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ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCES MANAGEMENT AND HUMAN RESOURCE ACCOUNTING IN NIGERIAN PUBLIC SECTOR

CHIMA Chukwuka Christian
Department of Business Administration and Management, University of Agriculture and Environmental Sciences, Umuagwo, Imo State, Nigeria

Abstract: *The paper examined artificial intelligence in human resources management and the need to present this important asset in the financial statement which can be reflected as part of government financial performance. The study employed descriptive design. Thus, it is exploratory in nature based on extensive review of relevant literature on artificial intelligence, human resources management and human resources accounting. The findings revealed that artificial intelligence is gradually taking over certain areas of human resources management and most organizations have failed to recognize them in the financial statement as required. The paper therefore, recommended among others that human resource available in the public sector should be rightly assessed and should be further developed through motivation training and development, and perception to the needs of the organization concerned. This will help to determine the financial performance of the government as it will reflect in the financial statement. Again, artificial intelligence is redirecting human capital in the organization, so the cost of acquiring artificial intelligence and human capital in the organization will reflect us in the financial statement of the organization. Further studies can be empirically done on this topic to establish the relationship between the variables.*

Keywords: Artificial Intelligence, Human Resource Management, Human Resource Accounting, Public Sector

INTRODUCTION

Technological evolutions, globalization and increasing competition force the professions to change constantly. Increasingly, technology drives economic activity in both the service and manufacturing industries. In many industries, rapid technological growth and change happen routinely. The creation and maintenance of information contribute to the economy at an ever-increasing rate. Views of the modern business firm and its purpose in society also are changing rapidly (Aljamaan, 2017).

According to Ciurea and Man (2020), the change of the current economic environment due to globalization and digitalization, the evolution of information technology and their diversification have led to a change in human resource management, financial and accounting services. The digital technology of the 21st century will affect almost all aspects of economic life and modern society. As with other professions, the HRM and accounting professions changes and develops as a result of digitalization and technological development. The current use of smart technologies, artificial intelligence, opportunities and benefits seems unlimited, leading to increased productivity, safer working conditions, creating opportunities for these professionals to become informed about new technologies, in addition to creating jobs, higher value work resulting from digital transformation. Technological development and technologies such as cloud, artificial intelligence and blockchain will strengthen the role of accounting professionals and the entire financial

industry, as manual data entry is reduced and speed, quality and accuracy of data are improved (Ciurea & Man, 2020). However, the journey into the future of human resource management requires understanding of the technological drivers into the future. Ofarisen (2018) noted that significant changes are occurring with regards to what is possible, what is actually happening and the needs of people and these changes are affecting the home and defining careers. Elsewhere, he observe that the future portend some very important things worth keeping an eye on. What follows is speculating and prognostic, looking at how things are evolving, and will be subjects of future inquiry and research (2018:14). One of those changes in technology is artificial intelligence. Current technology enables such remote work in a rapid digital world with disappearing boundaries to have significant impact on careers. In other words, the digital economy is upon us and so is the audience that comes with it (Azeez, 2018). With technology advances also comes the opportunity to streamline activities that previously have had to be carried out by humans (Johnson & Herranen, 2019).

According to Ologunoye, (2018) the development of new technologies has dramatically changed the way many human resource practices are preformed. Organizations now have access to the best and brightest ideas across the globe and this alone can leverage the organization into an industry –leading position if well deployed. The biggest macroeconomic trend that will influence the function of HR professionals in the future will undoubtedly be technology (Tomassen n.d) noted.

However, the rapid developments in the field of technology over the last decades referred to by the world Economic Forum as the "fourth Industrial revolution" – after steam, mass production, and electronics – have given rise to a wide variety of technologies and their possible applications in HRM development. Yawalkar (2019) observed that technology is one of the major influential factors in an industry. Since the 19th century, the role of robot has been replacing employees in production department. In third revolution which began in the year of 1970s personal computers and the internet entered into working life and human labour were replaced by the machines.

Recently, digital technologies like machine Language (ML) and Artificial Intelligent (AI) both entering into day-to-day working at workplace and which will lead transformation in business. Thus, today's business world is becoming more global, more mobile, and more digitized; any HR team that will make huge impact in it has to be a technology-enabled. The organization landscape is being reinvented by workplace innovators, traditional management systems are being disrupted daily due to innovation explosions and it has now become a necessity to redesign organization for agility by building out light-weight approaches to keep fast moving; otherwise organization will be outpaced in the race to digital (Ologunoye, 2018).

Therefore, AI and digital technology has impact on the ownership and responsibility for decision making, cost reduction and enhanced service, personnel shifts and downsizing, has impact on organizational structure and workforce management. AI is entering into the overall system of an organization and one of the areas is HR department where by using AI system human replaced the human and all functions in human resource departments is carried like candidate screening, recruitment, alignment of human resource activities and performance management, etc, (Yawalkar, 2019).

The speed with which the business rhetoric in management moved from big data (BD) to machine learning (ML) to artificial intelligence (AI) is staggering (Tambe, Cappelli & Yakubovich, 2018). Again, humans have developed the power of computer system in terms of their diverse working domains, their increasing speed, and reducing size with respect to time. A branch of computer science named AI pursues creating the computers or machines as intelligent as human beings. Thus, the development of AI started with the intention of creating similar intelligence in

machines that we find and regard high in humans. The systems which exhibit intelligent behaviour, learn, demonstrate, explain, and advice its users. Creating systems that understand, think, learn and behave like humans (Tutorial Points, 2015).

