

STRATEGICALLY ALIGNING HUMAN RESOURCES SKILLS IN PREPARATION FOR THE FOURTH INDUSTRIAL REVOLUTION

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Abstract

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Preparing for the Fourth Industrial Revolution (4IR) is imperative to facilitate the survival of businesses through effective manpower planning. Layoffs, in a country tormented by escalating unemployment, will be futile and will exacerbate the already unsurmountable unemployment problem. The obvious action is to prevent the loss of social capital and for human resource (HR) managers to upskill employees and find the right skills for the job in an effort to align HR skills required with the new opportunities that 4IR will bring to the workplace. The 4IR is at the doorstep of business. Those businesses that do not prepare adequately for it will face dramatic consequences. There is a paucity of research providing guidelines and strategies that businesses can consider and adopt in efforts to plan for the 4IR climate. This study, therefore, assesses the activities that HR managers, especially in businesses in developing countries, can adopt and engage in order to guide the organisation to have the appropriate skills and talent to transition into the 4IR work environment. The study adopts a grounded theory approach to explore what is needed to achieve a sustainable 4IR. It provides HR professionals with insight into the 4IR skills alignment framework, digital skills and competencies needed in the 4IR and recommendations to enable practitioners to effectively prepare for the 4IR (Adams, 2006; South African Board for People Practices [SABPP], 2012). HR managers play a pivotal role in predicting future changes that affect the workforce and in guiding the organisation to transition from a values-driven standpoint.

Keywords: Forth Industrial Revolution, 4IR, Human Resource Professionals, Manpower Planning, Human Resource Skills, Human Resource Strategy, Upskilling Human Resources

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1. INTRODUCTION

The Fourth Industrial Revolution (4IR) has a significant impact in an organisation. This includes changes in employee behaviour, changes in the traditional way of performing a job, changes in production, indirect costs, such as the loss of social capital or the pressure on HR managers to find the right skills for the job, or in terms of direct costs, such as replacement and upskilling of employees (Müller, Kiel, & Voigt, 2018; Staw, 1980; Salkin, Oner, Ustundag, & Cevikcan, 2018). The enlightenment of the 4IR by human resource (HR) managers has significant implications on organisational manpower planning. It is, therefore, imperative to recognise the importance of ensuring the readiness of HR managers to secure a smooth and sustainable transition of the 4IR in the workplace as quickly as possible (Adams, 2006; Bansal, 2005).

Each revolution is unsettling; it arises with new encounters and prospects that redefine the world of work. An innovative set of skills need to be well-defined and made accessible to the organisations of the future and this challenges the HR function to operate in a significantly more complex, evolving, and unpredictable environment. The 4IR is a great case of digital disruption as it will disrupt conventional ways of value creation, societal interactions, and doing business. It will be even more disruptive for countries that have not been preparing for the 4IR.

This upcoming revolution is yet to be realised by developing countries; it has already started being realised by developed countries.

HR managers have an opportunity to ensure that they align the skills required with the new opportunities that 4IR will bring to the workplace. It is therefore crucial to upskill current talent within the workplace and also source external talent with the skills that are not available within each business. HR managers have to ensure that they are not left behind in their understanding of the opportunities that 4IR is expected to bring into the workplace since their lack of understanding will result in a lack of skills and talent that is required in order to remain competitive. Hence, the research question of the study is:

RQ: What should HR professionals do to guide the organisation to have the appropriate skills and talent to transition from a values-driven point in order to ensure an objective, efficient and sustainable transition for the organisation's workforce and the society as a whole?

The formulated research question then addresses the current gap in 4IR literature and research (Dyllick & Hockerts, 2002; Glavič & Lukman, 2007).

The structure of the paper is as follows. Section 1 provides a background to the study and contextualises it. Section 2 reviews the relevant literature. Section 3 documents the methodology adopted to conduct the empirical research on how HR managers can guide the organisation to harness the appropriate skills and talent to transition to the 4IR. Section 4 presents and discusses the results of the study. It provides recommendations and propositions to guide in transitioning into the 4IR. Section 5 concludes the study.

2. LITERATURE REVIEW

The theories underpinning the study include Porter's value chain theory and the maturity and readiness model:

Porter's value chain theory: The 4IR largely influences manufacturing as organisations use 4IR technologies to enhance production. The idea of the value chain is based on the process view of organisations as they strive to adopt a systematic approach to enhance manufacturing and service. When one views the system in terms of the transformation of inputs into outputs, the role of technology in the process of achieving this becomes increasingly prominent and the activities of infrastructure procurement, human resource management, and technological development come to the fore in supporting the value chain. Value chains can then help manufacturing firms overcome the threats of adopting 4IR (Ajayi & Laseinde, 2021). In addition, 4IR enables digital supply chains (Moufaddil, Benhaddou, & Bouhaddou, 2019), thereby bringing about effectiveness. Nayagadza, Chare, Mazuruse, and Hove (2021) emphasize that the main challenge for developing economies is to create ways of engaging in dynamic global value chains (GVC). David, Nwulu, Aigbavboa, and Adepoju (2022) suggest integrating 4IR technologies into the water, energy, and food nexus for sustainable security.

Maturity and readiness model: To overcome the problems of existing readiness models, Schumacher, Erol, and Sihn (2022) add 9 organisational aspects, namely, products, customers, operations, and technology as basic enablers and strategy, leadership, governance, culture, and people as additional dimensions. Several researchers stress the need to be people-focused in the 4IR (Betti & Palamariu, 2021). Considered the Father of Industry 4.0, von Scheel (2019) from Nokia stresses that three key drivers for 4IR success are to think value and not technology, to think people and not tools, and to set clear targets from the start.

After providing insight into the literature relating to the study, the link to the models will be elaborated upon.

