
**The Influence of the Fourth Industrial Revolution on Human Resource within the
Zambian Banking Sector**

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Abstract. The banking sector is currently in the wake of the fourth industrial revolution (4IR), banks should therefore be proactive enough to build on the beneficial aspects of technological change while at the same time being wary of the risks that the revolution brings on work life. This study therefore explored what 4IR technologies are being used in the Zambian banking sector, explored its influence on Human Resource (employees) and further recommended strategies that banks can employ to better manage 4IR disruption. Literature review and structured interviews were the main source of data. Through purposive and snowballing sampling ten (10) participants were selected to participate in the research and responses were analyzed in relation to the reviewed literature. Findings indicated that technological advancement has aided with tedious repetitive tasks and paves way for upskilling opportunities while challenges identified included the difficulty of learning a new skill, the fear of losing jobs and reliance on technology means slowed work during downtime of machines. The research further recommended that banks should intentionally focus on re-skilling their staff to ensure they stay relevant through training, organizational strategy alignment to 4IR and a change of mindset and culture towards technology. This study used a small sample and employed qualitative research. Therefore, further study should explore the possibility of creating a hypothesis and tests using quantitative methods. In addition, future study can also explore the influence of 4IR in other sectors.

Key words: 4IR, Banking sector, Technological advancement, Technological unemployment, Zambia

Introduction

According to Sutcliffe and Bannister (2020), 4IR can be simply defined as the current and developing environment in which technologies such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way we live, interact and work. 4IR is an inevitable global development and this in essence means that no economic sector is exempt from the far-reaching effects of it (Sutcliffe & Bannister, 2020). The increase in digitalization, artificial intelligence encompassed in 4IR has a vast impact on markets, including the labor market (Sumer, 2018). Sumer (2018) further points out that advances in technology can either erase jobs thus creating unemployment or create them. In addition to Job creation, digitalization and automation can reduce company costs in the form of labor costs and human error costs during production (Harahap & Rafika, 2020). 4IR can also bring about efficient and effective management of resources and an increase in productivity and all in all boost employee motivation and performance (Sutherland, 2019). The use of advanced technology with regard to machines and algorithms in the labor market is gradually increasing as the use of it brings an ease to routine tasks, increases the quality of work and productivity (Riminucci, Industry 4.0 and Human Resources Development: A view from Japan, 2018). On the other hand, advanced technology requires a sophisticated set of skills which may lead to extinction of some jobs and thus reshape the structure of an economy (Sumer, 2018). It is therefore imperative that companies and economies at large start preparing for it as this would ensure that the positive outcomes of 4IR are taken advantage of and the negative impact of it minimized.

Automation and robotics are the aspect of 4IR that is expected to have the most significant impact on employment within the workforce worldwide, as well as a lasting impact on society (Riminucci, Industry 4.0 and Human Resources Development: A view from Japan, 2018). The outburst of artificial intelligence and IoT is instigating significant changes in labor demand and many jobs are being lost at a fast pace with the automation of low to medium skilled tasks (Aramco & W, 2019). According to Harahap and Rafika (2020), numerous research done on 4IR show a bias towards the high skilled labor in most countries while creating unemployment and inequality for the low and medium skilled workers through human and technology competition. The concerns of unemployment have indeed been in existence for 200 years since the first industrial revolution to the third industrial revolution (Harahap & Rafika, 2020). According to Harahap and Rafika (2020), the fourth industrial revolution however introduces a profound sense of automation, internet of things (IoT) and robotics that if not managed wisely in the workforce could lead to the risk of skill gaps being widened, broader technological unemployment and failure to harness the lucrative opportunities it presents.

Technology-fueled disruption will continue to reshape the global banking sector, creating new opportunities and solutions for businesses and customers as it democratizes financial services. However, the accompanying restructuring will have a significant impact on employees and their jobs. The banking sector has been selected as the area of focus as they are the leading sector in the world of innovation in Zambia and are quick to respond to changing trends in technology. Simple examples include that of Self depositing ATMs that are slowly replacing tellers, advanced phone applications and online banking. The vital questions to then pose is- What does this really mean for the bank's employees? What are Banks doing to protect their employees from the negative impact posed by 4IR?

Literature Review

In the banking Industry, several developed countries have employed 4IR technologies in their day-to-day bank work. According to Kumar (2021), 80% of the banks worldwide acknowledge the benefits of Artificial Intelligence, 75% of them have employed it and 46% plan to implement it. An example is that of AI software called Kensho which is being used in numerous developed countries. Kensho is a financial analytics software that can conduct a financial analysis in seconds as opposed to 30 man-hours from well qualified analysts (Acemoglu & Restrepo, 2017). Investment Banks in England and America are using High Frequency Trading (HFT) which enables them to trade stock at a high pace and has displaced several traders as robots are more efficient at this task (Bessen, 2015). Canadian banks are utilizing AI on their mobile banking as well to make the banking experience more personalized and proactive. The banks have integrated Siri in their bank App to send money and all one has to say is '*hey Siri, send \$50 to Sam*' (Kumar, 2021). While in Korea, HANA financial Group has an AI software that can process in full a loan application for their existing customers online with just five simple steps (Kearny, 2021).

Compared to the rest of the world, Africa and other developing countries lagged during the previous three industrial revolutions and the same is expected during the fourth industrial revolution (Mminele, 2018). The African workforce currently has the second largest working population and according to the World Economic Forum, the ability for Africa to adapt to 4IR technologies is not satisfactory and more effort is required to close in on the skills gap (Mminele, 2018). The forum therefore considers Africa unprepared for the disruption to jobs and skills that 4IR brings with it. Generally, Africa lags in technological advancements and 4IR technologies (Further Africa, 2020). It is however worth noting that a few African nations have invested in digitalizing their economies and taking advantage of 4IR. According to Further Technologies (2020), robotics has been taken advantage of in South Africa as well

as Northern Africa, specifically Morocco, Egypt, and Tunisia. South Africa, Africa's leading industrialized nation has made vast progress in preparing for 4IR with regard to the impact digital revolution will have on unemployment and job creation (SERR synergy, 2021). In other developing countries such as India, banks have also begun to adopt 4IR technologies. HDFC, one of India's largest banks, is using AI software called Eva which is a chatbot that can integrate data/information from numerous sources and avail answers in an easy-to-understand language in less than one second (The Conversations, 2017). Due to automation, Indian banks have reported a substantial improvement in customer service and a 7% reduction in human resource in only two quarters (The Conversations, 2017).