However, in the year 1920 during a science fiction play named Rossumovi Univerzalni Roboti which mean – Rossam's Universal Robots, also better known as R.U.R. by Czech writer Karel Capek the term ROBOT was firstly used (Verma & Bandi, n.d.). Artificial Intelligence (AI) was coined first time in academics in 1956. The Darthmouth Conference of 1956 was organized by Marvin Minsky, John McCarthy and two senior scientists, Claude Shannon and Nathan Rochester of IBM. At this conference, the expression "Artificial Intelligence" was first coined as the title of the field. The Darthmouth conference triggered a new era of discovery and unrestrained conquests of new knowledge. The computer programmes developed at the time are considered by most as simply "extraordinary". Computers solve algebraic problems, demonstrate theorems in geometry and learnt to speak English. At that time, many didn't believe that such "intelligent" behaviour was possible in machines. In 2016, AI celebrated 60th anniversary of the Darthmouth workshop, which marked the birth of AI being recognized as an academic discipline. The global AI market was around $260billion in 2016 and it is estimated to exceed 3trillion by 2024 (Perez, Deligianni, Ravi & Yang, n.d.). Hence, AI is in the development of computer functions associated with human intelligence, such as reasoning, learning and problem solving. There are some applications which integrate machine, software and special information to impart reasoning and advising. They provide explanation and advice to the users (Tutorial, 2015).

The term AI, therefore, was closely associated with the field of "symbolic AI", which was popular until the end of the 1980s. In order to overcome some of the limitations of symbolic AI, sub symbolic methodologies such as neural networks, fuzzy systems evolutionary computation and other computational model started gaining popularity, leading to the term "computational intelligence" emerging as a subfield of AI. Presently, the term AI encompasses the whole conceptionalization of a machine that is intelligent in terms of both operational and social consequences. The recent successes of AI have captured the wildest imagination of both the scientific communities and the general public. Given increased accuracy and sophistication of AI systems, they will be used in an increasingly diverse range of sectors including finance, pharmaceuticals, energy, manufacturing, education, transport and public services. It has been predicted that the next stage of AI is the era of augmented intelligence. Robotics and AI amplify human potentials, increase productivity and are moving from simple reasoning towards human-like cognitive abilities (Perez et al. n. d.) Robots are able to perform the tasks given by human. They have sensors to detect physical data from the real world such as light, heat, temperature, movement, sound, bump and pressure. They have efficient processors, multiple sensors and huge memory to exhibit intelligence. In addition, they are capable of learning from their mistakes and they can adapt to the new environment (Tutorials Point, 2015). A practical definition proposed by Russell and Norvig in Perez et al (n.d.) is that AI is the study of human intelligence and actions replicated artificially, such that the resultant bears to its design a reasonable level of rationality.

With the development of AI technology, a new generation of labour, such as the human intelligence or artificial intelligence has become the key factor for organizations to survive and transform in a changing environment (Ertel, 2018). The Prospect of creating and the extension of human intelligence through the use of computers have fascinated many people, as in times past physical power was extended through the use of mechanical tools (Kok, Boers, Kosters & Putten, n.d.).

On the other hand, it is important to understand the history of HRM before predictions about the future can be made

(Tomassen, n.d.). During the past years the HRM field has been strongly affected by technological advancements, especially the internet has largely impacted the overall functioning of HRM in organizations (Dhamija, 2012). The genesis of HR can be traced back to the American labour problems when working conditions were extremely poor which resulted in strikes, high job turnover en poor work efforts. In the beginning of the 21st century personnel departments first appeared (Kautman, 2014) that aimed to improve worker issues. The rebrand into HRM gave the field an updated, broader and more progressive image which illustrated the new found believe that HR can make all the difference in achieving competitive advantage, consequently academic and managerial attention to HR grew (Kufman, 2014).

Meanwhile HRM is the process of acquiring and maintaining new skills capabilities and competences in an organization through its workforce by the means of different management techniques (Johnson & Herranen, 2019). This is because HR is such a dynamic part of an organization and is ever changing, therefore it needs the right management by an organization and is ever changing, and therefore it needs the right management by an organization (Bibi, Pangil & Johari, 2016). HR managers use AI technology as an auxiliary decision-making system, which can carry out strategic planning more comprehensively, and the financial implications must be presented in the financial report.

Inspite of the technological advancement and increasing importance of computerisation, human resources continue to play a dominating role in the effective use of physical and financial resources (Paton 1952; Flamholtz (1972). Thus, ever expanding dimensions and growing complexities of business activities, increasing governmental monitoring on business affairs, pressing trade unions' demand for greater disclosure on human performance in business and emanation of scientific management within the organisation necessitate the development of a system of accounting for the associated men who are indispensable resources to an organisation (Agarwal, 2004).

Though few studies have conducted over the years under this perspective in the Nigeria. Human Resources Accounting was introduced back in the 1980s (Rahaman, Hossain & Akter, 2013; Abubakar, 2006; Glautier, 1974), recent years have witnessed the emergence of numerous treatises on the relative merits of human resource accounting (*Farr, 1853; Engel, 1883; Elovitz, 1967; Brummet, Flamholtz & Pyle, 1969; Flamholtz, 1972;* Spiceland & Zaunbrecher, 1976). Reporting performance outcome in a prompt manner (Anthony & Govindarajan, 2005; Kaplan & Norton, 1992; Mithas et al., 2009), and highlighting the areas of weakness within the divisions, units and among employees, is critical in manifesting feedback interaction. During the past couple of decades, numerous authors have claimed that major parts of the world economy have transited into a knowledge-based economy. In this process, it has often been proposed that traditional accounting and financial reporting have become increasingly less useful (Roslender, 1997; Lev, 1997). They emphasize on intangible resources as either 'assets' or 'skills' (see Hall, 1992; Reilly, 1992; Johanson, Eklöv, Holmgren & Mårtensson, 1998). For Frederiksen and Westphalen (1998) until recent years, the 'value' of an enterprise as measured within traditional balance sheets, e.g. buildings, production plant, etc., was viewed as a sufficient reflection of the enterprise's assets. Back in mid-1980's, behavioural scientists criticized the conventional accounting system for its failure to value the human resources of the organization.

RESEARCH PROBLEM

Research associated with artificial intelligence is highly technical and specialized as it relates to HRM. Wikipedia (2019) opines that the traditional problems (or goals) of AI research include reasoning, knowledge, representation, planning, leaning, natural language processing, perception, and the ability to move and manipulate objects. General intelligence is among the fields long term goals.

