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AI-Powered HCM: The Analytics and Augmentations

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Abstract

Artificial intelligence (AI) is seemingly everywhere, red-hot right now, livewire and livelihood for everyone contributing \$15 trillion to the World Economy and amplifying Society (*Humans 2.0*), auguring Service (*Cyborg Concierge*) and augmenting Management (*C-Suite*). The waning of 'Enterprise Technologies' (R/3 Legacy Systems) and waxing of 'Dynamic Technologies' *viz.*, Artificial Intelligence (AI), Deep Learning (DL) and Machine Learning (ML) reshaped, redefined and rewrite the concept of 'Human Capital Management (HCM)'. The 'Human Capital' has always been a top challenge and 'Human Talents' are ever scarce resources even today. The Human Capital Management (HCM) and Human Capital Intelligence (HCI) emerged as 'Natural Intelligence Science' for Chief Human Resources Officer (CHRO). The HCM Functions have been augmenting, 'app'ified (an application form) a nerve in a large, diagnosing and detecting problems, proposing the promising solutions. AI-powered HCM embedded into the workplace and transformed the workforce from doing digital to being digital, from centre driven to human-centric, from compliance and control to trust and empowerment. In dictum, AI and ML will be 'Bright and Shiny Objects' in the future reinventing Employee Workforce Analytics and redefining Employee Interface (EI) and refining Employee Experience (EX).

Keywords: AI, AR, CHRO, DL, ML, EC, EE, EI, EX, HCBA, HCI, HCM, NN, VR

1. Introduction

1.1 Information Technology parlance 'AI Powered HCM - The Start and Syntax'

Artificial intelligence (AI) is the new electricity and has a transforming power to change the way of life and walk of work [1]. The Intelligent Virtual Assistants *viz.*, *Alexa*, *Siri*, *Google*, *Jovi*, *Knockout Bot* and *MiHCM*, permeate everywhere and every sphere of personal as well as professional life [2]. The growth of AI by 16.4% in 2021 (\$327.5 billion) year-over-year and expected to break \$554.3 billion mark with a five-year Compound Annual Growth Rate (CAGR) of 17.5% even at times of uncertainty, resilience and amidst COVID-19 promisingly send signals to human society that AI is always-on and always-me for the welfare, wellness and well-being of the human race at times of need and exigencies [3].

Artificial intelligence (AI) evolved from the realms of science fiction and emerged as a plug-and-play technology with immediate returns [4]. AI stimulates the human cognitive power by the application and adoption of Machine Learning (ML) (Python & MATLAB), Deep Learning (DL) (Caffe) and Neural Networks (NN).

The Internet of Behaviour (IoB) (Gartner), DNA Data Storage (Microsoft), Neuromorphic Automation (Intel), Quantum Computing (IBM), Hybrid Cloud (Oracle), Augmented Humans (Amazon) and Emotional Experiences (Pymetrics) are evolving and emerged as a few Proofs Of Concept (POC) for Gen-Nxt. The AI (1.0 & 2.0) and Analytics (*Diagnostic, Descriptive, Predictive, Prescriptive and Integrated*), Hybrid Cloud and Crowd, Digi-Assistants and Chabot's, etc., amplify the performance, productivity and predictive power of 'Human Capital' thereby winning the hearts and minds of the workforce in the workspace.

The digi-era is evolving into an intelligence era and 'Cloud' became the cornerstone for all intelligent enterprises. The waning of 'Enterprise Resource Technologies' (*R/3 Legacy Systems*) and waxing of 'Dynamic Technologies' viz., Artificial Intelligence (AI), Deep Learning (DL) and Machine Learning (ML) reshaped, redefined and rewrite the concept of 'Human Capital Management (HCM)'.

The ML and Neural Networks assess, develop and predict the cognitive power of 'Workforce' in a rationale and systematic manner. The prominent Neural Networks *inter alia* include the following: (i) Neural Networks and Multi-Nominal Logistic Regression Model [5], (ii) Seasonal Moving Average (SMA) [6], (iii) Artificial Neural Network Analysis (ANNA) [7], (iv) Artificial Neural Network (ANN) Choice Modelling [8], (v) Neural Networks using the Barone-Adesi and Whaley (BAW) American Model [9], (vi) Feed Forward ANN [10], (vii) Elman & NARX Neural Network and a Back-Propagation Algorithm [11], (viii) Artificial Neural Networks (ANNs), and Support Vector Machine (SVM) Models [12], (ix) Cloud Computing, Machine Learning, and Text Mining [13], (x) AI and Robotics [14], (xi) Feed-Forward Neural Network Model estimated with Backward Propagation (NNBP), and Feed-Forward Neural Network Model Estimated with a Genetic Algorithm (NNGA) [15], (xii) Probabilistic Neural Networks (PNN) [16] and (xiii) Artificial Neural Networks (Feed Forward and Back Propagation) [17] to deal with productive performance and effectiveness.