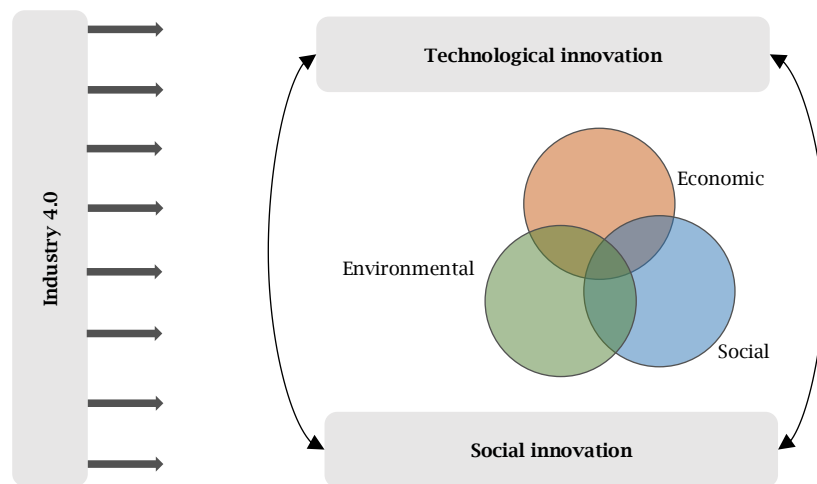
The 4IR is branded by the main technologies. It is characterised by well-built computerisation and digitalisation methods, electronics and information technology (Lu, 2017). From the production perspective, 4IR focuses on establishing smart and communicative systems such as machinery-to-machinery and human-machinery interfaces, dealing with the data flow from smart and disseminated system interaction to the production floor that is operated by a human (Salkin et al., 2018). Among other features, 4IR promotes flexibility, agility, decisiveness, effectiveness, and expense reductions (Perales, Valero, & García, 2018).

The 4IR implementation should be interdisciplinary amongst distinct major divisions within the business. Numerous authors described the main pillars of the 4IR framework (Gilchrist, 2016; Motyl, Baronio, Uberti, Speranza, & Filippi, 2017; Saucedo-Martinez, Pérez-Lara, & Marmolejo-Saucedo, 2017). These numerous interactive network products are the Internet of Things (IoT), cloud computing (CC), big data (BD), virtual reality (VR),

augmented reality (AR), and autonomous robots (AR). An important goal to accomplish the incorporation of the 4IR framework is the human role that will be enhanced with the advancement of the career competences of the employees. Likewise, researchers maintained that 4IR is affecting all economic sectors and requires an interdisciplinary approach to teaching, research, and innovation (Layton-Mathews & Landsberg, 2022). Gwata (2019) stressed that in order to function in the 4IR work environment there is a demand to not only be interdisciplinary but also a t-shaped person. This means one has to have in-depth knowledge in his/her specific field as well as sufficient knowledge in other fields outside of his/her specialisation.

For a sustainable 4IR, it is crucial to realise that new technology has progressively made an effect exceeding economic and industrial outlooks, and it possibly will have a significant role in ensuring the realisation of a paradigm shift, as anticipated by Rifkin (2014). There are three key pillars that form the bases of a sustainable 4IR framework: namely, economic, social, and environmental (Adams, 2006). Social and technological innovation are vital drivers in delivering workable solutions that meet the three main principles of sustainability and is useful for assessing the instrument to some linked improvements of the 4IR, as shown in Figure 1.

Figure 1. A framework for a sustainable fourth industrial revolution



Source: Adams (2006, p. 2).

2.1. The role of human resources in shaping strategies for the Fourth Industrial Revolution

The World Economic Forum (White Paper, 2019) suggests that ensuring a successful shift to a new world of work will need substantial and well-coordinated efforts by both the public and private sectors. While government institutions will need to update labour and education policies, deliver more support for upskilling and reskilling, and enhance social protection to help employees effectively manage their transition, businesses will also have to capitalise on their workforce through lifelong learning, training, and efforts to foster diversity and inclusion. In this regard, the White Paper (2020) emphasizes the role of human resources as a key driver in defining how work and the workforce evolve and how businesses will continue to produce value.

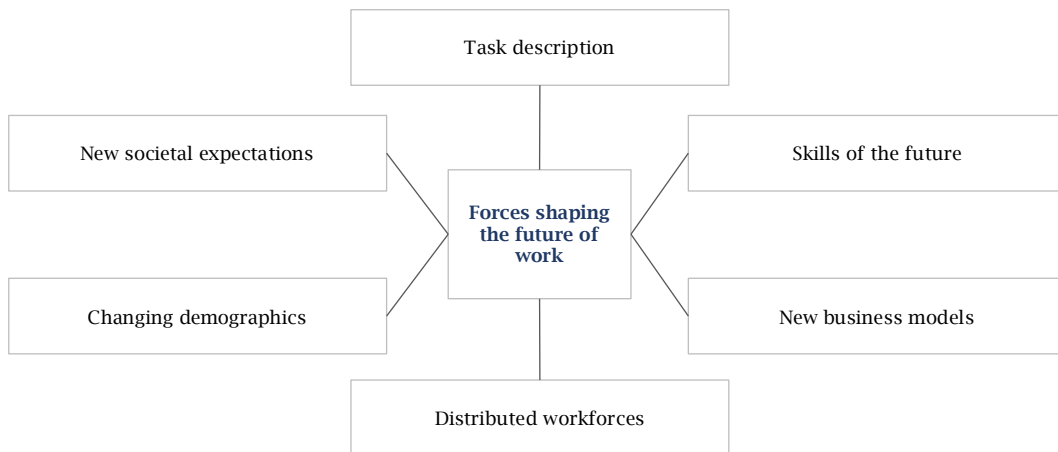
It is crucial for business leaders to manage this transition successfully since it will help to define a new contract between companies and employees, which will also determine whether the 4IR results in a positive outcome for businesses. The evolution of the human resources function, therefore, has broader societal implications, even beyond how relevant and forward-thinking employee strategies are executed within companies. For HR managers

to be able to assist leaders with the transition to the 4IR, it is important to identify the forces that shape the future of work; therefore, Figure 2 will assist HR managers to identify such forces.

The 4IR requires strong leaders. It is not an easy task to transform industries and business models, establishing the best global frameworks and strategies, and eventually supporting organisations to adjust to the digital world; however, it is possible. It is, therefore, crucial to ensure that leaders have the correct skills in order to ensure a smooth transition to meet the digital need of employees and societies.