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Approaches include statistical methods, computational intelligence, and traditional symbolic A1. Many tools are used In A1, including versions of search and mathematical optimization, artificial neutral networks, and methods based on statistic, probability and economics. The field was founded on the assumption that a machine can be made to stimulate it. This raises philosophical arguments about the nature of the mind and the ethnics of creating artificial beings endowed with human – like intelligence. These issues have been explored by myth, function and philosophy since antiquity. Some people also consider A1 to be a danger to humanity if it progresses unabated (Wikipedia, 2019).

In the 21st century, A1 techniques have experience a resurgence following concurrent advances in computer power, large amount of data, and theoretical understanding; and A1 techniques have become an essential part of the technology industry, helping to solve many challenge's problems in computer science, software engineering and operations research. For most of its history, A1 research has been divided into subfields that often fail to communicate with each other. These subfields are based on technical considerations such as particular goals (e.g. robotics or machine learning), the use of particular tools (logic or artificial neutral networks), or deep philosophical differences. Subfields have also been based on social factors (particular institutions or the work of particular researchers.

Many have researched on A1 in difference areas of human labour and human resources, yet in the research area of HRM, there is still a lack of an overall A1 theory and technology application framework, combined with the specific dimensions of HRM, to analyze its specific application and its quantification in financial performance. It is becoming increasingly recognized that survival and success of the public sector in the present complex society depend largely upon the quality of the human asset. The essence of this paper is to determine where A1 will make or mar HRM in future and its cost effect in public sector. Whether A1 will displace workers, employ more workers or help workers in doing their works. Literature documented that demand for uniquely human skills to grow, according to the future of jobs report from the world economic forum (WEF). The WEF projects that 75million current jobs will be displaced as A1 take over more routine aspects of work. However, 133million new jobs will be created, and skills in both emotional intelligence, will be important.

Gartner estimates that A1 will create more jobs than it eliminates. The focus for future will be on deciding how to use A1 to help workers do their jobs better. Sarah smart, vice president of Global recruiting says, "By using A1 to source, screen and interview candidates, we have increased our speed to hire by 85%. Unlike people, who can grow tired or bored, or being unconscious biases into their decisions, A1 programmes are fast, tireless and efficient. It is increasingly being used to automate many HR processes, and it appears automation is going to pay off big time (Biro, 2019). He noted that sorting through incoming resumes is an arduous task that's prone to error when left to human beings. A1 can save HR departments up to 23 hours per hire by analyzing incoming applications and using algorithms to assess and evaluate the applicants experience, knowledge and skills, HR managers who don't use automation for tasks such as payroll, applicant tracking, training, job postings and more say they lose an average of 14 hours a week completing these tasks manually.

To Verma and Bandi (n.d.) another development will be seen in cases A1 will replace human in labour tasks, giving them space to generate value and become specialist. With machine costing less and performing better than certain HR. This will allow organizations to change and diversity their investment. 69% employers attribute insufficient talent intelligence to bad hiring. The Mckinsey Global Institutes believes that "more than 30% of activities in 60% of occupations can be replaced by A1 (Chui & Francisco,2017). A. Jia, Guo, Liand chen (2018)

documented research report of the university of oxford, which reveals that, in the next 10 to 20 years, half of the 702 jobs in united states will disappear under the influence of IT, an nearly 47% of US employees will be employed similar study by Arntz, Gregory and Zierahn (2016) through task-based approach and occupation-based approach.

Frey and Osborne's occupation-based approach prediction that 47% of all American jobs are at risk of being computerized is an overestimation. Their task-based approach cannot assume that jobs and task structures between and even within nation are the same. Consequently, they find that only 9% of all jobs in the OECD countries are at risk of being computerized. But the reports did not provide us with insights if and to what extent parts of an occupation can be computerized. Therefore, to them is highly unlikely that machine learning applications will destroy jobs at a large scale in the near future. The question that arises then is how jobs will look like in the future. From the weight of this question, it is likely that in the near future, some occupations night disappear, but most will probably not disappear completely. This view is supported by Brynjolfsson and McAfee (2004) who state that humans will still play an important role in a future since the collaborations between man and machines are likely to yield the best results-or at least better than humans and machines both acting independently.

Bostrom (2011) added, few believe that there are people who act perfectly normally but lack consciousness. However, other human beings do not merely behave in person-like ways similar to us; they also have brains and cognitive architectures that are constituted much like our own. An artificial intellect, by contrast, might be constituted quite differently from a human intellect yet still exhibit human-like behaviour or possess the behavioural dispositions normally indicative of personhood. It might therefore be possible to conceive of an artificial intellect that would be sapient, and perhaps would be a person, yet would be sentient or have conscious of any kind.

At the international level, a study was conducted based on which the automation capabilities were tested among digital accounting platforms, based on artificial intelligence (AI) applications, such as: OneUp, QuickBooks Online, SageOne and Xero and where an accuracy of 77% and 95% of them was highlighted, that is, an extremely high capacity of applications to recognize transactions without human intervention. This platform works with digitization and digitalization elements supported by Artificial Intelligence, as well as technologies used by global companies such as Google, Oracle, Facebook, Netflix and Microsoft (Ciurea, & Man, 2020).

However, various papers have, in the past couple of years, discussed the susceptibility of jobs to computerization and the outcomes are diverse and oftentimes conflicting. Still diverse interdisciplinary scholars and practitioners are already actively working on addressing some of the ethical and legal issues related to the adoption of AI. In the light of these considerations, we need the collaboration of the academics and practitioners in developing new programmes of interdisciplinary research, encompassing economic evaluations, sociotech analyses, studies of information flows, and systematic assessments of the impacts of better workforce information on HRM efficiency, quality and safety, as well as new exploratory research to understand the value of information for driving analytics in support of sustainable and effective work system. Academics and practitioner experts do agree on the fact that HR Professionals must become more data and technology minded in AI future. Because in the future where AI applications enter the HR arena it is suspected that the competencies of HR Professionals will change.