AI is seemingly everywhere, red-hot right now, contributing \$15 trillion to the world economy and amplifying the Society (*Humans 2.0*), Service (*Cyborg Concierge*) and augmenting Management (*C-Suite*). Industry-4.0 is augmenting, auguring and accelerating the power of AI and HCM embraced the algorithms of AI. Automation permeates everywhere and has a positive impact on work and the workforce. The digi-operations make the work more interesting, smart and simple and also providing opportunities for career advancement and enrichment [18].

2. Human Capital Management (HCM): the premiere

The phrase 'Human Capital (HC)' can be defined as the productive wealth embodied in labour, skills and knowledge and refers to any stock of knowledge either innate or acquired characteristics of a person [19, 20]. The Human Capital is an intangible asset and the most valuable of all capital assets measured in terms of the economic value of a worker's experience and skills [21, 22]. It has the attributes and competencies of a population along with physical and intelligent capital contributing to the economic productivity and prosperity [23–26]. The 'Human Capital' as always a top challenge and 'Human Talents' are ever scarce resources even today.

The 'Human Capital Management (HCM)' is a data-driven analytical function to resolve all critical issues and cultivate reasoning skills [27]. 'Data is the New Oil for Gen-Nxt' and without good data no planning and no modelling, no policy-making was made led to poor decisions either behavioural and/or policy [28]. The 'Human Capital Management (HCM)' evaluates the policies and practices of 'People Resource Management' that creates a value. People Resource Management is a

high-level strategic, investment and operational initiative that deals with the issues that are critical to organisational success and imply a causal link between people management and business success [29–31].

The HCM is about creating and demonstrating a value to an organisation by way of great people management with the great people. The HCM focuses on the set of practices related to ‘People Resource Management’ providing specific competencies and capabilities that create organisational value and meet the specific needs of an organisation [32]. These practices are related to (i) Workforce Acquisition, (ii) Workforce Management and (iii) Workforce Optimization. The HCM measures the value of ‘Human Capital’ in terms of stock of accumulated knowledge, skills, experience, creativity and other relevant workforce attributes for the purpose of ‘Organisational Development’ [33].

The Intelligent HCM (IHCM) architecture is based on AI, ML, Neural Networks and DL that deal with automation of routine HR tasks, deliver personalised experiences, and gain actionable and operational insights from HR Data Bank. The digitalization moves make a quantum leap in reinventing, redefining and refining the Employee Interface (EI) and Employee Experience (EX).

The centennial and one-time life pandemic COVID-19 will have a lasting impact on the future of work. The effects and strains of extraordinary challenge touch the human lens and confined the role of CHROs’ to mere ‘Listening’. The applications and adoptions of Human Capital Management (HCM) refined and reframed and HCM emerged as a ‘New Behavioural Data Science’ that considers and analyses the opinions, feelings and views of the workforce. During this grim and gloomy situation, the HCM brings out the best from the collective humanity with an objective orientation of transforming the organisations from inside out and the bottom up. The COVID-19 altered the working conditions and Work From Home (WFH) became the new norm to navigate organisations through uncharted territory [34–37]. The HCBA and Integrated Analytics (IA) leverage the power of the workforce in a real-time scenario and undoubtedly resolve all HCM issues in the realm of Human Capital Intelligence (HCI) [38].

3. AI-powered HCM: the architecture and applications

The ‘Assisted Intelligence’ is for today, ‘Augmented Intelligence’ is emerging and ‘Autonomous Intelligence’ will be for the future. The AI in HCM can be analysed from the (i) Basic Support Layer (BSL), (ii) Platform Framework Layer (PFL) and (iii) Domain Technology Layer (DTL) point of view [39]. Big data are the fuel for ‘Basic Support Layer’ and ‘New Enhanced Algorithm Model’ has greatly improved Machine Learning (ML) capabilities representing Deep Learning (DL). The Supervised Learning (SL), Unsupervised Learning (UL) and Intensive Learning (IL) are the outcomes of BSL. The software giants’ *viz.*, Google, Facebook, Microsoft, Baidu and Amazon, University of California at Berkeley and the University of Montreal in Canada have launched PFL-based DL Framework.

The SAP-HCM Suite deals with human efficiency by minimising the cost and errors and optimising the human solutions by implementing SAP-HCM Modules *viz.*, Organisational Management (OM), Personnel Administration (PA), E-Recruitment, Time Management (TM), Payroll, ESS (Employee Self Service), MSS (Manager Self Service) and Reporting [40].

The Accenture Audit and Compliance HCM App (Application) and API (Application Programming Interface) identify and address personnel data quality issues quickly. The extensive use of HCM app helped in attrition (15.2% decrease), internal job fill (13.7% increase) and productivity (5.4% increase) [41].