For business leaders to be able to transform business models and redefine company strategies, it is crucial to ensure that they have a clear understanding of the importance of their role and the responsibility that comes with the 4IR transition. Leaders should display a high level of positivity, trustworthiness, responsibility, strategic thinking, active and creative thinking, and strong communication skills. These skills will assist them to ensure that everyone in the business has a common understanding during the transition period. HR practitioners, therefore, have a crucial role to ensure that leaders are equipped with the necessary skills in order to be capable to transform industries to align with the 4IR.

Figure 2. Forces shaping the future of work



Source: White Paper (2019, p. 1).

Figure 2 displays the forces shaping people’s strategies in the 4IR. HR leaders, along with business leaders are expected to facilitate this shift in organisations whilst also changing their own human resource practice. People strategy is a top priority of an organisation as the technological, economic, and social forces intensify; therefore, it is crucial for companies to find a balance between a human-centric approach and operational excellence.

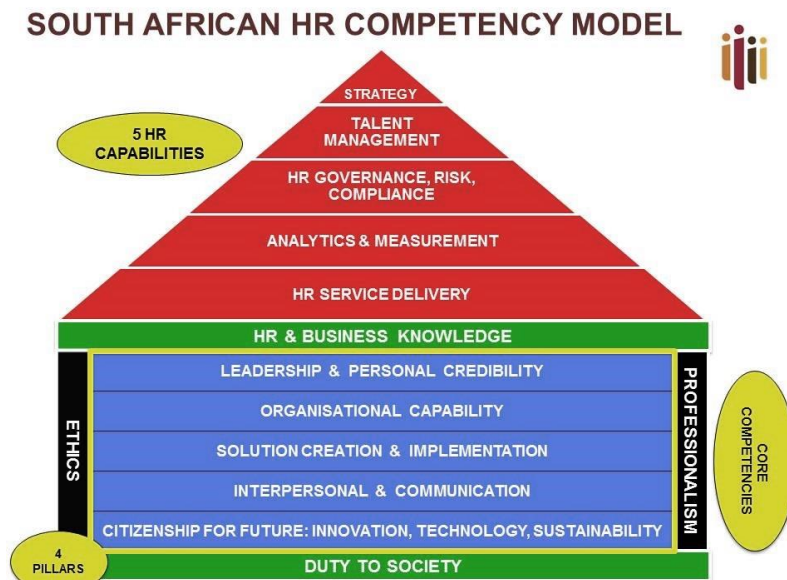
2.1.1. Skills of the future

Human resource professionals have a responsibility of ensuring that as tasks and jobs transform, businesses have a workforce that is equipped with

the required skills. This creates a challenge for them since they will be required to ensure that they are re-skilling and upskilling the current workforce to be in line with the new skills requirements in the workplace. They will also have to compete with other organisations in finding the new skills that will be required in the future.

There will be deficiencies in skills in fields that require technical skills such as information technology, mathematics, medicine, and engineering. In this case, companies will try to find and win people with critical skills. The only way to be successful in this competition is to set up your own talent management systems and integrate them into HR processes.

Figure 3. South African Board for People Practices (SABPP) national HR competency model



Source: SABPP (2012, p. 1).

The designing of human resource (HR) competency models has achieved interest throughout the past decade, supporting organisations to adjust to continuing adjustments in the business world (Abdullah, Musa, & Ali, 2011). The South African Board for People Practices (SABPP) introduced a new

competency model in 2012 to be used as a guide to the professional conduct of HR professionals in South Africa. “The National HR Competency Model has been further developed to contain a full competency library, with behavioural indicators detailed in accordance with Levels of Work, covering

Level 1 Support, Level 1 Professional, Level 2, Level 3 and Level 4. Both generalist and specialist HR roles are catered for. The library also contains a breakdown on a similar basis of all HR technical work, in alignment with the HR Architecture of the HRM System Model" (SABPP, 2012, p. 1).

2.1.2. New business models

New strategies that are aligned with the future of work in the 4IR will become increasingly important in enabling businesses to contribute to socially responsible approaches to ensure a smooth workforce transition. In order for human resources to be able to contribute to business results, *business units need to be strategic partners*. In order to achieve this, HR professionals who can understand and interpret financial data, and who also have a good command of the dynamics in the sector in which the company operates will be crucial in all businesses. It is therefore important for HR professionals to be up to date with new technological developments so that they can contribute to important projects carried out in the company with regards to newly developed technological applications and projects parallel to these elements.

2.1.3. Distributed workforces

The 4IR will break the boundaries that currently exist across geographical locations. At this stage, there is already a huge shift that has been created by social media whereby every person who is connected can receive the same information at the same time, irrespective of their geographic location. These changes will in the future lead to a shift from traditional employee-employer relationships to distributed workforces.

2.1.4. Changing demographics and new societal expectations

Changing demographics and new societal expectations of the workforce are also shaping business priorities. Women are now the majority of those with higher education across most developed and developing economies and the workforce will be made up of five generations for the first time; this will have a huge impact on how organisations operate in the future since they need to ensure that their workforce diversity is taken into consideration. Additionally, there is a greater expectation on the part of workers that workplaces will be inclusive of all races, genders, identities, cultures, religious affiliations, and physical abilities (White Paper, 2019).

2.1.5. Task disruption

Organisations are facing a shift away from a "one-size-fits-all" model towards a more personalised approach to the employee experience in the future. As the needs of each generation and diverse workforce groups vary, technological advances offer increased choice and flexibility. All these trends are moving quickly and in parallel, which therefore creates a need for organisations to change how they unlock, manage, and maintain human potential.

It is crucial for human resource managers to ensure that a people strategy is aligned to the business strategy in order to address several challenges and changing trends that all global organisations face. Furthermore, a people strategy impacts an individual's financial security, social stability, feelings and sense of belonging, well-being, and growth.

Therefore, there is a huge need for the organisation and its leaders to shift their view of human resource managers from that of an administrative function to one which:

- determines business outcomes through creativity, innovation, stability, and agility of talent;
- drives the relationship between the company and the community;
- inspires positive societal outcomes in an era of change and disruption;
- is a co-creator of the organisational culture;
- is an integral part of ensuring the deployment of technology in the interest of efficiency and inclusion.