The Banking sector in Zambia has experienced significant technological development over the last years. Most banks have highly invested in innovation as they harness the opportunities brought on by technological change (Haabazoka, 2019) and it is important that banks embrace technological change to remain relevant. Over the years, Zambian Banks have improved methods in which they interact with their customers and products and services have improved in tune with the pace that technology has evolved. We have witnessed how ATMs first introduced in the 60s could only serve a withdraw request to the development of cards that could make payments to now 24/7 online banking service all with the help of Artificial Intelligence (Kumar, 2021). We have banks such as First National Bank (Zambia), that have been leading in innovative products in the country, from the first bank to introduce swiping machines at filling stations to being the first bank to introduce ewallet and to self-depositing ATMs (Haabazoka, 2019). The public can transact on their phones, block their cards, change limits all in comfort of their own homes through internet and cellphone banking, which are all aspects of 4IR.

4IR in Zambia is coming of age and its growth in the future of Banking is inevitable in the years to come. Head of transactional Products and services -Stanbic Bank, Mr. Chanda Mwila, stated at an Anakazi digital banking meeting, that with the significant steps Zambia has taken in creating a digital economy and having the banking sector leading in Zambia's digital revolution, there is still significant work to be done to fully exploit the opportunities introduced by technology development (Stanbic, 2020). At the same meeting, Bongohive Executive director Lukonga Lindunda further pointed out that corporates and institutions of learning have a large role in grooming their employees and youths in making strategic forward thinking and digital innovation a norm (Stanbic, 2020). It can therefore be concluded that banks and other businesses in the country still have a lot of work to do regarding the full understanding 4IR and its influence and further research must be conducted to understand the impact it has on human resource (employees). This is vital as the negative impact of 4IR on Human Resource is already notable. For instance, Standard chartered bank closed off eight branches as part of their digitalization strategy with more focus on online banking, cellphone banking and deposit taking Automotive Teller Machines (ATM) (Lwizi, 2020).

4IR and Job Creation/Refinement

4IR is not only disruptive but beneficial too when economies master how to exploit the opportunities it presents. 4IR reduces costs for a business and increases efficiency. The revolution creates and opportunity for new industries to be created thus the creation of new quality jobs. Therefore, the positive attributes of 4IR include the ability for an economy to increase GDP, improve unemployment rates and thus improve the standard of living (Mminele, 2018). 4IR has the potential to present substantial opportunity to create new jobs in the economy and redefine most jobs in organizations. With regard to banking, automation makes it possible to shift focus onto their core functions thus creating an increase in quality and thus profit (All Answers Ltd, 2018). The advance of technologies such as artificial

intelligence and robotics not only improves productivity and efficiency but also has a profound impact in most workplaces.

Job creation is the other positive outcome of 4IR in both developed and developing economies. According to Magwentshu (2016), findings done by new McKinsey paper suggests that South Africa will gain 1.2 million jobs by 2030 and productivity growth is expected to triple. However, These new jobs will require higher skill levels than most of the jobs lost, this therefore calls for higher levels of education and re-training in banks and other businesses. In Kenya, technological advancement in the financial sector of mobile payments such as M-PESA resulted in 6,000 job losses between the years 2014 and 2017 but also the number of mobile payment agents drastically increased by approximately 70,000 thus resulting in a positive effect for the sector (African Innovators, 2019). On a global scale, The World Economic Forum (2017) reports that by 2030, 38% of jobs will be enhanced while 25% of organizations believe that automation will result in the creation of new roles (Change, 2017). To practically understand the aforementioned, Magwentshu (2016) points out how 90% of the data handled by any IT specialist was only created in the past two years.

4IR and Job Elimination

According to the World Economic Forum (2019), the utilization of technology over the past twenty years has caused several roles to disappear. Research done by the World Economic Forum (WEF) (2019) shows a prediction that 50% of jobs worldwide are vulnerable to the impact of automation and that job losses by 2030 will amount to 7.1 million and only a creation of 2 million jobs in the next five to ten years thus creating a large gap of technological unemployment. Anon (2019) describes technological unemployment as unemployment brought on by technological advancement which is as a result of failing to match new jobs to the job losses. This type of unemployment is inevitable and cannot be avoided. WEF further carried out a survey of HR executives from 371 companies from 9 different industries from developed and emerging countries, their findings showed that challenges being faced by HR management is that of knowing how to recruit for automated related jobs and the challenge of retaining the current workforce (Aramco & W, 2019). A report done by McKinsey further estimates that in the next ten years 60% of all the occupations could be automated. This approximately translates to 375 million people globally who may be required to change jobs or acquire a new set of skills (Mminele, 2018).

Karanikola and Panagiotopoulos (2018) observed that the impact of 4IR will unquestionably affect all aspects of life, communication, interaction, and work. To survive it, people will need to upskill and adopt new attitudes and knowledge. Their study emphasizes that workers will have the responsibility to strengthen their skills to avoid being declared redundant and have the ability to cope with challenges automation presents. Afoakwa and Nyanhongo (2017) also argued the same, companies and employers need to adequately prepare themselves for the impact of 4IR. They outlined that the banking industry will experience immense complexity, uncertainty and drastic strategy change and adaptation if it's to ensure that it remains relevant and retains its employees (Afoakwa & Nyanhongo, 2017). The paper also pointed out that in the next decade, 40% of the largest companies will fail if they don't prepare well for 4IR. The importance of companies and HR preparing well for this revolution is because 4IR is not comparable to other revolutions the world has been through and is developing at an exponential pace. The evolution encompasses an era of self-thinking smart phones, high speed communication, Artificial intelligence, and the introduction of robotics. The paper also emphasizes that the only way companies are to minimize the negative impact of this evolution to ensure the right leader are placed in companies and HR implements the right and effective strategies.