On the other hand, recent literature has emphasised the importance of knowledge management. It is a known fact that high labour turnover, costs the company which results in lowering the level of profits. In knowledge economy, the

human resource has been recognized as a strategic tool, essential to organizational profitability and sustainability (Myloni et al., 2004). The organization needs to align organisational performance with human resource management practices, which would be shown by organisational output of financial variables (sales growth, goal achievement, good services, productivity) (Osman, Ho & Katou, 2011; Chand & Katou, 2007;) and non-financial variables (management quality, long-term orientation, continuous improvement, workforce quality) (De Waal & Frijns, 2011; Dimba, 2010) and also other outcomes as commitment, quality and flexibility (Guest, 1997). Once a business entity has analyzed its mission, identified all its stakeholders, and defined its goals, it needs a way to measure progress toward those goals (Kaplan & Norton, 1996). This comprises of three specific areas of firm outcome which includes financial performance, product market performance and shareholder return (Richard, Simon & Brut, 2009). Organizational performance can be seen as a multi-dimensional construct consisting of more than simply financial performance (Baker & Sinkula, 2005; Griffin, 2003). This paper therefore, is of the opinion that the cost and financial implication of acquiring artificial intelligence in the workplace and human resource management should be reflected in the financial statement to ensure proper presentation of financial performance in the public sector.

Review of Related Literature

Conceptual Review

Artificial Intelligence (AI)

The precise definitions and meanings of the word AI, and even more so of HRM and HRA are the subject of much discussion and has caused a lot of confusion. Artificial Intelligence is a commonly employed appellation to refer to the field of science aimed at providing machines with the capacity of performing functions such as logic, reasoning, planning, learning and perception (Perez et al n.d.) AI, also known as machine intelligence is an interdisciplinary science that mimics human capabilities and intellectual behaviour. It is the process of stimulating the information process of human consciousness and thinking, it can quickly retrieve the database, extract information, answer our doubts efficiently, and provide the best answer directly and rationally (Jia et al, 2018). AI is concerned with the creation or development of computers able to engage in human-like thought processes such as learning, planning, problem solving, reasoning, socializing, creativity and self-correction (Kok et al, n.d.). AI is simply intelligence demonstrated by machine, in contrast to the natural intelligence displayed by humans.

Some would define AI as the creation of robots, machines or programmes with the ability of such things as to learn, interpret and understand, on their own and inhabits what could be seen as similar intelligent behaviour as human have (Tecuci, 2012, Kaplan, 2006). Some of the technological areas of AI have expanded to be robotics, processing of natural language, expert system as well as automated reasoning (Ved, Kaudanya & Panda, 2016). Marvin Lee Minsky, who is considered as one of the founding fathers of AI, defines it as the science of making machines do things that would require intelligence if done by men. It requires high-level mental processes such as perceptual learning, memory and critical thinking (Mission, 2018; Tutorials point, 2015). AI refers to a broad class of technologies that allow a computer to perform tasks that normally require human cognition, including decision making (Tambe-et al, 2018). AI is defined as “an ideal intelligent” machine that is flexible agent that perceives its environment and takes actions that maximize its chance of success at some goal (Yawalkar, 2019; Strohmeier & Piazza, 2015; Bostrom, 2011). Its ultimate goal is to transform apparently dissimilar problems to a set of relatively similar sorts of problems after which the problem can be solved using various algorithms and to ultimately-generalize the algorithm to exampler beyond those in the training set (Frey & Osborn, 2013).

machine learning can be seen as the most developed branch of AI that actually works which at the core uses advanced

pattern recognition software to adapt to new circumstances and to detect and extrapolate patterns, analyzes vast amounts of data to predict …behaviour (Mena, 2011:P.1). In a future where ML algorithms enter the arena, the tasks that HR professionals then, perform, how they create value and what competencies they need might change considerably.

Human Resource Management (HRM)

human resource management (HRM) is the strategic and coherent approach to the management of an organization's most valued assets – the employees working there who individually and collectively contribute to the achievement of the objectives of the organization directly or indirectly (Onuegbu & Obiah, 2015). HRM comprises a set of policies designed to maximize organizational integration, employee commitment, flexibility and quality of work (CIPM study Pack, 2018). For Aljamaan (2017), human capital refers to a set of knowledge and competence, skills and training, innovation and capabilities, attitudes and skills, learning ability and motivation of the people who form the organization**.**

Human Resource Accounting (HRA)

Modern view is that cost incurred on any asset as human resources need to be capitalized as it provides benefits measureable in monetary terms. Human Resource Accounting (HRA) is a new branch of accounting **(Islam, Kamruzzaman & Redwanuzzaman, 2013)**. Newman (1999) defined, HRA as the measurement of the abilities of all employees of a company, at every level – management, supervisory and ordinary employees – to produce value from their knowledge and the capabilities of their minds. In I973, the American Accounting Association (AAA) formed a Committee on Human Resource Accounting and made it responsible for identifying, examining and proposing alternative methods of human resource accounting. This project was undertaken in response to the increasing concern within the accounting community that a major asset (human asset) within the organizational entity was being handled without proper recognition with respect to its accounting treatment and impact on financial planning and decisions. This negligence of human asset (human employees) apparently distorted the financial information presented in the income statement, balance sheet and the statement of changes in financial position. Human Resource Accounting (HRA) involves accounting for the company's management and employees as human capital that provides future benefits (Bullen & Eyler, n.d.).

Theoretical Framework

The significant theoretical developments that occurred in organization and management literature during the last three decades have gone a long way to broaden the scope of organization theory. This theory suggests that neither the individual nor the organization behaviour is solely self-determining but that workers behaviour is largely determined by factors that lie outside the orbit i.e. in their environmental system (CIPM Study Pack, 2013). Therefore, this paper will adopt the Socio-Technical School of System Theory and replacement cost model.

Socio-Technical School of System Theory.

Developed by Eric Trist of the Tavistock Institute as one of the most important contributions to systems theory. A.K. Rice of the socio-technical school claims that the classical organization models are for the most part, based on closed systems – that the organizational problems can be analyzed by referring only to its internal environment and can be accommodated within the existing organization. The social systems and the technical systems are phenomenologically different. The goals of the systems and the technical systems can be best achieved by joint organization (CIPM Study Pack, 2013). In other words, technological advancement in terms of AI can jointly with human resource management (HRM) to achieve the organizational goals and not independent of the other. AI cannot replace human effort, neither can human being deal without technology.