2.2. The future of work

The 4IR presents transformations; if managed properly, 4IR has the potential to lead organisations to a new phase of efficient work, fulfilling careers, and improved quality of life for all. However, if not managed properly, it poses a risk of broadening skills gaps, increasing inequality, and enlarging division. Industrial modifications and technological innovations are normal, and they are a good sign of any developing society. There are some concerns that exist whereby people believe that the 4IR might establish a world where robots replace humans in the workplace. However, automating important responsibilities could eliminate the more monotonous aspects of jobs and permit the human workforce to concentrate on more significant, satisfying assignments.

The 4IR will have a mostly positive effect on the outlook of the workplace. It will allow managers and human resource professionals to concentrate on more important responsibilities and assist individuals throughout each business to carry out their duties to a better level. Machine learning and artificial intelligence are entering the person's space and boosting the abilities of HR managers. Progressively, artificial intelligence is now being utilised in other parts of the world to match experience and skills to job specifications. People who do not enter the correct search words are simply overlooked. Robots in other countries are already conducting the first job interview in a recruitment procedure. Robots have assisted with a reduced chance of human bias during the process of recruitment; therefore, this is a more positive value that robots are adding to a business process.

Another positive impact is that distance is no longer a barrier to connecting people with the required skills to match career opportunities. Interviews conducted through a video conference empower the obtaining of talent that would have previously been overlooked because of geographic distance. Human resource managers need to be aligned with the changes that are being introduced by technological advancements and recognise the technologies that are going to enhance their success and productivity. It is crucial to note that there is no business or industry that is exempt from

4IR. Every industry will be affected by changes that come with the 4IR, this includes farming, education, government, and manufacturing.

Organisations will look to HR professionals to lead them through the largest transformation since the invention of the internet. HR will have to provide critical insights in identifying which roles can be automated and which will be managed by humans. This is all part of the process of HR leading organisations to the forefront of the change, as alarmingly, those that fail to adapt quickly will be left behind, history is filled with cautionary tales of such organisations that became victims of strategic drift.

HR will be tasked with the complete integration of people and technology, taking a holistic approach to organisational and technological transformation at a scale never imagined before. Automation is unavoidable, planning now to develop the organisation's talent acquisition and management strategy will be a defining moment in the future success of an organisation. The 4IR offers challenges

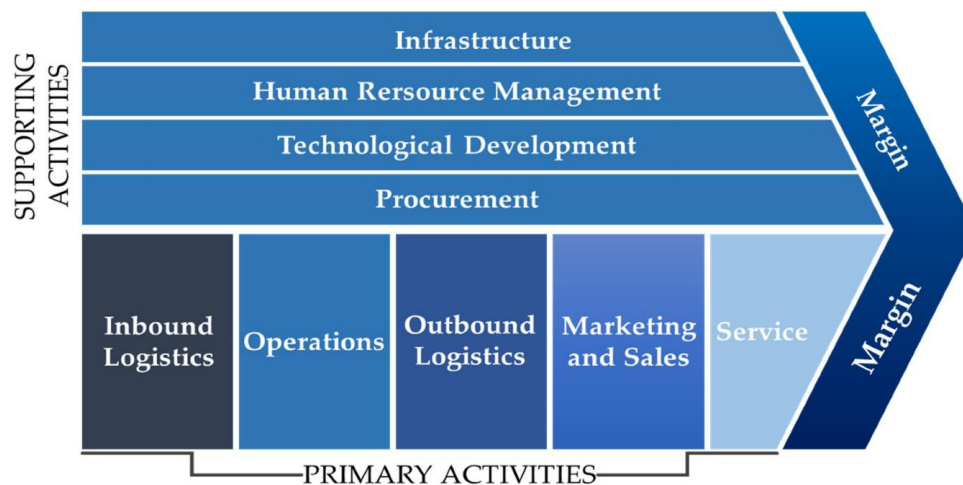
and opportunities in equal measure. The role of HR should be that of *advancing the technological capabilities of a workforce to ensure it stays in step with technological advancement*, as well as ensuring an organisation is equipped to address the unknown.

2.3. Link to theories underpinning the study

2.3.1. The relationship of Porter's value chain theory to the Fourth Industrial Revolution

The 4IR has an effect on the whole business; it is, therefore, crucial to comprehend the way in which its several elements can exploit the prospects presented by digitisation (Hofmann & Rüscher, 2017). In this study, the researchers use Porter's value chain model (Figure 4) to identify how the 4IR technologies are employed in various processes, with exclusive interest to the techniques used for knowledge creation, distribution, and evaluation (Porter, 1985).

Figure 4. Porter's value chain



Source: Porter (1985, p. 37).

Figure 4 indicates that a business's competitive advantage cannot be viewed at in isolation. Furthermore, it is also essential to realise how each business element impacts supplying the product or service to rivals at a higher quality or lesser price. One of the practical forms of the value chain method is to standardise all business activities and to obtain the basis that can be used to gain a competitive advantage. This configuration is highly dependent on the business's strategy, corporate traditions and policy execution.

2.3.2. Existing 4IR maturity and readiness models

To analyse current 4IR models accurately, review measures that have been utilised in related studies are recognised based on the literature. While there has not been much research focusing on the criteria for assessing the 4IR readiness, similar findings

have been explored in the literature completed to identify the assessment criteria.

The term "maturity" describes a state of being complete, perfect, or ready (Simpson & Weiner, 1989) and indicates an improvement in system development. Therefore, developing systems (e.g., technical, biological, and organisational) expand their abilities over a period concerning the attainment of the desired outlook. Maturity can be captured quantitatively or qualitatively in an unconnected or constant manner (Kohlegger, Maier, & Thalmann, 2009). It is crucial to mention that there is a distinction between maturity and readiness. Readiness assessment occurs prior to engaging in the maturing process while maturity assessment seeks to capture the current state. With regard to the sphere of 4IR the below tools and models for assessing readiness or maturity have been published (Table 1).