The workforce is hastily changing worldwide due to technological development. According to International Labor Organization (2019), the workforce changes if not prepared for can affect work opportunities, reduce the employment rate, and thus affect the living standards of a country. In developed countries, evidence shows that advanced technology is already replacing workers in most industries and more replacements are expected (International Labor Organization, 2017). In Zambia however, research shows that the pace of technological development is slower and the replacement of staff by robots is not immediate. This does not however mean that technological advancement is not affecting the Zambian workforce, and the financial services sector is among the industries pointed out to be impacted by it (International Labor Organization, 2019).

Theoretical Framework

The following theories supported this research:

Charles Schumpeter's theory of 'Creative Destruction'

This theory dates back to 1940 and is effectively applicable to technological advancement. The theory suggests that technological development may create new opportunities in the labor market in the form of employment opportunities and industrial growth and may also result in the decline of employment opportunities (Markowitz, 2019). Schumpeter describes creative destruction as the degeneration of long-standing procedures, products and practices by innovative ones that are usually disruptive (Markowitz, 2019). YouMatter (2020) suggests that creative disruption theory is based on the belief that old ways need to be phased away to allow for new beneficial innovations.

Schumpeter further argues that technological advancement will temporarily increase demand for new products and procedures followed by a decline in the demand for labor as innovation results in a 'saving effect' therefore contributing to the technological unemployment rate (Cang, 2017).

According to YouMatter (2020), an example of Schumpeter's creative destruction theory is that of transitioning from the revolution driven by oil and steam to the technological revolution such as the third industrial revolution with the introduction of computers. This change results in previous models being obsolete which then forces businesses to innovate and drastically transform. Those that thrive are those that have effective strategies in place to survive the transition and those that lose are those that fail to adapt and effectively prepare for the transition, thus massive job losses (YouMatter, 2020).

Pissarides' 'capitalization effect' theory

On the other hand, Pissarides' theory suggests that technological advancements will lead to the creation of jobs in industries as technological progression leads to a higher present value of profits (Cang, 2017). The theory assumes that if all remains constant across business cycles then economic growth should lead to an increment in jobs and eventually reduce technological unemployment (Cang, 2017).

Methodology

The study conducted was Qualitative in nature and mainly explanatory research as it was seeking to explore questions and increase understanding of the topic without having a definite conclusion (Creswell, 2009). The study made use of the case study strategy with main focus on the top five banks in the country. Data was mainly collected through a structured interview with both open and closed ended questions.

This study was conducted in Lusaka, Zambia with particular focus on the top five technological leading banks in and two bank managers from each bank were engaged thus making the sample size 10 participants. A number higher than 10 participants would result in repetitive feedback thus a point of saturation was reached with the sample size (Moshime,

2021). In addition, the study made use of two non-probability sampling techniques being purposive and snowball sampling

Results and Findings

An interview invite was sent to 10 purposefully chosen participants who all successfully participated in the study thus achieving a response rate of 100%. The sample was made up of 10 Zambian respondents between the ages of 28 and 52 years with a minimum of 3 years work experience to 10 years maximum. The range of experience suggests a broad spectrum of views and various cultural backgrounds. Regarding gender, the respondents consisted of four female managers and six male managers. Table 1 below shows the list of participants and summary of the participant demographics.

Table 1. List of participants

Job Title	Age	Gender	Nationality	Years in Job
Project Manager A	32	Male	Zambian	5 years
Human Capital Coordinator- Bank B	28	Female	Zambian	9 years
Project Specialist-Bank B	49	Male	Zambian	6 years
Team Administrator-Bank C	33	Female	Zambian	5 years
Relationship manager-Bank A	48	Male	Zambian	11 years
Project Implementation Manager-Bank D	36	Male	Zambian	5 years
Credit Manager D	38	Male	Zambian	7 years
Senior Project Specialist Bank E	46	Male	Zambian	9 years
Branch Manager-Bank C	51	Male	Zambian	12 years
HR Admin-Bank E	42	Female	Zambian	10 years

4IR Technologies in the Banking Sector

It was imperative to first know if the respondents understood what 4IR is and based on the responses provided 70% of the respondents adequately defined 4IR in their own understanding thus showing that they are well informed while the other 30% were not aware of it. For instance, most of the respondents said 4IR involves technological advancement, digital migration, and technological global industrialization. The respondents further illustrated how technology in the banking industry has evolved over the years from physical banking to digital banking and self-depositing ATMs, from working physically in an office to working virtually, from manually analyzing data to quick data output with the help of software.

Despite the respondent being knowledgeable on what 4IR is, 40% of the respondents share the sentiments that 4IR is yet to come and yet to have substantial impact in the industry. In addition, most of them were not conversant with the meaning of 4IR technologies, the few that did, pointed out artificial intelligence and Robotics as the main 4IR technologies. Based on the responses, the researcher was able to observe that the lack of knowledge on 4IR technologies is attributable to the lack of in-depth training from their employers. When asked about 4IR technologies, respondents said:

“With robots, I feel we are not yet there. We do not use any robots in banks”. A robot is something that movies around, in our banks, you do not see such things”.

Another respondent said, *“Robots are only found in production industries and not banks”.*

The above statements clearly shows that the respondent had minimal understanding of 4IR technologies. However, a few respondents did show a fair understanding of 4IR technologies as seen in the responses below;

“Artificial intelligence is a powerful tool in the banking sector. It allows customers to interact with systems. AI enables customers to withdraw money at the ATM”.

