stated as follows:

•	To understand how industrial revolutions impact/ed society.

•	To explore the South African scenario iro the mining sector and the services sector.

•	To explore how 4IR risks could be managed in organisations to mitigate winner-

 loser scenarios emerging with the application of 4IR technologies.

Reality is highly subjective and to a large extent constructed by human consciousness. This study thus followed an interpretivist ontology in order to determine the realities about risk in 4IR. The study has been based on an interpretivistic paradigm which is phenomenological, and in which reality is socially constructed, and thus consists of multiple realities. There is thus a hermeneutic and subjective understanding and interpretation of texts. Epistemologically considered, knowledge is viewed as subjective and relative, and many truths and 'knowledges' exist depending on one's perspective and social context. Axiologically, the research aspect is a value laden enterprise which then reflects human subjectivities.

Literature review

The literature trends are presented under these sub-headings which follow.

Industrial Revolutions

There have been three industrial revolutions prior to the current 4IR which is in operation. The areas of innovation and key stresses in the sequence of these revolutions was, sequentially stated, steam, electricity, computing and intelligence and their uses.

In the initial Industrial revolution or First Industrial Revolution which developed during the 19th century, water and the steam engine were key aspects which ultimately made possible the conversion of the predominantly farming and feudal society to a manufacturing society. Agriculture was replaced by industry as the underpinning of the economic structure of global society (Hoppit, 1987). In the process of this revolution, there was a an inordinate discontinuity, as there was a transition from one kind of society and economy to another (Thompson, 1973: 29) and women were forced out of manufacturing roles they played in support of a male controlled and dominated shop floor culture.

In the Second Industrial Revolution from the 1940s to the 1970s, there was a scientific-technical revolution in which there was a rapid industrialization by means of oil, petroleum and electricity to power mass production processes and the mechanization of manufacturing. Electrical energy was used to generate mass production processes. In this period the combustion engine began to use the new resources and the steel industry began to make headway. Science and technology was considered to be the path to an improved life and progress was considered to be inevitable (Smil, 2005).The invention of motor vehicles and

aircraft had a huge impact upon the economic and industrial archetypes which were centred on large factories and the organizational models of production. Communication also changed through the invention of the telegraph and the telephone (Gray, 1984; Sentryo, 2017).

The Third Industrial Revolution followed and was involved in the application of electronics and information technology and was thus termed a Digital Revolution. Both electronics and information technology were applied to drive the automation of production. Nuclear energy was harnessed and electronics developed via transistors and microprocessors and of course also the upsurge of telecommunications and computers. As information technology (IT) spread in usage and reach, society became grounded on the Collaborative Common which is defined as the Third Industrial Revolution era and also the zero marginal cost society (Rifkin, 2014).

The Third Industrial Revolution in many ways moulded the post Second World War world that required some economic revitalizing and a new political dispensation. Both governments and industries began to identify the influence of computers on all aspects of life. This revolution resulted in the era of high-level automation in production based on androids and programmable logic controllers (PLCs) (Sentryo, 2017). The flourishing technologies of the Third Industrial Revolution were generating new products and new industries but also energized current industries by refining products and the various manufacturing processes, heralding the renewable energy based society. They also transformed markets and remodelled companies in the markets (Rifkin, 2011; Gray, 1984). The Fourth Industrial Revolution is a radical change that transpires once IT burgeons in all industries, including the primary, secondary, and tertiary industries and it is a consequence of the horizontal development of IT. This means that 4IR is essentially a creative linking between technology and the market in every industry grounded on IT (Yun, 2017). But will South Africa be left behind again? Or will we be able to change everything by jumping on board the 4IR train? And, if we do, what could it mean for us? Here, At the edge of the world?

The current position

There is currently a weighty archetypal shift taking place, specifically the swing from the mechanistic to the information-knowledge era, which is grounded in microelectronics and the computer sciences. The rapid technological transformation -4IR- which is currently underway is the driver of changes which are pertinent in all industries and in every aspect of society. It is coalescing technological and human capabilities in an unparalleled manner through inter alia, self-learning algorithms, self-driving motor vehicles, human–machine synergy and big-data analytics which are all forming and moulding the impending new operational world via their numerous effects on both the private and public sectors. The 4IR emerged through the use of cyber-physical systems (CPSs), the Internet of Things (IOT), and services (Pfeiffer, 2017).

The current Fourth Industrial Revolution (4IR) is thus in progress and is ongoing, and began with the development of the Internet. It is based on digitalization which allows the creation of a virtual world which will control physical world (Hughes, 2004; Gershenfeld & Vasseur, 2014; Prisecaru, 2016). It is characterized by the integration of technology that "… blurs the lines between the physical, digital and biological spheres to completely uproot industries all over the world. The extent and depth of these changes are a sign of transformations to entire production, management and governance systems" (Schäfer, 2018). The 4IR is also widely referred to as the Digital Revolution and it increases globalisation. The growth of technology which is driven by the 4IR will demand the existence of 4IR capable employees with exceptional proficiency in all industries and their various sectors.

However, there some serious challenges. For example "Since 2000, 52 percent of the companies in the Fortune 500 have either gone bankrupt, or have been acquired, or have ceased to exist" (Wang, 2014) and this is primarily due to the fact that the digital transformation has become a great priority on most leadership agendas. About 90% of business leaders in the U.S.A and U.K. expect digital technologies to create increasing strategic contributions to their complete business in the upcoming decade which also leads to lay-offs as the trend will affect contracting of employees' decisions.

This differs somewhat to 'creative destruction' (Schumpeter, 1934) which speaks to the notion of a disruptive revolution in that it is increasingly likely to lead to new technologies and also products which will be at the expense of prior products and technological advances. In disruptive innovation, it is often the case that it supports organisations to be more sustainable. This, however, does not relate to every enterprise in an ever-changing market as some innovations are disruptive and others are sustaining. The sustaining innovations advance prevailing technologies into further available, effective and lucrative solutions as they are often supplementary to existing technologies or products (Kloefkorn, 2016).