Table 1. Existing 4IR readiness and maturity models

<i>Model</i>	<i>Research context</i>	<i>Maturity levels</i>	<i>Dimensions</i>
The connected enterprise maturity model	IT readiness	5 maturity stages: Assessment; Secure and upgraded network controls; Defined and organized working data capital (WDC); Analytics; Collaboration.	4 dimensions related to technological readiness. No further information is provided related to aspect dimensions and the creation process of them.
IMPULS — Industry 4.0 readiness	Industry 4.0 readiness	6 maturity levels: Outsider; Beginner; Intermediate; Experienced; Expert; Top performers.	6 dimensions: Strategy and organization; Smart factory; Smart operations; Smart products; Data-driven services, and employees.
Empowered and implementation strategy for Industry 4.0	Implementation strategies of Industry 4.0	No information was provided regarding the maturity model.	No information was provided regarding the maturity model.
Industry 4.0/Digital operations self-assessment	Industry 4.0/Digital operations self-assessment	3 maturity levels: Vertical integrator; Horizontal collaborator; Digital champion.	6 dimensions: Business models; Product and service; Portfolio market and customer access; IT architecture; Compliance, legal risk, security tax; Organisation and culture.
A maturity model for Industry 4.0 readiness	Industry 4.0 maturity	Likert-scale maturity levels (from rating 1 = "not important" to rating 4 = "very important").	8 dimensions: Strategy, Leadership, Customer, Products, Operations, Culture, People, Governance, and Technology.

Based on the above models it can be concluded that there is growing research being conducted on the 4IR in recent years, however, there is a research disparity due to limited research in the use of maturity models for the 4IR. As presented in Table 1, the most noticeable shortcoming of the models is that they do not support the production value chain holistically. Additionally, the approaches recorded in Table 1 present a smaller number of details concerning the development process, assessment methodology, and structure, and consequently, there is no basis for a comprehensive evaluation.

3. METHODOLOGY

3.1. Research approach

In this study, the researchers adopted a qualitative research paradigm and followed the Straussian approach because of the lenience in the position of use of literature as a source of insight that helped the researchers to engage with participants, then formulate relevant probing questions. It is logical to use grounded theory analysis techniques as proposed by Glaser and Strauss (1967) and other authors (Giske & Gjengedal, 2007; Glaser & Holton, 2004; Holton, 2007; Jones & Alony, 2011), who suggest three levels of coding, namely, open coding, axial coding, and selective coding.

The qualitative nature of this study entailed embarking on in-depth, recorded interviews with HR managers to give responses to the research question. The sampling procedure followed a non-probability sampling technique called purposive sampling. The purposive nature of the sampling procedure, which in grounded theory is referred to as theoretical sampling, allowed the researcher to approach HR managers in different sectors that were theoretically in the best possible position to provide information that will answer the research question. The sample may be described in terms of sector and size of organisation from which the participants' reign.

3.2. Respondents

The sample comprised 60 managers, from whom data was collected using semi-structured interviews to enable further probing and follow-up. The sample comprised 22% being the fast-moving consumer goods (FMCG) sector, 11.1% from the higher education sector, another 11.1% from the government sector, whereas 55.6% were from other sectors (e.g., legal, health, transport, mining, security, auditing firm, postal services, refinery, beverages and alcohol). The staff compliment from the companies where the participants are based consists of 38.9% having below 500 employees, 16.7% having between 500-1000 employees and 44.4% having above 1000 employees.

3.3. Instrument

Data was collected using a semi-structured interview schedule. Rapport was established by clarifying the purpose of the study, the process to be followed, risks/discomforts, benefits, costs, feedback, informed consent to participate, and permission to record the interview session. The interview schedule covered 6 aspects relating to the impact of 4IR in the workplace in South Africa, the influence of HR professionals on the impact of 4IR in the workplace in South Africa, and the impact of internal and external factors on HR professionals' success in facilitating 4IR within their organisations, problems anticipated in ensuring the facilitation of 4IR in the workplace and the resources needed to ensure the facilitation of 4IR in the workplace.

3.4. Measures

Three levels of coding that were used in this qualitative study include open, axial, and selective coding. Data collection continued until the point of data saturation. Alvesson and Skoldberg (2009) describe saturation during interviews as a moment when there is no different data that is discovered by an additional collection of data due to the fact that all the questions raised have been exhausted by the initial questions that were asked during the

qualitative interviews. Each interview went through the initial open coding which involved grouping similar concepts into codes, that is after each interview had been transcribed. After the point of data saturation, which is at a point where there was no new data emerging, the researcher went through open-coded data to perform axial coding, whereby all codes were grouped according to themes. Selective coding was then narrated to formulate a storyline that explained the network of concepts or axial code that resembled a framework.

The researcher adopted the naturalist inquiry. When defining naturalist enquiry, Lincoln and Guba (1985) stated that it is a paradigm of enquiry whereby a model is used on the manner in which an enquiry may be conducted. In order to ensure trustworthiness, the most suitable terms in naturalist paradigms are the concepts of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). This study adopted a comprehensive method to guarantee credible and accurate findings. Transferability has been boosted by a recruitment approach that required the highest variation in the sample.

To ensure dependability, this study clearly states the demographic of the variables, clearly defines the research question employed in the process of collecting research data, and clearly explains the coding procedures (Given, 2008).

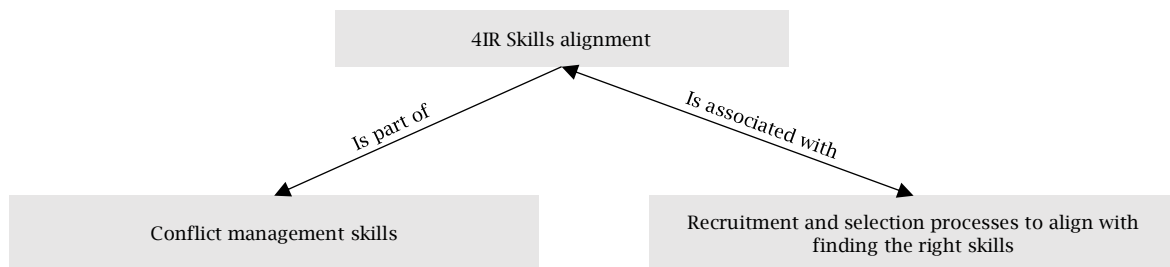
The qualitative data analysis package ATLAS.ti was used for coding. Steps have been taken with the purpose of ensuring that the findings of the study are the results of the participants and not the preferences of the researcher (Polit & Beck, 2014). The triangulation of different sources and perspectives was undertaken in order to promote confirmability (Lincoln & Guba, 1985). Confirmability has been addressed by cross-checking codes for accuracy. The researcher also verified preliminary findings by listening to audio recordings to ensure a credible interpretation of participants' responses.