The IBM-AI-powered HCM Solutions *viz.*, IBM-Kenexa Talent Acquisition Suite, IBM-Watson Candidate Assessment, IBM-Watson Recruitment, IBM-Watson Talent Match, IBM-Talent Assessment Solutions can predict the attrition rate of workers with 95% accuracy and save nearly \$300 million in retention costs. It also identifies the new skills, education, job promotions and raises of the workforce [42]. The IBM-AI Powered HCM Solutions assess and develop 'Human Capital' competencies and capabilities today and tomorrow and pave the way for phenomenal transformations in the domain of HCM.

The Cognizant One-HCM Cloud Solutions enable HCM Organisations to move from Legacy Personnel Management (LPM) to Strategic Human Capital Management (SHCM) Models. The standardised processes, accuracy and accountability, a pace in implementation and lowering the cost of ownership, are the salient solutions of HCM Cloud.

The adoption of AI in HCM makes hiring 10 times faster and it increases retention by 25% and 25% more applicants are interviewed [43]. The chatbots, robots and virtual assistants are powered by business algorithms joining into the rank-to-profile of workers. The Advanced Deep Learning (ADL) Technologies reduce the burden of human capital deployment. The Natural Language Processing (NLP), face recognition (*Alipay*), voice assistants (*Apple Siri, Microsoft Cortana* and *Google Now*), speech recognition (*Amazon Echo*), and translation, and search engines, Q&A software, sentiment analysis and automatic answering are some of the AI Assistants and APIs' (*Application Programming Interface*) adapted by HCM Suite.

4. Human Capital Intelligence (HCI): the applications and adoptions in HCM

Human Capital Intelligence (HCI) is an 'AI-powered disruption in HCM' that streamlines the HCM processes for a seamless workflow and intuitive work environment. The HCM Functions have been 'app'fied, touched a nerve in a large, diagnosing and detecting problems, proposing the promising solutions. Leveraging the 'Cloud', the best AI-powered HCM-Solutions *inter alia* include *UZIO, Oracle HCM Cloud, Sage People, SAP SuccessFactors, ADP WorkforceNow, Workday, Rippling, Vibe HCM, Ascentis, Viventium, TensorFlow* and *eXo Platform* (<https://peoplemanaging-people.com>).

The digitalization moves make a quantum leap to reinvent the Employee Interface (EI) and refine the Employee Experience (EX) than narrowly focusing on Employee Culture (EC) and Employee Engagement (EE). The Integrated HCM Analytics, pulse surveys, wellness and fitness apps, design thinking and employee journey maps assess and predict the 'Employee Satisfaction' by customising HCM Apps *viz.*, Employee Net Promoter Scores, Work Day, SAP Success Factors, Oracle HCM, resulting the positive and progressive Employee Experience (EX), that is an emerging new phenomenon in HCM [44].

It is a high and critical time to customise algorithms by considering the 'Emotional Experiences' of Human Capital keeping in view the Agile, Augmented Realities (AR) and Virtual Realities (VR) [45]. Human Capital Engagement (HCE) yields positivity in all scorecards of work-life, performance and productivity [46]. The Pymetric Behavioural and Psychometric Tests [47] analyse, assess and predict the behaviour of 'Human Capital' physically, cognitively and emotionally and provide indelible analytical and operational insights based on the situation and scenario.

5. Human Capital Experience (HCX): a scintillating and exuberating experience

Human Capital Experience (HCX) (**Figure 1**) is a digi-transformative and intervention at times of uncertainty for Gen-Z CHROs' to assess and evaluate the experiential needs of employees, customising work algorithms, configuring work processes and creating creative workspace. The HCX improves EE, optimises digital EX and holistically measures the employee performance and manage Employee Life Cycle (ELC). The deliverable positive outcome of an 'Employee Engagement (EE)' is 'Employee Experience (EX)' and the essence of EX is not only engaging the body of the employees but also touch the soul and mind [48].

The offering of perks at work, rewards and appraisals in between small and big moments to the workforce has become a source of pride and a competitive differentiator for companies vying for 'Top Talent'. In a 'Hybrid Cloud Platform', the world of work makes the people to work better, deliver digital experiences and unlock productivity [49].

In a gig world, 'Money' is no longer the inspiring and motivating factor for 'Gen-Z'. The physical, cultural and technological work environment, promising 'Work Culture and Employee Experience (EX)', is on the rise during the entire HCM cycle from pre-employment to exit en route recruitment, selection, onboarding, employee development, career management, performance management. The Employee Experience (EX) focuses on satisfying the experiential needs of the workplace and transforms the workforce into engaged employees. It is an integrated approach that deals with psycho-cognitive sentiments and intersects employee expectations, needs and wants with the organisational expectations, needs and wants, that is the relationship between the organisation and the employees. To sum up, EX is the sum of real and true feelings and expectations of the workforce about the world of work [50].