All revolutions are by nature disruptive, but the fourth holds the power to produce whole new industries or sectors while entirely destroying others. One may discover that even if a disruptive product or service's impact is net neutral on jobs lost or generated, the jobs created may be concentrated in the country of origin – and in most cases be highly developed or technologically mature and geographically remote from the country of consumption (Rossouw, 2018)

> These innovations make what one would view as a good product even better in the eyes of consumers: an enhanced laptop screen, a faster hard drive processor or superior mobile phone reception. They can be minor advances or major breakthroughs, but they enable organizations to sell more products to their customers. On the other hand, examples of disruptive innovation include the Internet of Things (IoT), the cloud, mobile Internet and 3D printing. Each of these technologies, according to a report published by the McKinsey Global Institute, have the potential to "produce great disruption in our very near future as have the power to transform the economy and our daily lives." (Kloefkorn, 2016).

The notion of 4IR is often viewed as an alternative expression of 'Industry 4.0,' which focuses on the application of digital technologies to manufacturing. Industry 4.0 is however an important element within the larger area of 4IR with its narrower, dynamic focus on the important relationship between digitalization, organizational transformation, and productivity augmentation in especially the manufacturing and production systems.

Businesses will be increasingly faced with potential conflicts of interest which arise from what shareholders expect and what other stakeholders desire. What it means to be socially responsible as an employer in a 21st century context will be under the microscope. "The technology shifts that present opportunities to create new business models are also the same opportunities that disrupt existing systems" (Wang, 2014). The 4IR is "…taking automation to new levels, blurring the lines between the physical, digital, and biological spheres and using technologies to perform tasks previously carried out by humans, ranging from piloting vehicles to 'rules-based' jobs in areas such as accounting and law" (Nicva, n.d.). 4IR is influencing the future through its effects on government and business and the average person has little influence over either technology or its disruptive nature.

Artificial intelligence (AI) will undoubtedly help employees to become more productive. However, there is concern in some circles that security will be compromised and that

implementing AI will be a very expensive exercise. The biggest challenge remains a lack of apposite employee preparation and up-skilling. Promoting AI will be compelled by organisational employees and their need for information, understandings and team work (Bose, 2019).

4IR impact on the Hospitality Industry

The change brought by the Fourth Industrial Revolution is inevitable, not discretionary and the hospitality industry will not be immune to it. For employees at the front-desk of a hotel, there needs to be a shift in mind-set. Employees and computers will inherently play diverse roles. In any event, each possesses unique strengths and weaknesses.

Technology and data are going to be the key drivers for transformation in the hotel industry.

> "Whereas not too long ago their influence would be sought in the visible presence of gadgets in hotel operations and guest entertainment, now they are considered to be rather enablers of new business models and customization. A "currently unimaginable connectivity" is expected, as well as a seamless integration between virtual and offline in hotels. "High tech" will be combined with "high touch", a personalized approach of the hotel guest. Whereas today hotels merely pretend to do so, the hotel of 2020 will really focus on the guest experience. Hospitality employees become experience managers. Review scores outweigh traditional indicators as ADR. Guest experience will become an important element in real estate valuations. Hotels will no longer seek to just "put heads in beds"; facilitating meetings between guests and between guests and locals will become an important part of their concepts. The attention will shift from rooms to public spaces. The distinction between business and leisure travel will be blurred. Local communities will become involved in hotel activities. New hotels will be located preferably in existing buildings." (Oskam & Boswijk, 2016: 30-31).

Future hotel guests will have quite different expectations when lodging at a property. They will expect top notch well-designed experiences and usability of their own device to operate room facilities and other hotel services. Guests will have many options from which to select a hotel at which to stay and will likely use Airbnb. Hotel companies will need to resort to online bookings in a drive to achieve high rates of occupancy. This means that employees at hotels will need to be tuned in to the latest technology and learn the requisite skills. This means that employees will require higher quality education that integrates general knowledge in both the hospitality sector with emerging technologies. Employees will need to be proficient in service quality provision, ingenuity, open-mindedness, appreciate diversity and hone their social skills while studying for their selected hospitality vocation (WEF, 2016; Lancefield, 2015). Intelligent bots will be able to operate across digital and social platforms and improve response times by answering basic customer queries (Bose, 2019).

Computers, unlike humans, can accumulate enormous amounts of data and they are unbiased in their decision-making. Conversely, it is often the case that front-desk employees are dogged in their decisions and drive guests away. This is where they will need to be creative and make strategic decisions to give their hotel a competitive advantage. Hotels will need to treat their guests as stakeholders and merely buyers of services. In this way the customers will benefit from improved products and services and hotels will become more likely to meet their needs. Co-creation will result in guests investing in the success of an idea and this will build loyalty (WEF, 2016).

AI needs to be assimilated into prevailing processes. In the HR department, for example, AI can drive value in recruiting processes and make it far easier for potential employees to access

a job posting that is suitable for them. In addition AI can also be used to assist existing employees to access opportunities in their own hospitality enterprise and thereby grow their career (Bose, 2019). Hotel managers that embrace an intelligent and connected ERP system, will be in a position to have AI-driven analytics the enable users to assess the current state of their operations and analyse the information. This will facilitate them forging the correct course of action. AI powered digital procurement will also automate a range of processes including inter-alia invoice processing, contract analysis and spend analysis and they will be empowered to constantly run analytics to make forecasts and drive process improvement (Bose, 2019).

As technology changes the way employees work with machines it is increasingly likely that some technology may well substitute them. Disruption will increasingly driving convergence and guests will seek to be empowered more in business transactions and drive demand for innovative answers. Hotels will need to block out disruption by obtaining or associating with new competition or even through reconfiguring their often archaic business models. Hotels that innovate will obtain huge upsurges in competence and their productivity levels will rise. It is also likely that leisure needs will emancipate employees from the workplace and allow them to follow other comforts and thus, entrepreneurship will also flourish (Baweja et al., 2016; PricewaterhouseCoopers, 2017). Hotels that do not empower their employees by improving their skillsets will not enjoy the productivity gains or the improved customer service quality that AI can deliver (Bose, 2019).