4. RESULTS AND DISCUSSION

4.1. 4IR skills alignment

Participants highlighted the importance of ensuring that skills development is facilitated by HR managers in preparation for 4IR, and it should start with ensuring that line managers are well equipped with the necessary skills. Figure 5 shows the 4IR skills alignment framework, which displays some of the crucial factors that should be considered to ensure 4IR skills alignment. In particular, the top management structure and management must be properly trained to facilitate 4IR skills alignment.

Figure 5. 4IR skills alignment framework



HR must take the responsibility to appropriately train managers to be able to manage effectively. Whilst it is a team effort, each manager needs to understand that the accountability stops at him/her to ensure that the employees are involved and are suitably skilled in terms of needs to fulfil what is expected of them (Interviewee 9). A logical, sequential process should be followed which assists managers with skills development first, then providing employees with the required skills needed when 4IR is implemented as the readiness of the people and the skills required to operate the technologies are also imperative. In fact, one needs to develop employees from scratch, then train them based on the needs of the direction that the organisation is taking, and then look at skills required for the future in tandem with skills that the organisation currently has. So, the strategy would be to start embarking vigorously on skills and qualifications, database updating of that information and then matching with skills that the organisation has, locating the gaps and developing employees to fill those gaps or strategically sourcing the skills (Interviewee 11). In addition, there is the need to ensure that future skills of employees are also considered in order to ensure that employees continue to remain relevant within the organisation

without having to be replaced. This emphasizes the crucial role of the training and development division in preparing the workplace for the 4IR. The training and development division will have to focus on the upskilling of people to be aligned with the business operating model and ensure that the skills of the workforce have transitioned in congruence with the needs of the transition from the old to the new business model. This means first identifying the exact processes in the production operating model that will be impacted by the 4IR so as to assess the skills needed and whether they will be developed or sought out. Once this process is undertaken, the skills needed may be mapped out in order to assess how they may be built, especially those that cut across the business. In this regard, the change management process becomes critical and the need to change mindsets is reinforced so that people are more accustomed to new realities and, combined with employee upskilling, there is greater support for the 4IR business operating model (Interviewee 16). Likewise, Hofmann and Rüschi (2017) stated that the 4IR has an effect on the entire organisation; it is, therefore, important to understand the manner in which different elements of 4IR have an impact on each organisation. HR managers should utilise the 4IR transition period

to determine and contribute to an effective 4IR business operating model. Business leaders should ensure that they provide all the necessary information regarding the business goals, thus ensuring that the impact of 4IR on those business goals is also considered.

HR managers must first have the skills themselves to be able to identify the skills gaps. Key to building the skills is effectively communicating with the workforce to enable each and every employee to understand that while it is business as usual type of work, the routine work will be a thing of the past and everyone has to ready him/herself that the business has to “up its game” and this can only be done by learning new skills. Likewise, Malik, Budwar, and Srikanth (2020) stress that HR professionals need to have new skills and knowledge in order to successfully engage in the new and brave world of artificial-intelligence-based technological disruption. In this regard, Chaka (2020) emphasizes that the required HR skills for 4IR relate to the soft skills of communication, creativity, and problem-solving and the hard skills of programming. This means that HR has to adopt high cognitive upskilling to communicate this mindset, identify areas that need to be developed and create opportunities for new skills development (Interviewee 13). This may require HR to undertake climate surveys, partner with learning systems like LinkedIn learning and explore possibilities of tapping into the education system to enable employees to capacitate themselves. This also entails exploring where the people required are, where they are being trained and where are the facilities or the people who have the right skills and are able to do the right job and the job right (Interviewee 14).

It is crucial that HR creates the 4IR awareness sessions with all employees so that they will understand the direction that the organisation and the world are moving into, thereby, creating an understanding of a need for skills development. Hence, the workforce needs to understand 4IR from a competence perspective and from a development perspective (Interviewee 17). With automation, there will be some operations that might become redundant or not necessary thereby requiring HR to prepare the workforce by upskilling and reskilling and assist in ensuring that jobs are retained as much as possible. This will also assist in moulding employees cognitively into thinking that when the business will automate a process, one’s job, process, and output will change (Interviewee 17). Therefore, it is important to engage with employees early to obtain a sense of their thinking and so that their preordained thinking of job losses through modernisation can be channelled into thinking self and competency developing for automation and improvement. In this way, HR can enlighten the workforce on how 4IR can build skillsets rather than result in retrenchments, thereby helping to nurture excitement and enthusiasm about 4IR rather than fear (Interviewee 18).

Another HR manager explores the idea of upskilling people differently and partnering and leading as well as empowering in accordance with 4IR. It is imperative to understand that employees will require different skills and while automating many things simultaneously it is imperative to

explore opportunities to upskill people differently. This is where HR can play a critical role in partnering and leading (Interviewee 1). The respondent elaborates further on the importance of HR harnessing the process by themselves having a medley of skills including skills to manage structural change, conflict management skills, interpersonal relationships skills, and skills to see opportunities as they arise, always taking cognisance that all skills must be nurtured and empowered in terms of 4IR.

With regard to the need to up skill very quickly, it was noted that technology can play a huge role in this regard in terms of gaining access to quick learning and quick development of teams.

Some participants emphasized that they had already facilitated the process of skills audit, others had not started the process of skills development for the readiness of 4IR but had only undertaken skills and qualifications updates in the organisation.

One participant cautioned that in order to successfully implement 4IR, the recruitment process must also change and be aligned to the type of candidates that will be required to operate in the 4IR environment (Interviewee 6) and stressed the need for proper actual job specifications and the need to secure a 4IR fit first and stresses that HR needs to be much more selective and professional when it comes to undertaking interviews and ensuring that the recruitment processes are extremely effective in matching the right person with the right skills to the job. This requires asking the right questions in the right manner, effectively, verifying qualifications, and drawing up job profiles, advertisements and interview schedules to achieve the best person-job fit (Interviewee 15). Ultimately, the way in which HR approaches getting the right people, in the right jobs, within the boundaries of the law, to produce the results is going to be key to future success.

