



## The Future of Big Data and Artificial Intelligence in Talent Management Practices: A Literature Review

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**Abstract.** *Currently, the business sector has entered a digital transformation stage involving Big Data (BD) and Artificial Intelligence (AI). At this stage the institution must change the way it operates its business, even to a philosophical point. This paper attempts to predict the direction of these changes through literature studies. The purpose of this paper is to provide a broad view regarding the application of BD and AI in Talent Management (MT) practice. From this study it was found that the use of AI and BD in the MT process (recruiting, developing, retaining and deploying talent) has obstacles include: 1) availability of expert human resources, 2) data security and 3) psychological barriers of top management and employees. Some of the strategic recommendations found include: 1) Building HR expertise and adaptation, 2) Legal readiness, 3) Managerial strategy and 4) Reducing AI bias to increase the fairness of AI decisions.*

**Keywords :** *Artificial Intelligence, Big Data, Talent Management*

### 1. INTRODUCTION

The stages of digital technology change include digitization, digitalization and digital transformation. At the digitization stage, all data moves to digital data, then the data is connected to internet technology at the digitalization stage and finally significant changes occur in the institution when it enters the digital transformation stage (EDUCAUSE, 2020). Digitalization of companies has been proven to increase the ability to generate competitive advantages through reduced costs, increased efficiency or new forms of production (Earley, 2014; Fitzgerald, 2013). Digital transformation goes beyond the process paradigm and includes changes and implications for products, services and business models in general. Digital strategies in mature organizations are developed with the aim of transforming the business as a whole (Kane et al., 2017; Matt et al., 2015).

Digital transformation (DX) is proven to have boosted the performance of the HR department in the Talent Management (TM) system (Montero Guerra et al., 2023). Artificial

Intelligence (AI) and Big Data (BD) offer faster data storage and processing power, resulting in more informed and effective decision making that drives effective and efficient operations. HR managers can formulate and make strategic decisions through the role of AI that explores data from BD. However, the accuracy of decisions depends on the amount of data that can be extracted, stored and processed by BD (Radonjić et al., 2022). Digital trends have changed the face of traditional HR management which is manual-based, rigid with several points of automation into HR management based on interactive digital platforms, digital work culture, the use of AI and BD in HR management with an interactive and collaborative system between humans and robots (da Silva et al., 2022).

TM as a method of HR management is also influenced by digital trends and this paper attempts to explain the current conditions of these trends by using a literature study approach related to the benefits, internal obstacles and external challenges both actual and potential in the future, as well as suggesting strategies that can be taken by HR managers to face this trend.

## **2. RESEARCH METHODS**

This study will use the Literature Review approach as a descriptive basis, because Literature Study is defined as an approach that can provide information regarding the current status of knowledge on certain questions (Rousseau et al., 2008). All papers primarily concerned with literacy studies start from a research question (Booth et al., n.d.). The research questions in this paper include: (1) What is the description of the use of AI and BD in implementing TM system including the technical process, benefits, obstacles and challenges and (2) What strategies can companies implement to face these predictions?

The library data sources that will be used in this study are Google Scholar and Science Direct. This electronic database was chosen because it offers speed and reliable access to the articles you need and can be freely accessed. In the process of searching for articles, only articles that use certain criteria, namely discussing the theme of BD and AI in the human resource management practice sector.

The main aim of this research is to explain the field of TM which has been influenced by BD and AI. Apart from that, this research seeks to predict trends that will emerge from this exposure. It is hoped that this research can become a stepping stone for further research that will be carried out in the future. Several studies that are similar to this method include SLR research which explores AI-driven TM which focuses on risks and alternatives to

develop a theoretical basis (Faqihi & Miah, 2023). Apart from that, there is also SLR research by (da Silva et al., 2022) to find out trends and challenges in the field of HRM in the context of industry 4.0. Other research is quantitative research which also tries to take into account the implications of implementing TM integrated with AI (Rožman et al., 2022).

The difference between this research and other research is that this research is a literature study which has been prepared with the aim and focus of predicting the future by developing a series of strategies based on obstacles that will later be encountered in the literature research process.