South African scenario

South Africa is "…standing on the precipice of a fourth industrial revolution. The question is; how will automation infiltrate and affect the country's major industries?" (Daniel, 2018).

The 4IR will offer opportunities to employees for learning new skills and in addition to existing jobs, will likely create new opportunities for novel jobs that are needed to re-energise the ailing economy. This requires a careful scrutiny of new phenomena through prevailing paradigms which may need to shift gear to keep pace with both local and global demands. Managers are currently somewhat restricted in their understanding of what the role of employees will be in a society driven by technology. The global environment has characteristics which are evolving and changing as new trends and disruptive shocks affect nations in all counties. Almost forty years ago, it was acknowledged that the environment of business should be portrayed in two distinct dimensions that which are the local and global (Doz, Bartlett & Prahalad, 1981).

Rapid advances in artificial intelligence, automation and also robotics, all give rise to sombre questions concerning the likely impacts on human rights and the fact that work as we currently know it will change. Some people may benefit while many others could benefit. Especially workers who are specialists in data-centric environments will be required (Ndabeni-Abrahams, 2019). A big problem facing South Africa is that many leaders, are trapped in a protectionist mentality which is prominent regarding the 4IR. The 4IR indicates that over one-third of skills (35%) that are thought of as important in today's labour force will have transformed radically in the next five years and new competencies will be required in science, technology and innovation. South Africa must prepare workforces for the 4IR or accept the consequences (UASA, 2019). The practical implications of actions taken by employers as well as their employees will be critically relevant if and only if both parties accept the state of things to come in a harmonious environment which is conducive to economic growth and general societal wellbeing.

This aligns with President Ramaphosa's 2019 State of the Nation address in which he acknowledged that rapid technological changes are restructuring the manner in which people work and live (Ndabeni-Abrahams, 2019). There are predictions that by 2020, 4IR will have

provided South Africa with advanced robotics and artificial intelligence, the development of mobile Apps and linked wearable devices. which will change the way people work and interact (Ndabeni-Abrahams, 2019) autonomous transport, 3D printing, cloud computing and mechatronics, machine learning, advanced materials, big data, cybersecurity, cyber-physical systems, biotechnology and genomics that will all in some way alter life as we know it.

As these sophisticated tools and technologies begin to converge, the impacts of the 4IR will become more evident across a range of industries (Jamwal, 2019). Consequently, some jobs will disappear while new innovative technologically advanced jobs will be created and become routine in nature. The future workforce of South Africa will need to align its skillset so as to try to keep pace with the rapid global developments. 4IR can be recognized as the progression from modest digitalization to innovation based on groupings of technologies which permit organisations to revolutionize their business models. The resultant revolution has the latency to expand economic development and the quality of life and will inevitably lead to new job creation, social innovation, and product innovation (Rifkin, 2011; Valenduc, & Vendramin, 2017).

The South African economy finds itself in a difficult situation at the current time. Some of the problems faced are to an extent brought about by external factors. The global trends for growth are floundering and this adversely impacts the country. South Africa's primary sector including mining and agriculture remain essential contributors to gross value. However, the annual growth in this sector has generally taken to be less than 1%. South Africa is also not "the gate-way into Africa." (World Bank, 2017) it believes itself to be and the economy is .today only the third largest in Africa, following Nigeria and Egypt. South Africa is also no longer the most competitive nation in Africa and has been surpassed by to Mauritius which is now first in Africa (WEF, 2017)

South Africa needs the working age population to have the appropriate skills. Currently, the country is competing against international providers that have access to low-cost, productive labour and locally, people are increasingly competing against robots, automated systems, and machines that learn and are able to perform the same activities with higher efficiency and at lower cost. Thus education:

> "… needs a total 'face-lift'; the entire education environment, from pre-school to post-graduate education, needs to be re-imagined and aligned with emerging skills requirements. Life-long learning must become an imperative; not simply a 'nice-to-have'. We should not steer ourselves toward a situation that pegs people against robots, automated systems, and machines that learn, but rather one that works toward people working with new technologies. Leaders on all levels of society should engage with their people, to facilitate understanding and share knowledge and insights about emerging opportunities and potential threats. The 4IR is a given. Production could happen without people. This implies the potential substitutability of smart robots and artificial intelligence for human beings in the labour force in the primary, secondary and tertiary sectors of the economy. Economic growth is not the panacea to job creation." NEDLAC (2019).

Work will change and more drastically for some than others. Some people will benefit while others lose. There is a huge menace in the notion that the use of machines to increase productivity will invariably have dire social consequence in growing inequality via downward pressure on wages and loss of jobs (Bloomer, 2019). This is why the South African Government has adopted a 'Building a capable 4IR Army' programme. It is vital to empower communities to take advantage of the new digital technologies and thereby seek to create future jobs which will energise competitiveness (Ndabeni-Abrahams, 2019). It will be difficult

to try to be on a par with highly developed nations as South Africa is in many ways a paradox - still grappling with the Second and Third Industrial Revolutions in many ways, and in other was it is embracing 4IR. This is then additionally somewhat of an enigma given the high rates of illiteracy and inequality which still exists in the country in the post-apartheid era. Many people are encouraged to embrace 4IR and especially in the development of mobile Apps which will in some way provide opportunities to revolutionise the manner in which business is conducted and people interact with others.

Many advanced technologies are making rapid inroads into organizational processes and each one of them poses some unique dangers and ethical quandaries as they are risks due to possible mismanagement. Routine jobs will vanish as individuals within organizations will be progressively correlated with auditing actions and ground-breaking and critical thinking. 4IR can then, we are told enhance the quality of life, allow employees to work less and in improved ways while having their varied needs and wants met by more efficient and productive production systems and digital platforms. All things which can be digitized and automated will be implanted into intelligent machines and necessarily then jobs that are based on codified knowledge or codifiable knowledge will be completed by robots (Arntz, Gregory & Zierahn, 2016).