“We are currently using AI, big data analytics and robotics in automatic credit risk categorization of customer accounts and automatic government liquidity payments to Bank of Zambia”.

“We use AI to aid with auto reversal of unpaid fees for loans on customer accounts”.

“I Believe robotics has just been introduced in our call center/customer service department. A chatbot that talks to customers without human intervention and answers their easy queries. This will help with our turnaround time”.

Table 2 below gives a summarized view of the respondent data showing the level of understanding of 4IR technologies.

Table 2. Summarized respondent data on the understanding of 4IR Technologies

Interview session	Quotations	Themes
Relationship manager (Bank A)	<i>“The bank’s technology is updated”. “If you go in our banks, we use mostly artificial intelligence” Our technology is evident at our ATMs that are able to sense wrong passwords and advise customer on the notes available”.</i>	Artificial Intelligence, Robotics, Big data analytics
HR Admin (Bank E)	<i>“I am not so familiar with the concept of 4IR. Therefore, it is difficult for me to comment on it”.</i>	none
Project Implementation Manager (Bank D)	<i>“I Believe robotics has just been introduced in our call center/customer service department. A chatbot that talks to customers without human intervention and answers their easy queries. This will help with our turnaround time”</i>	Artificial intelligence, global advancement.
Credit manager (Bank D)	<i>“For me, 4IR involves technological advancements such as robotics and artificial intelligence. If I could relate it to our bank, I would say, ATMs, software, and integrated communication systems.”</i>	Robotics, artificial intelligence

The respondents further claimed that technological advancement in the industry is being warmly embraced as there is a strong desire to upgrade outdated bank systems and software that is heavily reliant on human and manual intervention. According to one well-seasoned banker:

“Not too long ago our norm was to only make cash deposits in the branch after being in the queue for so long. Now, branchless banking is the norm. I don’t have to go into the branch to make a deposit I can do it at the ATM. I don’t have to go the branch to fill in a TT form to send funds like it was done a few years back, I can now do that on my phone. Thus, a future with no branches is starting to make sense”.

His views clearly show how technology in the country has evolved as well as an example of how the industry is benefiting from 4IR.

Influence of 4IR Technologies on Human Resource in the Zambian Banking Sector

Technology in banks plays an important role in ensuring that customers are serviced in a satisfactory manner which is vital as exceptional customer service is the heart of any bank. The respondents reverberated this by pointing out how technology has helped shape a current world with less human and bank intervention thus aiding them to serve the customer more

efficiently. When asked how they have benefited from 4IR, the following responses were noted.

Reduction in branch traffic

The respondents gave an account of how technological changes and advancements has affected their work and those around them. The reduction of customers in the branch attributable to smart ATMs and cellphone banking has not only reduced the number of tellers in branches but employees have felt more rewarded as they have been moved to other departments where they are enhancing their careers.

'The branch has less people which makes branch work more manageable, those that actually do come to branch are served quicker and more efficiently'

'I started out as a teller but when digital banking was introduced, I was moved to back office as the need for many tellers was reduced. Am actually grateful as that was the push I needed to grow myself and am now a relationship Manager'

Another respondent said;

'With the reduced customers in branches, the branch employees have more time to do job rotations in the bank allowing them to acquire new skills and build on their personal development'

Reduced Labor Intensity

Respondent data also shows that technological advancement has reduced a lot of admin and manual work such as filing and printing. The Relationship Manager at one bank pointed out a software called sigma that allows them to load soft copy documents from their emails straight to the bank system without having to first print the document then scan.

"It has made our work lives better as there has been a reduction in paperwork and the tedious action of printing is scrapped off".

Improved Efficiency

4IR technologies also help employees to take their efforts off manual repetitive tasks and channel that effort into more rewarding tasks thus making them more efficient and productive as mentioned in the literature review. Bank B's branch manager also gave an example of how loan consultants and credit analysts spend less time analyzing loan requests as AI software (data Analytics) now does that on their behalf thus saving them time. The branch manager further said:

"My team currently spends less time opening accounts, they currently can open 10 accounts in a day as opposed to 3 accounts in a day when old legacy systems were used"

The HR coordinator said *"AI also helps with CV screening. Instead of going through a pile of data and CVs. It also helps with data analytics when I need to easily view staff personal data easily. It can also be used to test candidates for IQ in the recruitment process. We should also not forget that even during the pandemic people are able to work in isolation because of software such as teams and google meet."*

Negative impact of 4IR on Human Resource (Challenges)

The challenges expressed by the respondents came from asking questions such as: Are employees able to understand the technology? Are they able to apply the technology in their workspace? What changes will the technology bring? The below were the responses given.

Loss of Jobs:

One manager said, *"I reckon it is important to ensure that the employees have their own understanding of technology and how it affects them, the business and world at large. We constantly need to ask ourselves our current roles can be done in the future. For example, filing 10 years ago was important but we do not need data clerks now". 'A lack of not knowing how to position yourself in this era will definitely leave you redundant'. He further added.*

While the Bank C respondent said *'The bank's decision to focus on online banking forced a number of my colleagues to lose their jobs. And those of us that stayed were left with a fear of losing our jobs too and many others were demotivated. This made us want to look for jobs in other banks that seemed more stable'*

In addition, a Bank E respondent said *"I would like to give an example of some branches that were closed. Guess what replaced the half of the branch, an ATM! If you look at this situation, it is amazing how a branch was replaced by one single equipment to service a lot of people. But also look at the downside, HR had to deal with all the people that lost their jobs". "Moreover, people were stressed and mentally affected when they heard the news"* he added.

The respondents all shared the same sentiments that the Zambian industry has no choice but to keep pace with current times and that the influence of 4IR so far has been significant. Respondents vindicated this statement by noting the number of branches that have closed down in the country due to the migration to online and cellphone banking which has led to a number of employees either being pushed into other departments or losing their jobs entirely.