### **3. RESULTS AND DISCUSSIONS**

Talent management (TM) is an effort to identify, develop, retain and deploy talent systematically within an organization (Scullion et al., 2010). The role of HR managers will be critical in the TM process, including the development, rollout and monitoring of TM systems, greater organizational commitment to TM will increase the importance of HR professionals, thereby making their work vital to the company (Montero Guerra et al., 2023). TM policies begin with identifying key positions in the organization, then identifying people who have the potential talent to fill these key positions (Coulson-Thomas, 2012).

#### **A. THE BENEFITS OF APPLYING AI & BD IN TM SYSTEM**

TM system has become a strategic asset that generates innovation, consumer value and financial profitability. Therefore, attracting and retaining talent is key for organizations (Montero Guerra et al., 2023). TM is proven to be able to: (1) drive business change, (2) create a flexible and loose organizational structure, (3) master the complexity of talent and (4) prioritize learning in the organization (Fernandez-Vidal et al., 2022). TM is proven to drive success in the workplace and increase employee voice, commitment, employee satisfaction and performance (Efendi, 2021; Hasanudin & Pratama, 2023; Sugiono, 2021; Sugiono et al., 2023).

The use of AI in the field of HR Management in companies means using technology to complete tasks in various HRM processes, especially in the areas of talent acquisition, education, employee development, and workforce management (Kambur & Akar, 2022). AI can be used in almost all phases of work in HRM, from short-term talent selection and candidate screening to subsequent procedures for onboarding new employees and evaluating performance (Mikalef & Gupta, 2021). Apart from that, AI has been proven to be able to increase employee engagement and innovation (Tongkachok et al., 2022).

The use of AI is proven to provide a superior perspective compared to human experts (Jacob Fernandes França et al., 2023). AI significantly influences HR functions through technological awareness, social media influence and personal innovation (Shahzad et al., 2023). Apart from that, the combination of AI with HRM can provide personalized HRM according to each HR condition and it has been proven that this system is able to attract, develop and retain the best employees in the company (Huang et al., 2023).

Using this type of platform improves performance by up to 9% and reduces costs by up to 7%, providing a better balance between supply and demand in the digital era (Lund et al., 2016). The potential of AI technology in HRM is in the form of 1) Accuracy, 2) Automation, 3) Data Processing Capacity, 4) Real-time Experience with AI Chatbots, 5) Personalization according to human needs, 6) Time savings and 7) cost reduction (Nawaz et al., 2024). In addition, the application of integrated AI in TM has been proven to improve employee performance and engagement, support the acquisition and retention of talented employees, support employee training and development, form the right team, support organizational culture, support leadership and reduce employee workload (Rožman et al., 2022).

### **1) RECRUITING TALENTED HR**

AI has been proven to be successfully applied and received positive responses from both applicants and recruiters. The e-recruitment process makes it easier for applicants to take part in HR candidate selection. In fact, the use of AI analysis speeds up the recruitment data analysis process so that applicants do not have to wait long for decision results (van Esch et al., 2019). The e-recruitment system also has a variety of flexible strategies for analyzing applicants such as: 1) social networks such as LinkedIn, 2) large-scale training such as Udacity, 3) the Reveal game from L'Oréal, 4) Chatbot named Ari from Textrecruit and 5) BD analysis matching system from Randstad.tech (Allal-Chérif et al., 2021). An automatic selection and assessment system based on AI produces accurate and objective analysis (Faqihi & Miah, 2023).

### **2) DEVELOPMENT OF TALENTED HR**

In the development process, AI can effectively support talent deployment by enhancing the experience of individuals executing innovation strategies. This is supported by an innovation-driven strategy and culture that creates a social context

for sharing knowledge through knowledge-based data systems embedded in AI applications (Malik et al., 2021). Some of these strategies include 1) Training with M-Learning and E-Learning software, 2) Gamification for staff training and evaluation purposes and 3) File sharing, project management systems and wikis to facilitate collaborative work systems (Gaonkar et al., 2022; Paul, 2014; Simpson et al., n.d.). Support from technology is proven to increase engagement, job satisfaction, devotion/loyalty, and performance (Faqihi & Miah, 2023).