Human decision making in varying degrees, will be turned over to software programmes (Peters, 2017). Thus skills development initiatives must be forged and aimed at millennials and younger people so that they can become data scientists who are conversant with 4IR related programmes (Ndabeni-Abrahams, 2019). The growth of the "gig economy", enabled by new technology, is contributing to changes in the very nature of work by growing the accessibility of flexible positions that deliver opportunities for some while they invariably negatively and often irreparably affect the livelihoods of others (Brynjolfsson & McAfee, 2015; Lambert, 2017). The issue of millennials is important to note. In Poland unemployment is less than 2% and in the Czech Republic it is less than 0% ... estimated at -5%. Millennials stay no more than 6 months in a position (reporting always refers to them as jobs). The question is, 4IR breaks down jobs into tasks, hence, people can switch easily between "jobs". There is no switching between jobs by professionals. So in essence, the biggest threat of 4IR is on jobs such as *inter alia* professional lawyers, doctors, engineers, professors, and pilots.

In many businesses the conventional brick-and-mortar business model will shift towards a hybrid model incorporating the "nuances of the exponentially popular gig economy" (Knight, 2019: 60). Many employees will become digital nomads and will thus be remote workers who travel to diverse places while still accomplishing their professional responsibilities. The Millenials (those between 22-35 years of age) will be the prime candidates for what will become an optimal life-work balance, based on their high-tech knowledge and this will lead to many companies re-evaluating their tradition model of measuring productivity levels (Knight, 2019). Thus, productivity and indeed efficiency in employees will not be measured by how many hours one spends in the workplace and employees will increasingly define their own operational environments via digital nomadism (Knight, 2019). Employees will need to be empowered to work autonomously and determine their own working hours and work in an environment that best suits them being efficient and productive. Consequently, companies will need to leverage the right technology and thereby maximise their human capital (Knight, 2019; Baweja et al., 2016;   ).

What will happen to CEOs in the next 10 years if the skills revolution continues? Will there still be a need for them? The strategic thinker may also become a rare commodity. Each of these likely scenarios brings in huge ethical questions and dilemmas (Knott-Craig, 2018). If we work

towards embedding the 4IR in our society, our economy will grow and our people will be in a much more stable, sustainable and more hopeful place.

While impoverished rural communities may have some opportunities to surpass many of the economic challenges they face through advances in technology, there will be increased levels of unemployment giving rise to greater poverty and inequality. Thus the 4IR and its comprehensive transformation will potentially merely consolidate power asymmetries, and increase disparities, as it promotes technologies that do not exemplify human-centred moral values and are devoid of ethicality. It is critical that human rights be a fundamental aspect as we are enveloped by a new wave of technology. Democracies must promote accountability, fairness, trust and transparency in society, particularly in response to gaps and failures in both the public and private sectors (Sangokoya & Ajoku, 2018).

Technology is clearly a powerful tool for human rights as the increased access to the internet and the development of social media tools have permitted activists to organise and disseminate their messages more rapidly and to far wider audiences. Emerging technologies like artificial intelligence, may meaningfully enlarge the availability and quality of data upon which to make informed choices for the benefit of society (Bloomer, 2019; Höller, et al., 2014).

The rapidity and degree of the variations coming about due to 4IR cannot be ignored. The changes will bring about swings in power, and changes in wealth, and knowledge acquisition so by understanding the changes and the speed at which any advances in knowledge and technology happens the 4IR benefits will reach and benefit all (Xu, David & Kim, 2018). The followers of 4IR technologies trust that they will unbridle new opportunities and increase efficiency while helping to maximise human possibilities. Truth be told, many of the likely impacts on employment are hitherto unknown. This is why numerous human rights organisations are presently exploring how to safeguard that new technological advances can benefit all people and do not aggravate huge global inequality levels and further downgrade people who are already severely marginalised (Bloomer, 2019). Ndabeni-Abrahams (2019) states that "Many jobs are threatened by redundancy in the next wave of industrialisation and this pertains to Africa too. Existing jobs are expected to go through step-changes in the skill sets required to perform them. Others job types are expected to grow rapidly but unpredictably".

Service Industries and 4IR

The concept of the 4IR confirms the fact that certain technologies are gradually developed and they invariably have an impact upon society and transform the way we think. In numerous vocations, human interaction will remain a vital element that customers seek, and in most cases, technology is likely to enhance the relationship between them and a business enterprise. New technologies will further automate tasks which are process-driven and people should be used more creatively in such scenarios. Thus, technology should be an enabler and mechanism by which human capital can be steered in directions requiring a human touch (Business Traveller, April 2019). Unfortunately the 4IRT has the prospect, like the revolutions that went before it, to merge power lopsidedness and increase inequalities, and additionally advance technologies that fail to embody human-centred values (Sangokoya & Ajoku,2018).

Relationships are likely to become more continuous and should by all accounts result in better quality and greater productivity, which bodes well for businesses. People play a huge part in business interactions and especially in those in which services are provided to customers with diverse needs and wants. Organisations should develop strategic investment strategies in which they strive to invest in new technology so as to create an ideal balance between man and machine and they need to get the balance right without neglecting the human element of

service so that technology should be a conduit which supplements service to customers (Business Traveller, April 2019).

The Mining Sector

The Fourth Industrial Revolution (4IR) has been defined as technological developments that distort the lines between the physical, digital and biological spheres. It assimilates cyber-physical systems and the Internet of Things, big data and cloud computing, robotics, artificial intelligence-based systems and additive manufacturing (Van der Woude, 2019).