Therefore, the school of thought with respect to the socio-technical systems treat science or technology and

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humanities or human behaviour as two aspects that can be discussed separately but they cannot be separated. The humanities (HRM) search or furnish us with the problems in an organization, but technology (AI) provides us with the means of solving them. The socio-technical system allows for external influence as it is open to what goes on in the environment. There must be a relationship between AI and HR in the organization as to form a complete unity. AI technology is increasingly being used to automate many HR processes, and it appears automation is going to pay off big time.

Replacement Cost Model

This method was developed by Rensis Likert and Eric G. Flamholtz in 1973. The Model suggests that human resources are valued at their present cost. Under this method, human resources of an organisation are to be valued on the basis of the estimated cost of replacing the existing human resources with others of equivalent talents and experience. Human Resources are to be valued on the assumption that a new similar organization has to be created from scratch and the cost to the firm is calculated if the existing resources were required to be replaced with other persons of equivalent talents and experience. It takes into account all costs involved in recruiting, hiring, training and developing the replacement to the present level of efficiency. As against historical cost methods which take into account the actual cost incurred on employees, replacement cost takes into account the notional cost that may be required to acquire a new employee to replace the present one. Replacement cost is generally much higher than the historical cost. For example, Friedman has estimated that the replacement cost of an executive in middle management level is about 1.5 to 2 times the current salary paid in that position. Replacement cost is much better indicator of value of human assets though it may present certain operational problems.

The major advantage of this approach is that it incorporates the current values of the firms human resource which could make possible realistic presentation of financial statements. In the process, it take into account the fluctuations of the job markets and general rise in price level. It will not be possible to ascertain correct replacement cost of existing human resources as there can be no competitive replacement for them. Hence this approach defies the objective way of determining the value of human resource.

This approach also has the advantage of adjusting the human value of price trends in the economy and thereby provides more realistic value in inflationary times. This approach is present oriented. This approach is more realistic as it incorporates the current value of the organization's human assets in its financial statements prepared at the end of the year. Costs incurred by an organization in replacing a terminated employee are defined as replacement cost like the following: Communication of job ability; Pre-employment administrative functions; Interviews; Testing; Staff Meetings; Travel Cost; and Employment Medical Examination.

However, this method suffers from some difficulties also. It may not always be possible to obtain such a measure for a particular employee and is not always possible to find out the exact replacement of an employee. This method does not reflect the knowledge, competence and loyalties concerning an organisation that an individual can build over time. It is difficult to find out the cost of replacing human resources as different persons may arrive at different estimates. The replacement value is affected by subjective considerations and therefore the value is likely to differ from one another. Equally, it is against conventional accounting practice.

AI technologies offer significant opportunities to improve HR functions such as self-service transactions, recruiting and talent acquisition, payroll, reporting, access policies and procedures. The success of any organization depends on how effectively it combines people, process and

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technology intelligently to deliver transformational value at optimized cost. The most significant achievement of transformative technology is to make key data accessible anytime, anywhere and in any medium with a technology-agnostic solution. AI-based HR applications have strong potential to raise employee productivity and help HR professionals become knowledgeable consultants that boost employee performance (EY, 2018). However, one vital strategic task that HR should undertake is to prepare the organization for the AI revolution. This will mean ensuring that the workforce is 'change-ready' and prepared to embrace new technology (Reilly, 2018). He noted that the growing computer power, ever-increasing amounts of data and greater theoretical understanding is meaning that AI technologies are developing at pace. Organizations must grasp the implications of this change. But as we have seen, the interaction between people and technology at work is highly situation-specific and adapting to the situation is critical to enhancing the positive potential and minimizing the harmful side-effects of AI.

The theory and philosophy of artificial intelligence has come to a crucial point where the agenda for the forthcoming years is in the air (Muller, 2012). While the AI systems will increasingly become capable of reaching human-level performance in a variety of application domains, progress in the development of intelligent robotic systems will continue to focus on excellence in the performance of specific tasks, and on the introduction of new tasks to new types of robots (Gini, Agmon, Giunchiglia, Koenig & Leyton-Brown, 2018).

Empirical Review

Most literature on AI, HR and HRA are qualitative papers. In later years due to the technological changes, research has been conducted on how these important concepts HRM, HRA and AI can be combined. Usually, studies are conducted of how the recruitment process can be smoother and optimized with the help of focus lies a lot more on technological advances helping recruiters through automation. Due to this, it can be stated that the human touch in recruitment is becoming reduced (Bondarouk & Brewster, 2016).

In the study of Somen Mondal the CEO of Ideal Company, a software company that uses AI to automatically recruitment tasks, the biggest impact of AI is to automatically screen candidates and reduce bias, AI can learn the qualifications for successful employees in a particular position and apply this knowledge to select qualified candidates and score and rate candidates, according to Mondal, the company used AI software to recruit, with 71% reduction in recruitment costs and a threefold increase in recruitment efficiency (Denise, 2017 in Jia et al, 2018).

Salimuddin and et al (2010) had an article on "Intellectual Capital and Corporate Performance: A Value Creation Efficiency Analysis". The study examined the association between intellectual capital and corporate performance of 15 manufacturing companies listed in Dhaka Stock Exchange, value creation indicator used is value added concept and intellectual capital is explained by market valuation, profitability and productivity. The study finds that there is no strong association between the studied variables except relation between a component of VAIC, CEE and the different measures of the firms' performance. Physical capital efficiency is the most significant variable related to profitability while human capital efficiency is of great importance in enhancing the profitability of the company.