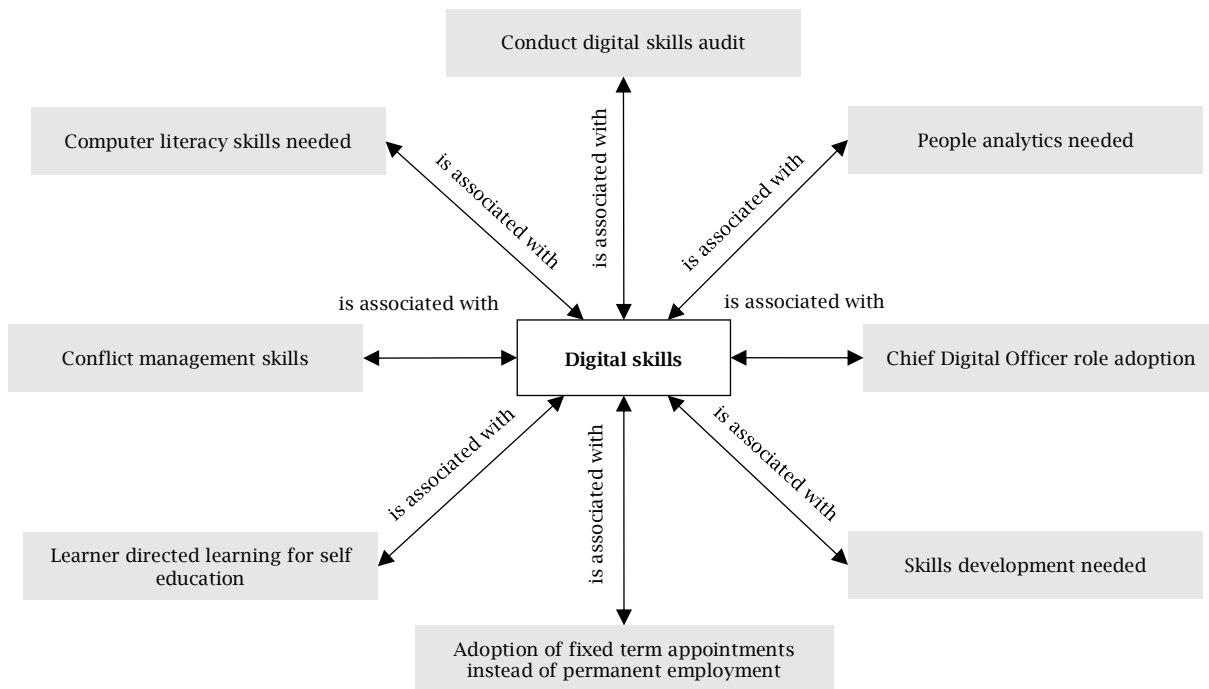
One participant emphasized the importance of aligning the organisation with 4IR by recruiting people with digital skills and stressed the importance of an early organisational redesign taking cognisance of creating the right structure for a digitisation strategy and finding key capabilities to support this structure and strategy.

HR managers should themselves have the right skills and competencies that will ensure the drive of 4IR as well as skills alignment in the organisation. They must be agile so that they can respond quickly, proactively, and timeously to the 4IR changes. HR managers should have innovation skills that will be necessary to design new models that are aligned with 4IR. They need to have the necessary digital skills in order to be able to drive digital capabilities. Since 4IR necessitates global operations, it is crucial to understand different cultures and how those differences have an impact on 4IR operations.

4.2. Digital skills

It is crucial to ensure that organisations have digital skills. The digital skills framework presented in Figure 6 consists of the important factors that should be considered when looking into digital skills. Without the correct digital skills, there will be no success in implementing 4IR.

Figure 6. Digital skills framework



Resources may be available in the organisation but if people do not possess the right skills and know how to use them, 4IR implementation can be negatively affected. 4IR demands the rapid use of technology in all spheres of work and often means moving away from analogue to digital demands quick learning and development and the application thereof (Interviewee 5). This emphasizes the need for skillsets that are relevant to the 4IR environment. Evidently, the 4IR has the potential to fuse and blend human resources and technology. In fact, Ramirez (2020) believes that the 4IR is already blurring the lines between people and technology, fusing the physical, digital and biological spheres.

Undoubtedly, skills development to equip employees with digital skills is something that organisations should consider. Clearly, in South Africa, this ties up closely with the legislation. Hence, if we are talking about a skills development function in an organisation, we know that the legislation, the Skills Development Act and the Skills Development Levies Act that regulates the skills planning, implementation and recognition, assists with compliance issues so if we are doing that and it is sort of a paper-pushing exercise it will not have its impact, skills development plays a critical role in the transformation and the direction we want the organisation to take. This means that HR has to plan for impact, that IT skills are imperative, and people must be more tech-savvy. In addition, other imperative attributes include people being more agile and fully understanding that we are living in a volatility, uncertainty, complexity, and ambiguity (VUCA) environment governed by volatility uncertainty, confusion and anonymity, and that 4IR is changing the face of how we engage and operate, demanding that we think broader and wider and constantly embrace a global perspective, thereby demanding a change on mindset and a whole new paradigm shift governed by tenacity.

Another respondent also suggested a plan that can assist with ensuring the readiness of digital skills. He suggested first undertaking a digital audit so as to complete a skills audit to obtain insight into who is where in terms of digital skills and then to categorise them in terms of the type and extent of assistance they will need to empower themselves to be the level that the 4IR will require. The basic audit will provide insight into the level of training and intervention needed to bring people up to the level where they will be able to cope with the demands of 4IR. In addition, Interviewee 2 provided insight into another approach adopted in his organization to ensure the right digital skills where they identified employees with the talent to attend certain technology training, who would then bring it to the organization, implement it and “run with it to the end”. Interviewee 9 enlightened about his organisation’s approach to running a very large project of creating online learning platforms so that as the new automated processes become a reality, they can simultaneously train their staff on how to utilize them in their own positions. All preparation strategies circumambulate doing a skills audit, having a 4IR operating business model, adopting digital technologies, and, upskilling and reskilling staff.