Mining is the foundation of the economy of South Africa, and it contributes R400-billion per annum. South Africa needs to take advantage of its many mineral resources, but this should for the benefit of all South Africans and the natural environment and not only mine owners. While technology has much to offer that is positive, it must thus not be at the expense of employees and infringe their labour and other human rights. In the mining industry, digital technologies may improve yields, enhance profitability and support sustainability (James, 2019), but this could well be at the expense of thousands miners as huge layoffs are likely to happen as mines are increasingly investing in autonomous vehicles and equipment.

The transformations that are emerging will have some positive and negative impacts. The class divide will grow as the rich become richer and the poor become poorer. There will also be greater gender equilibrium. Sectors   such as mining that involve manual labour or monotonous administrative tasks are prone to robotic automation – whether in a mechanical or software form or a combination of both (Rossouw, 2018).. This will grow unemployment predominantly for males who are involved in the manual labour sector. Female-dominated industries like call-centres, retail and administration will grow. There is also an argument that self-service technologies and bots may create an increased demand for specialised "human to human" customer service channels and interactions (Rossouw, 2018). While artificial intelligence is being used in various industries, there is currently little legislation to manage the likely effects (Manie, 2019) and this is problematic.

In mining, there is a convergence of technology, big data and artificial intelligence. The 4IR is generating a need to have greater regulation on issues such as unemployment, data privacy, intellectual property as well as security and liability for defects and loss of control (Manie, 2019). Digitalisation will bring in changes in mining (Humphreys, 2018) such as for example, many activities being driven from inside an office. There will be digital capturing of information and autonomous equipment such as driverless trucks. Robots will be designed to work in conjunction with humans. The mine nerve centres will be increasingly be driven by computers (NSTF, 2019). African countries need to ensure that they harness the positives from the 4IR as they mitigate its risks. African governments should then proactively adopt new technologies and in doing so they must stand firm against potential political losers who may form obstacles to economic development. "It pays – in the long-run – to craft inclusive institutions that promote widespread innovation" (Harvey, 2017).

> The social effects of joblessness are devastating. Demographic modelling indicates that Africa's population is growing rapidly. For optimists this means a "dividend" of young producers and consumers. For pessimists, it means a growing problem of youth unemployment colliding with poor governance and weak institutions. New technologies threaten to amplify current inequalities, both within and between countries. Mining – typically a large employer – may become more characterised by keyhole than open heart surgery, to borrow a medical metaphor. That means driverless trucks and robots, all fully digitised, conducting non-invasive mining. A large proportion of the nearly 500 000 people employed in South African mining alone may stand to lose

their jobs. Rising inequality and income stagnation are also socially problematic. Unequal societies tend to be more violent, have higher incarceration rates, and have lower levels of life expectancy than their more equal counterparts. New technologies may further concentrate benefits and value in the hands of the already wealthy. Those who didn't benefit from earlier industrialisation risk being left even further behind (Harvey, 2017).

A recent survey of CEO opinion on drivers of future industry transformation pointed out that industry leaders expect digitalisation to be the major driver of future change.

The chance of job losses being lost in the mining sector is great as mining companies such as Glencore and Anglo American battle to cope with global commodity price slumps. Productivity is on a decline globally (OECD, 2014). About 32,000 workers in the sector could lose their jobs as metals prices fall due to decelerating economic growth in China, which the world's biggest metals consumer. Companies in the mining industry, which engages about 500,000 people and contributes around 7 percent to South Africa's GDP, may have scant option but to cut jobs and close struggling mines to cope (EWN, 2016). The 4IR will exacerbate this daunting scenario as additional job losses could generate labour unrest which would keep foreign investors away from South Africa.

While it is important to seek out the safest, most efficient and cost effective ways of extracting mineral resources in a sustainable manner, we should not lose sight of the employees in mines, and indeed other industries. The quality of life of employees should be enhanced rather than degraded by the advent of the 4IR, and their skills, quality of life and general health must be considered. Thus, better pay and improved opportunities for employee growth and development are desired. All stakeholders including the communities in which mines operate should benefit as a result of the 4IR. "Previous industrial revolutions destroyed jobs, but also created new jobs and industries. With the fourth, while jobs are being destroyed, there is already evidence that the established sectors are not creating enough jobs to fill the gap" (Rossouw, 2018)

Forecasts suggest that artificial intelligence, automation, and the gig economy will be highly beneficial in the sense that people will be likely freed from numerous tedious tasks and be capacitated to enjoy an enhanced work-life balance. Amidst the swell of transformation, organisations need to ask questions about inter-alia, the challenges of the technologies they use, the markets they serve, their current business models, employee empowerment in respect of technology use, and customer needs and wants (Höller, 2014; Kloefkorn, 2016).

All these contemplations necessitate that organisations and their managers espouse a fresh outlook, and new thinking around technology and its impact. The manner in which important questions are tackled and related activities are conducted, will ultimately determine the level of disruption experienced and the competitive strategic advancement or otherwise, which is experienced by organisations. Organisations need to respond to fluctuating conditions and grasp the various emerging prospects or South Africa will be doomed. South Africa's unemployment rate is about 29%, and there is vast youth unemployment, that is employable citizens under the age of 25. The predicted unemployment rate under innovative automation will greatly exacerbate this already dire situation (Buston, 2019).

Mines will benefit from the 4IR as there is increased performance on the production side due to the application of high powered computing and big data and a move to what is termed 'intelligent mining'. This will involve rea-time information on most characteristics of mining operations and the use of data to bring about lean, factory-style production, reducing downtime, saving energy, increasing safety and boosting output. Improved integrated, real-

time systems will hypothetically reveal large productivity improvements by refining maintenance, mine planning and asset utilisation (Humphreys, 2018).

"Corporates can allay fears of job losses by committing to: Creating job alternatives through re-skilling initiatives, communicating transparently and honestly and engaging with employees and other stakeholders, taking all impacted parties along on the journey" (Accenture, 2018). This would of course be a daunting task facing a myriad of challenges in the process.