Over reliance on Machines:

The other notable challenges from the respondent data were mainly challenges in dealing with system failures with regard to managing clients and ensuring that work is done during such a downtime. One respondent said:

"We are down if the machines are down, Moreso during trail phases when a new system is being introduced"

Another respondent said;

'When the bank introduced new software that is able to quickly analyze financials and create ratios and simplify financial data, many people in my team expressed how they now have increased pressure as they are expected to produce good quality papers with no errors"

Observed from the above statements is the level of the frustrations that some employees face with technology and thus affects their performance

Increased Costs:

Respondents expressed that one of the challenges that comes with 4IR is an increase in costs. The respondent said. *"Due to the technology, HR has to increase their budgets to employee specialists conversant with new technology. In addition, the HR needs to plan for the training of employees, which is also an added cost as training is outsourced"*

While another expressed that new technologies and increased reliance on online banking has increased the number of cyber-attacks the bank has thus it increases the workload in some departments as they have to work double time in resolving these queries, this also translates into overtime pay which is a cost for the bank and fraud related losses that can't be recovered will be borne the bank.

'The biggest revenue leakage the bank currently has right now is related to cyber fraud. As technologies advances so do fraudsters'

Complex Training:

The respondents also highlighted challenges such as employees finding it difficult to learn new skill set required for new technology and one manager related to this challenge as often times his team has to be trained more than twice to grasp the Knowledge. In addition, the researcher observed that many of the respondents felt that employees in most cases did not have the adequate skills required when new software or robotics are introduced in the bank.

'It's difficult to understand anything related to technology and sometimes it's actually boring'

Strategies to effectively ensure Human Resource Retention

Training:

Respondents were asked if there are any strategies that are being used in their banks to ensure that jobs of employees are not affected by 4IR. The respondents had different opinions. One respondent pointed out that *“training and up skilling of employees is important. This is done by providing seminars and access to online training platforms.”*

Another respondent added that *“the bank has been on a path to ensure that all technologies that are acquired come with training for the available human resource. Besides, in customer service, human cannot be completely replaced.”*

‘I only know about 4IR out of my own curiosity and not because the bank has educated us on it, there has been no technology related training in our bank’

The results show that currently, the only strategy that seems probable is to train employees and improve on their skills. The findings are supported by literature reviewed which posited that training is key in ensuring employee retention. The respondents further felt that there is need to effectively align skills and education to 4IR to ensure that one remains relevant, one manager responded:

“The young people that want to work in banking need to forget about courses such as bookkeeping and focus more on analytic courses that will make them relevant in the coming future. Bookkeeping related tasks are now handled by AI driven software”

Mindset/Culture change:

The respondents gave the below responses when asked about the observed culture towards technology in the bank;

‘Employees need to be constantly reminded that technology is not threat and that its ok to make and accept change’

‘Many of us in the bank are used and are comfortable with the traditional way of banking and working. Sometimes it exhausting to learn something new’

The above responses clearly show that more work needs to be done with regard to shaping the bank’ culture to be more receptive to technology.

4IR Strategy:

The respondents were questioned if 4IR is embedded in the bank’s strategy and if support from executives is rendered in relation to new technologies. The below was their responses;

‘Our strategy year in and out usually only focuses on customers and profit, I don’t recall any focus on technology advancement’

‘No, 4IR has never been part of the bank’s strategy. I mean, I only heard this term here for the very first time.’

‘The closet technology has been part of the strategy is when we had a focus on driving online banking usage and reducing manual payments’

Discussion of Study Findings

The first objective of the study was to explore the 4IR technologies of the banking sector. This objective was achieved through a review of literature from studies conducted which defined the 4IR technologies and highlighted the use of the technologies in banks as suggested by Deloitte (2021), Kumar (2021), Retiwalla (2020) and Immerman (2020).

The findings of the current study revealed that respondents adequately understood the meaning of 4IR, implying that they are well informed. A majority of respondents, for example, said terms such as technological development, digital migration, and technology global Industrialization. The findings further revealed that there was unfamiliarity with the definition of 4IR technologies, many felt that robotics is not used in the banking sector, which is not in line with the literature reviewed as research done by Reitiwalla (2020) shows

that ATMs are a combination of robotics and artificial intelligence and thus showing that it is already being used in banks. With AI however, most respondents resonated with it more than they did with robotics, they believe that it is used in most bank software that aids them to do their work easier and quicker. These results are consistent with literature reviewed as a study done by Kumar (2020) shows how AI is used in risk management to quickly identify fraud transactions, how it aids to assess customer financials and facility desirability in the credit department and aid with other vital tasks such as demand forecasting and wealth management. All which helps to improve customer service and thus make banks more profitable through increased efficiency and productivity. Immerman (2020) also shared the same view and also added that the use of AI helps with reducing human error when reviewing loan requests. Therefore, the results in this study in relation 4IR technologies is supported by the literature reviewed.

The respondents further illustrated how technology in the banking industry has evolved over the years from physical banking to digital banking, from working physically in an office to working virtually, from manually analyzing data to quick data output with the help of software and the introduction of self-depositing ATM. In affirmation, reviewed literature by Deloitte (2018) and Iberdrola (2021) has shown how technology in the bank has evolved and is being accepted by customers. The existing research shows that the introduction of swiping machines at filling stations, quick turnaround time of bank loan requests and self-depositing ATMs have all been made possible by the adoption of 4IR technologies. It is therefore evident that 4IR technologies are already being utilized by bank customers and a survey done by Deloitte (2018) indicates the same

In addition, the study revealed similar sentiments in the literature reviewed, the banking industry worldwide needs to be aware of 4IR. The Zambian industry too has no choice but to keep pace with current times as the influence of 4IR so far has been significant, respondents vindicated this statement by noting the number of branches that have closed in the country due to the migration to online banking and cellphone banking, this has led to a number of people either being pushed into other departments or losing their jobs entirely.