Participants also detailed the role of HR in ensuring that employees have relevant digital skills. Interviewee 15 commented, “HR needs to be much more selective, more professional when it comes to interviews, also in the recruiting processes to check the right kind of people. You will appreciate that in the technical field when people make mistakes, those mistakes have big consequences. The recruitment process is going to be very important for HR, the way questions are asked, how the education is checked”, he further stated, “HR will have to look into their role at the organisation that they serve and say are we here just as gatekeepers or are we here to make sure that we get the right

people to set the profile of the company. The key thing that HR needs to do, looking at the technology, is to equip themselves with the knowledge, so that they can make sure that they get the right people for the right jobs”.

4.3. Recommendations

Based on the results of the study and insightful inputs from respondents, the following recommendations are presented that should be taken cognisance of when preparing for 4IR:

- It is crucial for companies to find a balance between a human-centric approach and operational excellence.
- It must always be noted that as tasks and jobs transform, businesses have a workforce that is equipped with the required skills. The challenge then is to ensure that they are re-skilling and upskilling the current workforce to be in line with the new skills requirements in the workplace.
- No one division alone is responsible for 4IR preparation. Instead, all business units need to be strategic partners. In fact, the 4IR implementation should be interdisciplinary amongst distinct major divisions within the business.
- A key aspect in preparation is for the organisation to set up its own talent management systems and integrate them into HR processes.
- In addition, ensure that a people strategy is aligned to the business strategy in order to address several challenges and changing trends that all global organisations face.
- Mindshifts, even in HR, are imperative. There is a huge need for the organisation and its leaders to shift their view of human resource managers from that of an administrative function to one which:
 - determines business outcomes through creativity, innovation, stability, and agility of talent;
 - drives the relationship between the company and the community;
 - inspires positive societal outcomes in an era of change and disruption;
 - is a co-creator of the organisational culture;
 - is an integral part of ensuring the deployment of technology in the interest of efficiency and inclusion.

For ease of implementation, recommendations for skills development are presented as propositions:

Proposition 1: Skills development has an impact on fulfilling the 4IR skills demands.

Proposition 2: HR strategy alignment with 4IR has an impact on the implementation of 4IR.

Proposition 3: 4IR skills alignment is crucial in preparing for 4IR implementation.

Proposition 4: Stakeholder consultation has an impact in 4IR implementation.

Proposition 5: Job losses concerns must be addressed during the 4IR consultation process.

Proposition 6: Personal development must be encouraged to address the skills needed in the 4IR era.

Proposition 7: Digital skills are necessary in ensuring the successful implementation of 4IR.

Proposition 8: Job security has an impact in ensuring the successful implementation of 4IR.

Proposition 9: Skills shortages have an impact in ensuring the successful implementation of 4IR.

4.4. Significance of the paper

The study provides guidelines for the practitioners engaged in preparing for the Fourth Industrial Revolution. When one thinks industrial revolution, it is easy to first focus on technology. This paper realigns mindsets in preparing for the 4IR by reminding the practitioner to think about value and not just technology and to think of people rather than tools. The paper also reminds the specialist preparing for the 4IR to set and communicate clear targets right from the beginning.

The paper provides the human resource practitioner and business partner with insights on the impact of 4IR on human resources and how to prepare the organisation's manpower and the management so both are able to transition smoothly and seamlessly into the demands of the 4IR work environment. The study reminds HR managers of the VUCA in the environment in which they operate and engage in decision-making and planning including human resource and succession planning.

5. CONCLUSION

It is fully acknowledged that the Fourth Industrial Revolution brings with it a tremendous degree of disruption. It will disrupt conventional ways of value creation, societal interactions, and doing business. It will be even more disruptive for countries that have not been preparing for the 4IR. Hence, organisations that do not prepare for 4IR and do not align their skills and their human resources strategically are certainly going to be bombarded by such disruption and they are likely to face instability that rocks their triple-bottom line and destabilizes their market share, profitability, competitiveness, and survival. To avoid this, the business needs to prepare in advance and the leadership needs to be alive to unprecedented changes and alert to the guidance of HR professionals to steer the business while not only being cognizant of the demands of 4IR but also viewing it as an opportunity to realign and gain momentum towards greater competitiveness and effectiveness. This means that HR has to position themselves for 4IR combat too in order to reign the business and its activities victorious in their transitioning to 4IR. Undoubtedly, those that fail to adapt quickly will be left behind, history is filled with cautionary tales of such organisations that became victims of strategic drift. HR professionals must become experts at analysing and predicting future changes affecting the workforce. They must develop a realistic view of when and where those changes will have an impact. They must also influence the leadership to approach the transition from a values-driven point in order to ensure an objective and efficient transition for the organisation's workforce and society as a whole. It is important for HR managers to be able to help others in the organisation to understand technology, design thinking, systems thinking, storytelling, understanding and conducting strategic workforce planning, and the emerging field of mapping jobs, skills, and tasks. The six requirements that are outlined in the recommendations, together with the associated HR functions, skills, and emerging best practices, are crucial as a starting point to

support change in the people strategies of global organisations in the 4IR.

The literature review can be summarised by determining that there is increasing research focus on 4IR in recent years; however, there is a research gap due to the limited number of studies on the utilisation of readiness models for 4IR. Existing readiness models in the literature do not satisfy all standards and should be improved. One of the shortcomings of the models is that they are not developed based on a properly recognised framework for improvement and assessment, and they also lack a succinctly clear structure with inputs, outputs, and practices. These studies lack a well-accepted readiness model for 4IR. The need for a structured 4IR model remains valid. This study aims to explore the readiness of HR for the Fourth Industrial Revolution in South Africa within different sectors. It is important to note that the 4IR should not just be viewed as a challenge but rather an opportunity to recreate and redesign for growth, development, and prosperity.

The study is undertaken in a COVID-19 pandemic environment where data collection was restricted to online platforms to adhere to the requirements of social distancing and work from home. Under these circumstances, the researcher conducted semi-structured interviews with managers, who had online accessibility. Future research should adopt a 360-degree data collection approach and collect the views of management and employees alike. Furthermore, this study was undertaken in several sectors within South Africa. In the future, a more global perspective may be embarked upon so that comparisons may be made. This study focuses on preparing for the 4IR and therefore analyses the time “before the 4IR”. It is proposed that an “after the 4IR” time period be studied to be able to engage in a “post-mortem” analysis which will provide insight into incorrect perceptions, incorrect focus areas, and incorrect implementation strategies, which will provide insight how major change of this nature can be prepared for better in the future.

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