Some additional challenges posed by the 4IR

As the world faces and contemplates the "socio-technological imaginary" (Jasanoff, 2015), managers will need to display sound leadership qualities to effectively cope with the vast array of alterations to the economic, political, and social milieus in which value will be innovatively fashioned and traded. The development of international industries in the 4IR is daunting because inter-alia, the synthesis of various technologies, the Internet of Things (IoT), genetic editing and 3D printing are all posing diverse challenges. Individuals will be increasingly moving between the digital domains and offline reality by using coupled technologies, to enable and manage their lives (Lambert, 2017). The most important competence of organisations will be their aptitude to be elastic, cautious, and attentive. For society in general, the mobility of the workforce is very important and an unqualified requirement in order to fully grasp the rewards of 4IR.

As 4IR technologies spread the risks and impacts associated with them, such as data protection, algorithmic bias, discrimination and privacy are exponentially amplified. We are led to believe that there will be benefits that will likely improve the quality of life for many people around the world and that income levels will be raised as entrepreneurs begin to develop new innovative ideas (Jee 2017, 255-256). Gifted entrepreneurial and innovative employees will become more critical to organisational success than finance. Individuals with novel concepts, and designs, and not employees or even billionaire investors, will become rare resources (Brynjolfsson, McAfee & Spence, 2014). Labour is required for people to endure and to forge a respectable existence for their family and themselves. As companies seek out skilled employees this will inevitably give rise to an increasingly segregated job market as poorly skilled employees will be substituted by computers and digitization. Higher paid jobs necessitating greater employee skills sets are unlikely to be substituted. An amplified dichotomy may exacerbate tensions in workplaces and lead to an upsurge in social tension. (Wolf, 2015).

The labour landscape is increasingly going to become challenging for the majority of workers in South Africa and they risk being replaced by robots as well as mechanical systems and technologies that learn. Many jobs will be lost and this is likely to lead to labour unrest and agitation, but new types of jobs may be crafted. in what will manifest as aof creative destruction.

This is where the public and private sectors need to collaborate and play meaningful roles in supporting education initiatives.

Today the use of robots helps people to an extent and organisations to a greater extent as routine actions are more easily carried out. However, technology will increasingly replace the human employee so that in reality, there is more likely to be far greater inequality than there is today and enhanced discrimination. 4IR will undoubtedly then produce more inequality, predominantly as it disrupts labour markets and the further dislodgment of employees by technologies will tend to aggravate the widening gap between returns to capital and returns to labour. Civil society organizations will most likely side-line employees as new technologies flood into the workplace. Technological developments will also affect characteristics of

personal lives, as one's sense of privacy is diminished, consumption patterns change and career growth is challenged. In addition, work and leisure time, social networks, and relationships will all be affected in various ways (Goode, 2018; Jules, 2017; Rifkin, 1995). Technology is clearly evolving at a far greater rate than the legal and moral frameworks that are required to manage it effectively (Waddell, 2017). Thus ethical considerations need to be a paramount consideration in business processes which are related to the conception, development and also the use of new technologies (Krell, 2018).

There will be continuous risks to digital rights as new technologies interlock with each other. In addition, the personal, social, and economic apprehensions of employees in organisations will grow as people believe that they are incapable of surviving without the ongoing support of their traditional employer. As entrepreneurs innovate and set up their businesses they will face radical changes characterized by the omnipresent and mobile Internet, inexpensive, smaller and stronger sensors; and artificial as well as machine learning (Schwab, 2017). Civil society faces substantial moral challenges in how the organisations use their data and information. Coping with challenges will require investing in an organisation's abilities to become more agile and allow all stakeholders to adapt to new changes in their micro and macro environments (Choi, 2017; Nicolaides, 2018).

The developing propagation of inter alia 3D printing, artificial intelligence and biotechnologies and a range of other emergent technologies, necessitates that employees be prepared for drastic changes in their workplaces and be ready to adapt in the civil the social order and also within their organizations. The new way of doing business will be the merging of information technology (IT) and operations technology (OT) in which business processes and office computerization will interconnect with industrial processes and factory automation. Interacting networks for the physical and digital components will be co-engineered to create cyber-physical systems and deliver the basis of smart services (Jamwal, 2019). Organisations need to carefully consider the ethical and labour law issues once these innovations begin to kick-in. There is a need that there be strong ethical leadership emanating from civil society as well as other stakeholders so that good governance can prevail.

Digital rights will be impacted as new technologies develop and are used by civil society and governments alike. For example, biometric databases will increasingly expose individuals as there will be diminished standards and guiding principles for the collection and use of sensitive data. The digital information ecosystem is extensively bombarded with disinformation, distraction, and misrepresentation. Cybersecurity issues will continue to grow as threats to the civil society sector increase. Any organisation which collects personal, financial, and even genetic data, is vulnerable to hackers (Sangokoya, 2017). Gaining from 4IR will require expanding prudence and critical understanding of the effects of developing technologies and the threats posed by them through knowledge sharing activities. Technical, economic, and social factors will regulate the speed of automation. What does it mean for employees? It is estimated that half of today's work activities might be automated by 2055, but this could also occur much earlier or later depending on the several factors, in addition to other economic conditions (McKinsey Global Institute, 2017).

Automation will certainly dislodge some low-skilled workers who carry out simple, monotonous tasks. People will need to endure operating together with technologies to produce the growth in per capita GDP to which countries around the world aim. There are also productivity estimates that assume that people displaced by automation will obtain other work (McKinsey Global Institute, 2017). This is however debatable as the threat of colossal job displacement under 4IR looms larger and larger.

The role of management in the 4IR and human rights

4IR is progressing at an exponential rather than a linear speed and it is unsettling practically all industries. Furthermore the vicissitudes represent the transformation of complete systems of production, management, and also governance (Schwab 2015). The development and application of new techno-human smart systems that are proficient in refining the efficiency and productivity of production systems and support a general improvement in the quality of life of individuals and communities is (on paper) a good thing (Schiuma, 2017). Nonetheless, trust is an essential element that is needed so that truth telling is to be pursued as a habitual aspect of operation. In this regards, organisations need to take a leadership role and regularly review their values compared to the Universal Declaration of Human Rights (UDHR) which was adopted in 1948 and the human rights standards in national constitutions in countries in which they operate. Values should thus be cultivated as an affirmative feature of technological systems and societal values must be promoted as priorities in an ambience of transparency and collaboration.