The Employee Experience (EX) emerged as a proven and easy-to-follow framework that helps to focus on the right activities and actions to improve the lives and livelihoods of bottom of the pyramid. The designing of an organisation with techno-cultural, physical environments encapsulate the inter-relationship between an Organisation and Employee Experience (EX), that is the real business value underlying 'making employees happy at work'.



Figure 1. Global Human Capital Experience (HCX)—a Kaleidoscopic view. Source: Deloitte University (2017).

6. AI-powered HCM: the future directions and dimensions

Human Capital Management has been a critical issue across the globe. Human validation is still necessary because of high economic and social stakes [51]. AI is replacing and heavily enhancing low-skilled and repetitive jobs that do not require emotional capabilities. The AI-powered HCM solutions provide rich insights from sourcing to selecting, recruiting to resourcing, deployment to development, training to retaining, employee engagement to employee experience and enjoyment.

The future directions and dimensions for the successful adaptation of AI in HCM solutions *inter alia* include the following: (i) aligning HCM Solutions at par with the strategy; (ii) boosting investments in analytics with a focus on the last mile; (iii) clarifying data ontology based on present and predictive analytics and creating cross-functional and collaborative agile teams; (iv) developing a data strategy with a strong data governance; (v) enable the process of deep data analytics by a tailored talent strategy and (vi) frontline empowerment make the analytics data-driven [52].

The future of AI-powered HCM applications focus on the following: (a) 'Data mining' as Decision Support System (DSS) in Performance Management, (b) 'Natural Language Processing (NLP) and Face Recognition' in Recruitment and Interview, (c) 'Robotics and Visual Scanning Technologies' in Training and Development and (d) 'Neural Network System' in Intelligent Salary Evaluation.

Do not be a shoemaker with a bare foot. Be a do-able change agent, digi-disruptor, strategic player with the vision and intent. The future of HCM lies in making 'Liquid Workforce' happy and healthy. A feel of joy at work, delivering happiness in the workplace, and enjoying with futuristic vision are the unique traits of 'Liquid Workforce (Gen-Z)'. The elephant room is gaining traction even the HCM is creating super jobs with human intelligence and sensitivity. Hence, the suggested strategies for exploring, experiencing and empowering HCM with AI-powered solutions are as follows: *Listen like a CEO, Speak like a COO, Read like a CTO, Write like a CFO and Act like a CHRO.*

7. Human Capital Management (HCM): a rethink, reinvent and redefine

Today, organisations are grappling with an unprecedented crisis that is fundamentally different from what they have ever experienced. In this hour of crisis, the HCM function has to be a catalyst in predicting change, co-creating a range of Scenarios and Planning (HRP & SP) for the future.

At this time of crisis, organisations must adapt Workforce Analytics for changing the ways of work, invest in the right IT infrastructure and build in structured mechanisms to institutionalise remote working. The working hours, work locations and even the work arrangements would become more fluid and make remote working to be an integral part of every organisation. Further, virtual working has faced the heat, therefore, mobilise IT infrastructure and set up data security protocols at a very short notice. In addition, focus on scaling up human productivity by building cost management options for the development of human capital.

The crisis is also forcing organisations to re-look at the HR processes and operations through a digi-lens that drive the future situations and scenarios (Scenario Planning). This will ensure not only the safety and security of the employees but the organisation's health. More than 70% of the organisations are now moving to virtual methods of 'Recruitment & Selection'. It is also the right time for CHROs' to recalibrate their priorities, focus towards managing remote workforce, digitalize the HR function and re-inventing workforce models [53].

An acceleration of future M&A, Nationalization and Glocalisation of companies will create challenges and rise in complexity for CHROs. There is a need to develop Agile Operating Models meeting the competition with deliverable solutions. The popularity of contractual jobs and freelancers is growing and it is imminent to workforce constantly upgrade and upskill to remain competitive. It is the right time to focus on Learning and Development (L&D) that make the employees future ready. Companies are doing Competency Mapping of their employees and exploring the possibility of transferring or re-skilling some of their employees to other divisions/locations wherever there is a demand or likely to have demand in near future due to the economic impact of COVID-19.

The devising and designing of HCM Guidelines from the head and heart, engaging human capital with human touch and spirit, introducing agile and augmented technologies, reskilling and reinventing HCM dynamics, imbibing confidence, inducing unbounded optimism for the welfare, wellness and well-being of the workforce under the decisive and reactive leadership undoubtedly redefine and reinvent the siloes and signatures of Human Capital Management, that is *the acta not verba and coup de maître of HCM*.

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