The second objective of the study was to assess the influence of 4IR technologies on Human Resource and in order to achieve this both opportunities and challenges presented by 4IR had to be explored. With regard to the positive impact of 4IR on Human Resource, the findings are in line with research done by Shafique (2014) who concluded that technological advancement leads to an increase in employee performance and an increase in employee productivity. This also builds on existing research done by Maqbool and Shafique (2014) who highlight that AI and robotics replaces repetitive work and enables employees to focus more on rewarding tasks, in addition, 4IR technologies have made it possible for employees to work remotely Moreso during the current pandemic. The current research findings are in line with the reviewed literature as this study revealed that there is a substantial number of opportunities brought on by the 4IR technologies such as increased efficiency, reduced banking traffic and reduce labor intensity.

The study findings show that employees are no longer spending much time on repetitive tedious tasks such as printing, filing, studying customer financial statements, or spending long hours opening accounts which all translates into increased productivity as shown by past studies. The Literature reviewed by Maqbool and Shafique (2014) illustrated that a software called sigma has replaced the intensity of staff to load physical documents, instead it loads soft copy documents from emails straight to the bank system without having to first print the document then scan as it used to be done in the recent past. In reverberation to that, Immerman's (2020) study indicated that the main aspect of AI is the absence of manual processing and the overall improvement and optimization of machinery thus driving efficiency and increasing revenue in businesses through cost cutting. In short. AI replaces

tasks done by humans. The Banking sector is indeed fully utilizing AI through digitalization and is disrupting the dynamics of the sector and changing the traditional way of doing banking. The reviewed literature points out that AI has become an integral aspect of banking and is changing the way services and products are offered to clients (Deloitte, 2021). In addition, the current study findings build on research done by Kumar (2021) who highlights one of the ways banks are using AI in spaces such as risk management in which AI helps to quickly identify fraud transactions in risk management. AI also helps to accurately appraise customer's credit histories and affordability so as to avoid default risk when extending loan facilities to clients.

The current study findings also show that technological advancements have had a positive influence on the bank working environment in terms of reduced physical visits by the customers to the bank which is attributable to technological adoption, specifically, the adoption of smart ATMs and digital banking. Due to this, bank employees in this study have felt more rewarded as they have been moved to other departments where they are enhancing their careers. In line with these findings, Retiwalla (2020) asserts that in the banking industry, we can already see the use of robotics in a number of ways. For example, Automated Teller Machines (ATMs) also referred to as a self-service robotic system is widely and commonly used in the industry and can now accept cash and cheque deposits thus eliminating the need of many tellers in the branch. The existing study also shows that banks are implementing Robotic Process Automation (RPA) which is used to automate manual processes and is simply a combination of Artificial Intelligence and robotics used to perform repetitive tasks in banks such as data entry. The benefit of RPA is that it gives a chance for staff to focus on more complex tasks thus making processes more efficient and accurate.

Apart from the opportunities provided by the wave of 4IR, the study findings revealed the challenges as well. The reduced labor intensity has two sides of a coin, other than reducing manual input, it makes employees redundant and numerous tasks obsolete as shown in the current findings. This argument agrees with a report by the BCC, (2015) study which revealed that 97% of the bank administrative and clergy jobs will be replaced by robotics, 41% of the analytics jobs will be replaced while executives' bank jobs will only be affected by 30%. A similar effect of technology was observed by the World Economic Forum (2019) amongst many other studies who predicted that job losses in the next 5 to 10 years will amount to 7.1 million jobs worldwide. The existing findings have however not shown the aftermath of job losses on employees as done so in this current research. The current findings show that employees that witness the job losses in their place of work are left working in fear and in a demoralized state and this finding can therefore be added as a contribution to the existing findings of the disruption brought on by 4IR.

Another finding emanating from the current study not supported by the existing research is that of system failure. The current research reveals that employees face a challenge with work when there is a system failure with regard to managing clients and ensuring that work is done during such a downtime. The findings show that during system failures, a negative impression is created by customers on bank employees with regard to them being incompetent which spurs emotional stress on employees. This finding reflects some of the frustrations that employees face with technology and thus affects their performance negatively in such an instance.

Research done by Harahap and Rafika (2020) shows that 4IR has the ability to reduce costs in the form of increased efficiency and a reduction in human error and labor costs. The current study findings however contradict the existing research findings as it shows that 4IR increases bank costs. The findings show that these costs are in the form of technological upgrade and maintenance, increased staff training costs and cyber fraud related costs.

The last objective was to establish strategies that can be implemented to ensure Human Resource retention. Study findings unraveled that training and upskilling is the main strategy that the banks are currently applying to adapt in the fourth industrial revolution technology space. The findings showed that training is the most realistic and practical strategy to be used by the banks to keep its staff compatible with 4IR technologies. Research done by Mutumba (2021), Riminucci (2018) and Maqbool and Shafique (2014) all highlight that training is vital in overcoming the high rates of technological unemployment as it aids employees to acquire new skills and knowledge required to better understand 4IR technologies. Despite Zambian banks using this strategy, the current findings show that employees feel that the trainings rendered are complex, dreary, and difficult to understand thus employees have not been able to fully benefit from training. The findings also showed that the training currently being offered in the banks does little to define 4IR and its technologies thus the observed lack of knowledge. Reviewed Literature shows that employees often show a lack of change readiness and will often resist it due to the lack of adequate knowledge on how to deal with change. Based on the findings it can therefore be deduced that the trainings currently being conducted in the banks is not being done in the right manner that would deem them beneficial to employees.

The findings of the study further show that culture in banks towards technology is generally negative, employees are not willing to learn something new as they are used to the traditional way of banking, and this would hinder a successful implementation of 4IR technologies in banks or force banks to replace their workforce with human capital that is more receptive to technology. Research done by Akthar (2019) agrees with this as his research points out culture as the biggest challenge for 4IR implementation.