Merlin and Jayam (2018) used secondary data to addresses the possibilities of how AI is transforming and supporting the HR function like recruitment, training, talent management and retention through real time, and finally addresses the future impact on the HR workforce (Verma & Bandi, n.d.). What this means is that, AI can solve organizational problem, make HR smart and efficient, make HR digital. Because AI engine can gather structured and unstructured data from candidate resume and relevant job description performs benchmark with the existing employees base with similar profile validates the profile

against job opening by analyzing interview transcripts and provides an intelligent analysis of the candidate profile using AI natural language processing and machine learning (Verma & Bandi, n.d.). In other words, contrary to popular belief, if applied appropriately, AI enhances both the recruiters' and candidates' experience and makes the overall recruitment process more efficient for both sides.

AI has impacted the process of HRM largely, little research had been conducted and examined about its effectiveness for organizations. Its applications as described above, have an exciting future and eventually will support employees or take over tasks from employees. Supporters and opponents AI both seem to agree that machine learning algorithms will influence job in some way or another as it will improve, streamline or remove processes (Strohmeier & Piazza, 2015). Application of AI has been an important trend in the future development of HRM process, which can bring greater economic benefits. Managers can get devoted to more valuable work as it provides powerful data based and analytical support, undertake and help managers speed up their daily tedious and repetitive work. Jia et al (2018) outlined such activities mainly to include the formulation of corporate HR strategies, recruitment and selection of employees, training and development, performance management, compensation management, employee mobility management, employee relationship management, employee safety and health management.

Furthermore, AI has been supporting in decision making, dealing with uncertainty, and especially equivocality of decision-making in an organization. Most organizations has been using AI in HR like chat bot, machines learning, and robot process automation in HRM which support in recruitment, screening on boarding, and interviewing, etc. it's being used to reduce the work load, favouritism and will help to increase the transparency at work place. Robotic task to increase efficiency at workplace includes filing reports, copying data, identifying required data from available data, processing, collecting data for HR and payroll system, etc (Yawalkar, 2019). Another aspect of technology application is Human Resource Information System (HRIS). HRIS can help to launch, manage and provide actionable insights on a full employee life-cycle, starting from recruitment and selection, and continuing through payroll and benefits administration, performance management, career and succession planning (Tursunbayeva, 2019).

Still in an industry the role of human is essential and AI have to depend on human when subconscious decisions are essential to elevate and facilitate the outcomes of decisions. AI only reproduces the reasoning mechanism of human as such they are lacking in flexible usability and possibilities for personalization; as it is very challenging to capture the complexity of the real world and establish fixed categories with the support of AI, organizations are altering their training and development practices and methods to a remarkable extent. Thus in each dimension and direction of the HRM, the variety of AI technologies can be attempted.

Ogenyi and Oladele (2015) analysed the effects of the major challenges to accounting for Human Resources in Nigeria. This study employed the survey method of data collection and adopted a quantitative approach to data analysis. The Binomial Logistic Regression, an inferential statistical tool was used to test the null hypotheses at a five per cent level of significance. The principal factors identified as challenges were categorised into three, namely Asset Recognition Criteria (ARC), Disclosure Requirements (DR) and Existing Social Order (ESO). Based on statistical analysis of data collected, the results showed that asset recognition criteria and disclosure requirements were highly responsible for the non-accounting for Human Resources in Nigeria even on a voluntary basis. Existing social order on the other hand, was statistically significant at 5% but does not hinder accounting for Human Resources in Nigeria.

Akhtaruddin (1996) wrote the article on "Human Resource Accounting a Survey on Its Applicability in the Public Sector Enterprises of Bangladesh". Public sector

enterprises in Bangladesh occupy a commanding position in the economy. But in spite of their major contribution in the economy in terms of value added and employment, their overall performance has remained unsatisfactory. The performance of an enterprise depends, to a great extent, on the qualified, trained and experienced human resources. But these key assets are neglected and are given less importance for their development. Development and maintenance of human resources require reliable information and it is HRA which would serve the purpose. The study made an opinion survey regarding the applicability of HRA in public enterprises. Majority of the respondents favoured the introduction of HRA in our public enterprises.

Methods and Procedures

The study employed descriptive design. Thus, it is exploratory in nature based on extensive review of relevant studies done earlier and comparative pictures of the various aspects of artificial intelligence, human resources management and human resources accounting have been discussed to arrive at concluding remarks. The study forms mainly the extensive review of related literature based on highly work. Therefore, is a qualitative or opinion paper with secondary data collected from internet, journals, proceedings, etc.

Analysis of Results

Therefore, the future generation of HRM aim to go even as far as helping to align employee goals with overall organizational mission, to continuously monitor their achievements in real-time and to evaluate financial performance implication not only at an individual level but also for a team. Strategic workforce planning can provide insights regarding not only employee members, but also the ideal distribution of skills needed in a productive and effective team, or skills that government might need in the future. These, however, need to be aligned with the broader strategy of the public sector and backed up with HR technologies and actionable analytics. New technologies allow for digitization of traditionally offline sources like sentiments, and emotions, speech and interaction and relationships (Strong, 2015). Today, major technological organizations are investing into applications for speech recognition, natural language processing and computer vision. The future machine without a mind and a will of his own, will have the overall ability to interact with humans. Therefore, as Azeez (2018) observed, if government is not driving its processes or services with technology, it may have a challenge engaging techfluent millenials.

The futuristic scenario is that autonomous super artificial intelligence may one day supersede the cognitive capabilities of humans. This pave the way to new AI challenges such as self-driving cars, etc. which may bring the possiblistic of common sense – the ability of AI to judge information beyond its acquired knowledge. AI will mimic human cognition to a point that it will enable the ability to dream, think, feel emotions and have own goals (Perez et al, n.d.).

However, with the ever-increasing complexity of HR channels, roles and lines of communication in mind, implementing AI is slowly turning into a necessity rather than a choice with attendant challenges. According to Tambe et al (2018), the effective application of AI to human resource problems presents very different challenges, even in accounting for it. They range from practical to conceptual including the fact that the nature of data science analyzes when applied to people has serious conflicts with criteria societies typically see as important for making consequential decisions about individuals. For Habeeb (2017), the core problems of AI include programming computers for certain traits such as: knowledge, perception, reasoning, planning, problem-solving and ability to manipulate and move objects. In other words, we are still far from creating a machine that would be able to match or outperform human capabilities in all fields. The possibility of creating thinking machines raises a lot of ethical issues. These questions relate both to ensuring that such machines do not harm humans and other morally relevant beings, and to the moral status of the

machines themselves. Stuart and Norvig (2016) have mentioned several problems that exploitation of AI can cause such as losing jobs to automation and in some case AI system can be used when there are undesirable ends.