In an era in which technologies are transforming society at a rapid pace, there is a need for ethical frameworks and normative standards to guide organisational behaviour. Leaders need to act from duty and not merely comply with duty. This implies that they should rationally deliberate upon their actions and guide their actions by ethically sound reasons as they are guided by the Categorical Imperative. Within one's reasoning then, employees need to be treated as an end in themselves and not as a mere means (Gini and Marcoux, 2012). Real leaders need to contemplate the results of their actions on others in society so as to benefit themselves. Business ethics is increasingly viewed as an imperative for managing organizational success and sustainability. However, there is a need to equip mangers and those whom they lead to develop the ethical aptitudes that will enable them to cope with the many and varied ethical challenges faced on a day-to-day basis (Nicolaides, 2014). Leaders and managers who are accountable are needed in society who can capitalise on 4IR,and they should take the lead as they inspire employees and especially up-skill them and re-skill them to cope with advances that emerge in digital and emerging technologies in a win-win situation. They can and must make a difference as they encourage creativity and initiative (Anderson, 2012), and strive to grow their organisations and engender an ambience in their organisations which exudes an entrepreneurial spirit within an ethically grounded ethos (Rossouw, 2002). The most important element for organisations is to embrace values and ethics as essential components over and above the triple-bottom-line (Nicolaides, 2015; Rossouw, 2018). In any dealings and decisions, truly virtuous leaders and managers will need to act righty for the right reasons, routinely andalso intentionally. All stakeholders must be treated respectfully as participants in business as both loci of moral worth and accountable agents (Gini and Marcoux, 2012).

Given that technology now informs the human rights adoptions of all organisations, ethical decision-making should permeate all of them and leaders and managers must devote themselves to ethical practices as they engage with employees concerns and needs and wants as well as the broader community in which they operate. Ethical principles need to be institutionalised in all organisations in clearly articulated missions and visions as 4IR transforms the world as we know it. Human rights must bring in its authoritative voice and insights into the equation of 4IR adoption in whatever organisation, be they micro, medium or mega enterprises. It is given that numerous jobs will be lost due to 4IR, but this is a fiercely contested issue. We cannot simply deny that the growth of 4IR will and already does in some sectors, have a significant impact on workers and their wages, and invariably on their human rights (Prisecaru, 2016).

"Research by the McKinsey Global Institute estimates that while automation could raise productivity growth globally by 0.8 to 1.4 percent annually, half of the activities people are currently paid to do could potentially be automated, amounting to nearly $15 trillion in wages. Their research finds that these activities are primarily physical activities in highly structured and predictable environments, as well as the collection and processing of data" (McGrath, 2017).

> Advancing technology has caused rapid and dramatic changes in the world of work. Labour law systems grounded in the industrial era, with their emphasis on collective bargaining, are not suitable in today's world of work. Throughout the world, the 'atypical employee' is replacing the standard or typical employee whose terms and conditions of employment were generally regulated by collective agreements. Atypical employee's terms and conditions of employment generally are not regulated by collective agreements. World–wide trends in the decentralisation of collective bargaining, de-collectivisation and individualisation of the employment relationship have contributed to a decline in trade union power and influence. Consequently the number of workers covered by collective agreements has decreased. Collective bargaining has been rendered less effective because of the changing the world of work. The South African labour law system places a huge emphasis on collective bargaining, particularly at industry level, for the protection of employee interests. Given these trends in the changing world of work, the appropriateness of this emphasis on industry or central level collective bargaining is questioned. The vacuum left by the inadequacy and inability of trade unions to protect employee interests in a comprehensive manner by means of collective bargaining, needs to be addressed. The following alternative means of protecting employee interests must be considered: (i) The socialisation of the law of contract; (ii) the interpretation given to the constitutional right to fair labour practices; and (iii) the role of good corporate governance and corporate social responsibility.
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> These alternative means of addressing legitimate employee interests could play a role in filling the vacuum created by trade union decline. The South African law of contract is capable of bridging the gap between law and justice by the application of the concepts of good faith and public policy, so that employment contracts may take cognisance of employee interests despite the imbalance of power between employer and employee. The protection of worker interests by means of the constitutional right to fair labour practices depends on the judge's interpretation of what is fair. Implementation of good corporate governance codes can be influential in protecting and promoting employee interests. (Vettori, M-S., 2005).

The rapidity and degree of the changes brought in by 4IR dare not go unheeded. The changes will bring about swings in power, prosperity, quality of life and knowledge. Only by being well-informed about 4IR can people ensure to an extent that developments in technology will advantage all stakeholders in society. As technology develops, organisations and their innovators must not fail to carefully consider all socio-ecological deliberations. Nicolaides asserts "This could develop a new outlook for organisations where they manage themselves in such a manner that they become not only economically viable and steadfastly uphold the law, but also seek the genuine welfare and sustainability of society; and where doing the right thing becomes part of its operating DNA" (Nicolaides, 2018).

The African value system of *Ubuntu* which includes the expression '*ubuntu nguumuntu ngabantu'* (I am because you are, you are because we are), ought to be used as a parameter

by organisations for the application of the ethical principles in their dealings with employees in order to triumph in sustainability efforts. They thus need to embrace a commitment to co-existence, compromise and consultation (Rossouw, 2002). Africans should not forget their special cultures when they become part of the corporate world and the commercial sector, but should rather stand firmly behind what is a sound ethical philosophy and require employees to heed their emerging concerns over 4IR (De Kock & Labuschagne, 1999).