Lastly, the study results show that banks generally do not have 4IR embedded into the bank strategy, focus is mainly on driving profit, improving customer service through online banking, and increasing the client base. The absence of this leads to the inadequate exploitation of 4IR and its benefits and research done by Sima (2020) and PwC (2016) agrees with this sentiment.

Theoretical Reflection

This research was supported by two theories being, Charles Schumpeter's theory of 'creative destruction' and Pissarides' 'capitalization effect' theory. The 'capitalization effect' theory suggests that technological development may create new opportunities in the labor market in the form of employment opportunities and industrial growth (Markowitz, 2019). While Charles Schumpeter's theory of 'Creative Destruction' presented in chapter three states that old ways need to be phased away to allow for new beneficial processes and innovations (YouMatter, 2020). This theory appropriately underpins this study as it is echoed by the respondents who claim that technological advancement in the industry is being warmly embraced as there is a strong desire to upgrade outdated bank systems and software that is heavily reliant on human and manual intervention. The study also showed that manual tasks are gradually and steadily being replaced by digital banking and AI software. This is also an indication that demand is increasing as the customers are also coping with the transition to digitization in the banking sector. This confirms Schumpeter argument as cited by Cang, (2017) that technological advancement will temporarily increase demand for new products and procedures followed by a decline in the demand for labor as innovation results in a 'saving effect' therefore contributing to the technological unemployment rate (Cang, 2017). In other words, the theory suggests that as obsolete processes phase away so do certain jobs and this holds true in the Zambian banking sector context as seen in the current findings.

On the other hand, the assumption of Pissarides theory were not proven in this study. The theory assumes that if all remains constant across business cycles then economic growth

should lead to an increment in jobs and eventually reduce technological unemployment (Cang, 2017). Although that does not mean that the theory is obsolete because in a study in Switzerland by the European Economic Research found that technological advancement resulted in the loss of 103,000 jobs between 1999 and 2010, however, in the same time period more than 234,000 were created due to the complimentary effect (Brandes & Zobrist, 2017). This implies that it is possible that extra jobs are created by technological transition due to forward and backward linkages. This effect should be explored in future studies in the Zambian banking sector.

Conclusion

Banks face both an opportunity and a threat from such innovative technology. On the one hand, AI technology has the potential to help employees work more efficiently and effectively by optimizing front-end procedures, eliminating tedious and time-consuming chores, and ultimately improving the client and employee experience. In addition, the fourth industrial revolution's involvement of automation processes, such as the use of robots in business processes, creates a variety of Human Resource issues in the business enterprise, such as the need for training, management conflict, changes in business processes, and layoffs. Management should consider these issues and take action to address them for the purpose of a business organization's effective performance. Retain top talent through corporate diversification and encourage employees to participate in learning. This is what the study results showed.

On the other hand, the study results when compared to the literature reviewed has shown that there is a lack of understanding in the application of 4IR technologies in Zambia. It is worrisome to notice that people in management positions lack an understanding of such terminology that can be used to gain competitive edge in a competitive market such as banking. Nevertheless, the respondents showed that what they know about the topic, and it was enough to provide answers to the research questions. The key conclusions of the study objectives are further presented below.

The study explored the 4IR technologies in the Zambian banking sector and concluded that there is adequate understanding by management of the technological revolution taking place in the banking sector. Those with limited knowledge is due to inadequate training of the influence of the fourth industrial revolution. The importance of technology, and opportunities created by the fourth industrial revolution in the sectors are well acknowledged which include, reduced physical banking traffic, and reduce labor intensity. The study also assessed the influence of 4IR technologies on human resource. By and large, the study deduced that apart from the opportunities provided by the wave of fourth industrial revolution technology, it makes employees redundant. A clear indication that with the coming of fourth industrial revolution technology makes some tasks become obsolete. This is one of the reasons that create resistance to adopt it in workplaces for fear of losing the job. System interruptions and power outages creates a negative impression by customers and staff performance. Moreover, keeping up with the fourth industrial revolution requires constant maintenance and trainings at a cost. In addition to this, the study concluded that 4IR contributes to employees' emotional stress and frustrations thus may also have a negative impact on productivity. The study lastly identified that the strategies implemented to effectively ensure human resource retention is scaling up of skills for staff, culture shift and embedding 4IR into the bank's strategy.

Recommendations

Based on the findings of this study, the following are the derived recommendations:

- Banks need to implement deliberate training and re-skilling strategies. This will help employees to survive and adopt the coming in of 4IR. In addition, banks need to also consider making technological related training more practical, exciting, and engaging for employees as opposed to virtual training which is the norm currently.
- Strategy alignment with the adoption of 4IR. Banks need include 4IR in their strategy to ensure that employees focus on understanding it and focus on upskilling.
- Driving a change in culture to embrace new technology. The findings have shown that even people in top management lack an understanding of 4IR. Banks through organizational learning must drive the organizational culture to ensure that workers' mindsets are aligned with the bank's technological changes. In most circumstances, organizational learning reduces employee change apprehension.
- Provide Counselling for employees in departments that encounter job losses to ensure they have a healthy mental state
- Create a Research and Development department or a segment in the Information and Technology (IT) department with a sole mandate to research on critical technological skills, technological changes taking place on the local and global front in the banking sector so as adequately prepare for any changes and technological related education. This researched knowledge can also be utilized in the necessary trainings to be conducted on a regular basis in house. This would in turn reduced the cost of outsourcing training.