Yet, necessary skills set for employees are required due to involvement of AI to HRM and the cost effect in HRA. Most of the times it is difficult for employees to adopt and learn the AI tools and have a proficiency in the field of digital technologies. Getting right candidate to handle AI tools is one core challenge in front of government and it can be difficult to HR department (Yawalkar, 2019). Equally, language biases and cultural understanding of machine are also challenges for AI. Understanding cultural barriers, what terminology is and how information is presented in certain nation or culture are areas that AI might have difficulties. The primary goal would be that they make our lives easier by taking care of complex and repetitive daily tasks (Mission, 2018). Jha (2019) added, as technology gets smarter and helps in solving more complex cognitive tasks, organizations will holistically adopt deep learning to understand the employees better and provide personalized experience at the workplace. It isn't as though AI will replace employees altogether in some futuristic utopia, but it does have the potential to reduce and streamline the HR workload.

CONCLUSION AND RECOMMENDATIONS

The paper has discussed artificial thinking being in the workplace and the future of HRM plus HRA in Nigerian public sector. The field is so broad that it cannot be limited to a specific area of research. AI is more of an ambition that seeks to understand how human cognition works by creating cognitive process that emulate those of human beings and HRA is to quantify the cost of this human resource in the financial accounting. The paper believed that we cannot bind the future to the past, when technology is always improving, and the cost of acquiring both the technology and human resource. Thus, the future of HR will both be digital and human as HR leaders focus on optimizing the combination of human and automated work and the financial performance, becomes necessary to assess the organization. What's needed is to change the mindsets of hiring managers and leaders to source in new ways. Change performance management and development skills needed in HR roles to include a fundamental understanding of how to use AI across the employee life cycle.

The paper therefore, recommends the following:

- Technological improvements, business strategies, quality concerns etc., will all have to be implemented through people, hence, government while employing artificial intelligence in human resource management, innovative thinking must be applied and human resource accounting will be used to measure the healthiness of the organization.
- The human resource available in the public sector should be rightly assessed and should be further developed through motivation training and development, and perception to the needs of the organization concerned. This will help to determine the financial performance of the organization as reflects in the financial statement.
- Artificial intelligence is redirecting human capital in the organization, so the cost of acquiring artificial intelligence and human capital in the organization will reflect us in the financial statement of the organization.

References

Abubakar, S. (2006). An Assessment of Human Resource Accounting Measures and Application Possibilities in Nigeria. *Unpublished M. Sc. Accounting and Finance Thesis Submitted to the Postgraduate School, Ahmadu Bello University, Zaria, Nigeria*.

Agarwal, R. (2004). Human resource accounting practices in Indian companies. *Ph.D Thesis Department of*

Commerce Auqarh Musum University Augarh (India)

Akhtaruddin, M. (1996). Human resource accounting a survey on its applicability in the public Sector Enterprises of Bangladesh. *Rajshahi University Studies Part-C* 4: 53-62.

Aljamaan, B. (2017). Human resources accounting: Concepts, objectives, models and criticism. *Global Journal of Human Resource Management, 5*(7), 1-10

American Accounting Association (1973). Report of the Committee on Accounting for Human Resources. *The Accounting Review,* 48, pp. 6-11.

Baker, W.E &Sinkular, J.M. (2005). Market Orientation and the new product paradox. *Product Innovation Management, 22*(6), 483-502

Bibi, P.; Pangil, F. & Johari, J. (2016). HRM practices and employees' retention: The perspective of job embeddedness theory. *Asian Journal of Multidisciplinary Study, 4*(5), 41 – 47

Biro, M.M. (2019). 7reasons AI will take over HR – and 1 reason it won't. Retrieved 02/12/2019

Bondarouk, J. & Brewster, C. (2016). Conceptualizing the future of HRM and technology research. *The International Journal of Human Resource Management, 27*(21), 2652 –2671

Brummet, R. L., Flamholtz, E. G., and Pyle, W. C. (1969) "Human Resource Measurement—Challenge for Accountants. *The Accounting Review*

Bullen, M.L. & Eyler, K. (n.d.). Human resource accounting and international developments: implications for measurement of human capital. *Journal of International Business and Cultural Studies*, PP. 1-16

Chand, M., & Katou, A. A. (2007). The impact of HRM practices on performance in the Indian hotel industry. *Employee Relations, 29*(6), 576-594.

Ciurea, M. and Man, M. (2020). The accounting profession from Romania in the digitized economy. *Advances in Economics, Business and Management Research, vol. 138 2nd International Scientific and Practical Conference "Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth" (MTDE)*

De Waal, A. & Frijns, M. (2011). Longitudinal research into factors of high performance: The follow-up case of Nabil Bank. *Measuring Business Excellence, 15*(1), 4-19.

Dhamija, P. (2012). E-recruitment: A roadmap towards e-human resource management. *Researchers World, 3*(3), 33

Dimba, B. A. (2010). Strategic human resource management practices: effect on performance. *African Journal of Economic and Management Studies, 1*(2), 128-137.

Elovitz, D. (1967). From the Thoughtful Businessman," Harvard Business Review, May/June Engel, E. (1883). Der Werth des Menschen. Berlin: Verlag von Leonhard Simion

EY (2018). The new age: Artificial intelligence for human resource opportunities and functions. Ernst & Young LLP

Farr, W. (1853). Equitable Taxation of Property. *Journal of Royal Statistics and Social*, XVI

Flamholtz, E. (1972). Human Resource Accounting: A Review of theory and research. *Minneapolis, Minnesota: Presented at the Thirty-Second Annual Meeting of the Academy of Management, August 15*

Flamholtz, E. G. (1985). *Human Resource Accounting*. 3rd Ed. San Francisco CA, USA: Jossey-Bass.