The ethical challenges are huge and to attain a sustainable world we must face them head on and prevail. Thus, the ethical discourse at all education levels must be intensified. Technology must be viewed as valuable if it supports the quality of life of all the inhabitants of the planet. Teaching ethics in Higher Education is a very important aspect of education since students who later become managers and leaders have ethical values reinforced in their thinking through relevant case studies and solid grounding in ethical philosophies and paradigms and these help orientate people to the future way of life that is desired. We need to remember that no enterprise or corporation can survive without society given that enterprises are a creation of society (Saxena & Puney, 2004).

Conclusions and recommendations

As 4IR progresses, entrepreneurial and innovative young employees will in some cases be able to work more autonomously from home or even some remote office, and they may well thrive in the 4IR era. But for most employees, it will be a disaster waiting to happen if organisations do not do the right things from an ethical perspective. This is why we require leaders and managers who are well-informed of technological developments of the 4IR and their impacts and how employees may be affected. They will also need to have a good understanding of the needed skills sets and knowledge of employees required to effectively navigate what promises to be stormy seas. "Security is critical. For all of our technologies, security is the Achilles' heel. If we want it to be used for benefit, we have to think about security. And we have to think about privacy, too: What data is private and what isn't, and are we engineering our systems so that they can support whatever privacy concerns we have?" (Waddell, 2017).

Immoral organisations with morally unconscious leaders and managers who are totally Machiavellian in nature and are driven by the notion that 'then end justifies the means' may well embrace 4IR and negate the human worth when conducting business. Where stakeholders and especially employees do not matter to organisations, they are likely to be unsustainable. 4IR requires organisations to be compliant and frown upon any unethical practices including side-lining employees in favour of a machine. Ethics in such organisations is generally well managed and carefully monitored. The conscious ethical organisation will make ethics a strategic pillar of its practices and be cognisant that ethics and law play a large part in the way an organisation treats it employees (Nicolaides, 2018, 2015, 2014).

There are many ethical and legal concerns when employees can be appointed and dismissed, how management treats them and pays them and what sort of work milieu they can anticipate. This is why it is important to have effective codes of conduct and solid ethical frameworks. In any event, labour needs to admit that digital technologies can and do bring the possibilities for economic growth and increased global competitiveness. The course of the digital revolution cannot be transformed but it can be vigorously managed (Accenture, 2018). Organisations have fundamental roles to play in accomplishing South Africa's shared economic future. They should be preparing their organisations to take advantage of the benefits of digital technologies, and additionally use technology to enhance growth beyond realizing efficiencies (Accenture, 2018).

An organization's ethical values affects it in various many ways as well as its reputation, productivity, and the desired bottom line of the organization (Kelchner, n.d.). Ethics within an organization can offer many paybacks. A positive ethical corporate culture increases the morale among the employees, which increases productivity, employee retention and loyalty. The absence of modern ethical frameworks is an enormous challenge. In efforts to protect civic freedoms and human rights including labour rights, labour unions will assume greater importance unions but will also be required to devote time to revamp their organizing models to adjust to an almost nomadic labour force as people speedily change their occupations and modus operandi. 4IR is anticipated to have unforeseen negative and positive effects for human beings, as it goes beyond mere market functions as in the original disruptive innovation which occurred (Park, 2017). The disruption of 4IR is about transformation which should emanate from carefully crafted ethical business models from which organisational and human growth is able to develop and prosper (Rossouw, 2018). There is also great indecision over which moral framework to adopt and this underlies the difficulty and limitations to assigning moral values to artificial systems (Al-Rodhan, 2015).

The use of digital and evolving technologies by organisations, administrations and also civil society groups is providing ethical and other challenges, especially given that there are no established business ethics programmes which are standard yet. Ethical issues that emerge due to technology use offer serious risks that are not capable of being addressed by current business ethics frameworks. If there were frameworks that were updated, organisations would be better positioned to cope with what lies ahead of them. It is sadly the case that ethics aspects in many organisations only get any attention when there is a major ethical lapse (Krell, 2018). The threats will serve to ensconce prevailing challenges that are associated with labour issues, accountability, fairness, trust, human consciousness and transparency. Revolutions of any type have been dynamic, disruptive and also damaging. 4IR offers opportunity for organisations that are able to adjust rapidly and embrace changes that are arising. Those that are complacent will fall by the wayside. Trust between technological developments and society must be secured as the government and civil society work in partnership and develop enterprises together and cooperate with universities and firms (Sangokoya, 2017). The long-term impacts of growth in automation on employees and society in general remain to be seen buy there is already real risk that lower-skilled workers that are already susceptible due to low pay, hazardous work conditions, and job insecurity may possibly be impacted the most (McGrath, 2017). Companies need to create a climate which attracts capable employees but which also motivates and is able to retain these employees through upskilling them- after all employees form a sizeable share of a company's assets and strategic competitive edge. (Rossouw, 2005).

Nonetheless, a framework for ethical considerations for especially those who develop the new technologies needs to be created in which there are practicable guidelines favouring employees and the organisations which they serve. Only in this way can opportunities which are associated with the likelihood of improvements in competence and productivity that will open new markets and drive economic development be realised. Organisations and government need to stress to universities that ethical courses are non-negotiable and need to enlighten future managers and leaders on the premises on which the computer driven global vision is built. Sustainability must incorporate the long-term use of the earth's limited resources so that graduates are empowered to make a meaningful positive difference through their ethical behaviours and excellence within their workplaces. Work should be a place in which managers and leaders can utilize their talents to integrate and inculcate ethical mind-sets. It is critical that organisations and governments begin to consider the obligatory legal and policy responses from an ethical perspective in order to ensure that the future of work puts basic

human rights in a priority status position in carefully crafted ethical frameworks. The ideal organisation should consider a wide range of ethical theories including inter –alia the categorical imperative, utilitarianism, hedonism, the golden rule, and the veil of ignorance, as intangible lenses which can help it help it to emphasize different aspects for its ethical framework construction and ultimately operational practices, thus each of the ethical theories has an important role to play.

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