References

- Acemoglu, D., & Restrepo, P. (2017). Robots and Jobs: Evidence from US Labor Markets. *Department of Economics - Working Paper Series, 17(04)*.
- African Innovators. (2019). *The future of Jobs in Banking*. Retrieved January 06, 2022, from <https://african-innovators.co.za/the-future-of-jobs-in-banking/>
- Akhtar, A. (2019). *Robots are set to wipe out the most sought-after (and highest-paying) jobs on Wall Street in the next 10 years*. Retrieved February 25, 2022, from <https://africa.businessinsider.com/strategy/robots-are-set-to-wipe-out-the-most-sought-after-and-highest-paying-jobs-on-wall/cxeh193>
- All Answers Ltd. (2018, November). *The Impact of the Fourth Industrial Revolution on Jobs: An Analysis of the Swiss Financial Services Industry*. Retrieved February 16, 2022, from <https://ukdiss.com/examples/fourth-industrial-revolution-jobs.php?vref=1>
- Aramco, & W, W. (2019). HR4.0: Shaping People Strategies in the fourth industrial revolution. *World Economic Forum*.
- Bessen, J. (2015). *Learning by doing: the real connection between innovation, wages, and wealth*. New Haven: Yale University Press.
- Brandes, D., & Zobrist, L. (2017). *What key competencies are needed in the digital age? The impact of automation on employees, companies and education*. deloitte.
- Change. (2017). *How Will the Fourth Industrial Revolution Impact the Future of Work?* Retrieved January 06, 2022, from <https://www.changerecruitmentgroup.com/knowledge-centre/how-will-the-fourth-industrial-revolution-impact-the-future-of-work>
- Creswell, J. (2009). *Research design: qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage: Thousand Oaks.
- Deloitte. (2021). *How Artificial Intelligence is Transforming the Financial Services Industry*. Retrieved February 18, 2022, from <https://www2.deloitte.com/za/en/nigeria/pages/risk/articles/how-artificial-intelligence-is-transforming-the-financial-services-industry.html>

- Further Africa. (2020, July 27). *4IR Offers Africa tremendous Job Creation Opportunities*. Retrieved November 21, 2021, from <https://furtherafrica.com/2020/07/27/4ir-offers-africa-tremendous-job-creation-opportunities/>
- Haabazoka, L. (2019). Innovations on the performance of Commercial Banks in Developing Countries- A case of the Zambian Banking Industry. *The future of the Global Financial System: Downfall or Harmony* (10.1007/978-3-00102-5), 1246-1260.
- Harahap, N., & Rafika, M. (2020). Industrial Revolution 4.0: And the Impact on Human Resources. *Jurnal Ecobisma*, 7(2477-6092), 89-95.
- Karanikola, Z., & Panagiotopoulos, G. (2018). 4TH INDUSTRIAL REVOLUTION: THE CHALLENGE OF CHANGING HUMAN RESOURCE SKILLS. *European Journal of Training and Development Studies*, 5, 1-7.
- Kearny. (2021). *Banking in a Digital World*. Efma.
- Kumar, S. (2021, May 28). *Use of Artificial Intelligence in Banking World today*. Retrieved February 19, 2022, from <https://www.finextra.com/blogposting/20688/use-of-artificial-intelligence-in-banking-world-today>
- Lwizi, G. (2020, August 17). *Zambian Business Times*. Retrieved July 17, 2021, from <https://zambianbusinesstimes.com/stanchart-to-shut-two-more-branches/>
- Magwentshu, N., Rajagopaul, A., Chui, M., & Singh, A. (2019). *The future of work in South Africa: digitisation, productivity and job creation*. McKinsey and Company.
- Markowitz, C. (2019). *Harnessing the 4IR in SADC: Roles for Policymakers*. Johannesburg: South African Institute of International affairs.
- Mminele, D. (2018, August 1). The Fourth Industrial Revolution and the future of work: some implications for central banking.
- Moshime, K. (2021). ANALYSING THE IMPACT OF THE 4IR ON THE ORGANIZATION OF WORK IN THE BANKING SECTOR OF SOUTH AFRICA: THE CASE OF SIX BANKS IN THE CITY OF TSHWANE. Retrieved February 7, 2022
- Retiwalla, R. (2020, June 18). *What is Robotic Process Automation (RPA) in Banking*. Retrieved November 26, 2021, from <https://www.productiveedge.com/2020/06/18/banking-robotic-process-automation-intelligent-automation/>
- Riminucci, M. (2018). Industry 4.0 and Human Resources Development: A View from Japan. *E-Journal of International and Comparative LABOUR STUDIES*, 7.
- SERR synergy. (2021). *THE 4TH INDUSTRIAL REVOLUTION - OPPORTUNITY FOR SKILLS DEVELOPMENT AND JOB CREATION*. Retrieved December 01, 2021, from <https://serr.co.za/the-4th-industrial-revolution-opportunity-for-skills-development-and-job-creation>
- Sima, V., Gheorghe, I. G., & Nancu, J. S. (2020). Influences of the Industry 4.0 Revolution on the Human Capital Development and Consumer Behavior: A Systematic Review. *Institute of Economics Agriculture*.
- Stanbic Bank. (2020). *ZAMBIA NEEDS TO LOOK WITHIN FOR DIGITAL INNOVATIONS - STANBIC*. Retrieved March 28, 2021, from <https://www.stanbicbank.co.zm/zambia/personal/about-us/news/zambia-needs-to-look-within-for-digital-innovations-%E2%80%93-stanbic>
- Sumer, B. (2018). Impact of Industry 4.0 on Occupations and Employment in turkey. *European Scientific Journal*, 14, 1-17.
- Sutcliffe, M., & Bannister, S. (2020). *RESEARCH ON THE 4TH INDUSTRIAL REVOLUTION:IMPLICATIONS FOR LOCAL GOVERNMENT IN THE CONTEXT OF SKILLS DEVELOPMENT*. Johannesburg: City Insight.

The Conversations. (2017). *Are Robots taking over the world's finance jobs?* Retrieved February 18, 2022, from <https://theconversation.com/are-robots-taking-over-the-worlds-finance-jobs-77561>

YouMatter. (2020). *Creative Destruction Schumpeter*. Retrieved January 18, 2022, from <https://youmatter.world/en/definition/creative-destruction-schumpeter-definition/>