Flamholtz, E. G. (1999). *Human resource accounting: Advances in concepts* (3rd Ed). San Francisco, USA: JosseyBass.

Frederiksen, J.V. & Westphalen, S. (1998). Human Resource Accounting: Interests and Conflicts. *A Discussion Paper. CEDEFOP Panorama. European Centre for the Development of Vocational Training, Thessaloniki (Greece).* Pp. 1-63.

Frey, C.B. & Osborne, M.A. (2013). The future of employment: How susceptible are jobs to computerization. *Retrieved from*

http://www.oxfordmartin.ox.ac.uk/downloads/academic/the-future-of-employment.pdf

Galanaki, E.; Lazazzara, A. & Parry, E. (2019). A cross-national analysis of e-HRM configurations: Integrating the information technology and HRM perspectives. *Organizing for Digital Innovation, 27*: 261 – 276

Gini, M.; Agmon, N.; Giunchiglia, F.; Koenig, S. & Lyton-Brown, K. (2018). Artificial intelligence in 2027. *AImatter, 4*(1), 10 – 20

Glautier, M. W E. (1974), "Human Resource Accounting: A Critique of Research Objectives for the Development of Human Resource Accounting Models. *A Paper Presented at a Seminar on Human Resource Accounting held at the European Institute for Advanced Studies in Management, Brussels, November 28 – 29*.

Griffin, E.A. (2003). *A first look at communication Theory* (5 ed.) Boston: Mc Graw-Hill. Guest, D. E. (1997). Human Resource Management and Performance: Review and research agenda. *The International Journal of Human Resource Management*, 8(3).

Habeeb, A. (2017). Introduction to artificial intelligence. Research Gate, pp. 1 – 9

Jha, P. (2019). Here's how consumerization of AI and VR could transform HR management. Dale Carnegie Training, India

Johanson, U.; Eklöv, G.; Holmgren, M. & Mårtensson, M. (1998). Human resource costing and accounting versus the balanced scorecard: A literature survey of experience with the concepts.

Johansson, J. & Herranen, S. (2019). The application of artificial intelligence (AI) in human resource management: Current state of AI and its impact on the traditional recruitment process. *Unpublished Bachelor Thesis in Business Administration*

Kaplan, J. (2016). *Artificial intelligence: What everyone needs to know*. Oxford: Oxford University Press

Kaplan, R. S. & Norton, D. P. (1996). *Translating strategy into action: The balanced scorecard*. Boston, Massachusetts: Harvard Business School Press.

Kaufman, B.E. (2014). The historical development of American HRM broadly viewed. *Human Resource Management Review, 24*(3), 196 – 218

Kok, J.N.; Boers, E.J.W.; Kosters, W.A. & Putton, P.V. (n.d.). Artificial intelligence: Definitions, trends, techniques, and cases. *Encyclopedia of Life Support System*.

Mena, J. (2011). Machine learning forensics for law enforcement, security, and intelligence. *Retrieved from http://books.google.com*

Mission, V. (2018). *What is artificial intelligence*? Retrived 02/12/2019

Muller, V.C. (2012). Introduction: philosophy and theory of artificial intelligence. *Minds & Machines*, 22: 67 – 69

Newman, B. H. (1999). *Accounting recognition of human capital assets.* New York: Pace University Press.

Ogenyi, M.A. & Oladele, K.O. (2015). Human Resources Accounting (HRA) in Nigeria: An Analysis of Challenges. *Research Journal of Finance and Accounting* *6*(22), 15-20

Osman, I., C. F. Ho, T, & Galang, M. C. (2011). The relationship between human resource practices and firm performance: An empirical assessment of firms in Malaysia. *Business Strategy Series, 12*(1), 41-48.

Pike, S., Rylander, A. and Roos, G. (2000). Intellectual capital management and disclosure, intellectual capital_Mgt_&_Discsloure.pdf

Rahaman, M.M.; Hossain, M.A. & Akter, A. (2013). Problem with Human Resource Accounting and A Possible Solution. *Research Journal of Finance and Accounting, 4*(18), 1-10

Reilly, P. (2018). The impact of artificial intelligence on the HR function. *Institute for Employment Studies, Member Paper,* 142: 1 – 17

Richard, O.C., Simon, T. & Brut, G. (2009). Measuring Organizational Performance: Towards Methodological Best Practice. *Journal of Management Sciences*, 76: 276-323.

Salimuddin, M. et.al (2010). Intellectual capital and corporate performance: A value creation efficiency analysis. *The Bangladesh Accountant, July-Dec.*, pp. 1-7

Saunders, M. Lewis, P. & Thornhill, A. (2009). *Research methods for business students.* 4th ed. Harlow: Pearson Education Ltd

Spiceland, J. D. and Zaunbrecher, H. C. (1976) "Human resource accounting: An historical perspective." *Accounting Historians Journal, 3*(1), 43-49

Strohmeier, S. & Piazza, F. (2015). Intelligent systems in management. In Kahraman, C. & Cevik Onar, S. (Ed.). *Intelligent techniques in engineering management: Theory and applications*. pp. 149 - 172 doi:10.1007/978-3-319-17906-3-7.

Strong, C. (2015). Humanizing big data, marketing at the meeting of data, social science and consumer insights. *Retrieved from* *http://www.koganpage.com*.

Stuart, R. & Norvig, P. (2016). *Artificial intelligence: A modern approach*. 3rd ed. Upper River Saddle: Prentice-Hall Press

Tecuci, G. (2012). Artificial intelligence. *Wires Computational Statistics, 4*(2), 168 – 180

Ved, S.; Kaundanya, N.S. & Panda, O.P. (2016). Applications and current achievements in the field of artificial intelligence. *Imperial Journal of Interdisciplinary Research, 2*(11), 932 – 936

Wikipedia (2019). Artificial intelligence. Wikipedia Free Encyclopedia. Retrieved 02/12/2019