### **3) MAINTAINING TALENTED HR**

In the retention process, there has been no research showing the integration of AI with HR management which focuses on providing compensation and benefits (Votto et al., 2021). However, AI and BD are by design capable of enhancing the process of retaining HR (Talent Retention) such as providing challenging work, competitive salary/wage structures, training for future skills, timely feedback, rewards, recognition etc. So that management can carry out early intervention before employees resign (Faqihi & Miah, 2023).

### **4) DISTRIBUTION OF TALENTED HR IN ORGANIZATION**

In addition, TM can be helped through data analysis provided by Talent Analytics from BD in three different ways: descriptive, predictive and prescriptive analysis. Individual career path decisions and future intentions are closely linked to data in BD. HR managers will be able to better understand employees' career interests and help better plan and manage their careers by conducting a quantitative analysis of all the information we can obtain about them. Companies can combine conventional career management with BD-based career management to fully examine workers' career paths, provide personalized career counseling and minimize talent turnover, resulting in a win-win scenario for organizations and employees (Faqihi & Miah, 2023). Furthermore, BD can produce an analysis of the ideal team composition by considering the character of each human resource and assigning the right role in the team to achieve an effective and efficient team (Russell & Bennett, 2015).

## **B. INTERNAL BARRIERS**

### **1) TECHNICAL BARRIERS**

BD offers various benefits in business, such as managing quite a lot of data that cannot be processed with ordinary computers (Chen et al., 2020), providing intelligence data and evidence to support corporate transformation or adaptation

(Mikalef et al., 2020) and giving companies the ability to build: 1) sustainable products, 2) sustainable prices and 3) sustainable places & promotions through data management and predictions made by BD (Chou et al., 2022). It can be said that BD is an asset that manages information with large volumes, high speed and variety with specific technology and analytical methods to transform that data into value for the company (De Mauro, Greco, & Grimaldi, 2016).

Unfortunately, behind these benefits, the system has several internal obstacles, including: 1) privacy, 2) Information technology system and infrastructure support, 3) high costs, 4) lack of IT expertise, 5) technical problems, 6) resistance to change by HR manager, 7) difficulty measuring potential profits, 8) difficulty measuring costs and 9) assignment of HR manager trained in BD analysis (Al-Jarrah et al., 2015; Chen et al., 2020; Raguseo, 2018; Söderlund, 2023).

In addition, it is known that AI and BD will greatly help in the process of searching, recruiting, placing, evaluating, training and retaining talented employees (Faqihi & Miah, 2023; Kambur & Akar, 2022; Mikalef & Gupta, 2021; Rožman et al., 2022). Unfortunately, this description still does not provide an overview of the role of HR managers in it. Additionally, the use of independent AI raises several concerns regarding issues of trust and work motivation (Eisbach et al., 2023). In the recruitment process, the use of AI has the potential to cause ethical, privacy law, moral and slander problems for prospective HR candidates because AI has the potential for in-depth analysis even down to physical aspects. Significant anxiety will arise among recruits if they realize this (van Esch et al., 2019). Apart from that, naturally AI does not have emotions, so all AI decision making still requires an HR Manager's communication approach to show correct and unbiased decisions (Radonjić et al., 2022).

## **2) BARRIERS IN TOP MANAGEMENT**

Apart from these technical obstacles, there are several specific obstacles when talking about digitalization in the MSME sector in developing countries. In Indonesia, various obstacles have been recorded from the HR side, such as 1) Level of education and core understanding of business by top management / business owners, 2) Age/Generation of top management/business owners, 3) Transfer of knowledge between generations in family businesses and 4) Support for

independent learning and exploration to build unique skills (Aminullah et al., 2022).

### **3) AI BIAS AND FAIRNESS ISSUES**

The use of AI has the potential to experience fairness bias (Delecraz et al., 2022). In reality, AI may not function without bias, but rather can be programmed to produce manipulated outputs, to the detriment of employee well-being and social well-being (Varma et al., 2023). There is a tendency for AI to produce a "hallucinate" effect, which is a phenomenon that makes AI answer a question with the wrong answer but appear confident. The phenomenon that occurs in ChatGPT is thought to have the potential to create social problems in society by spreading misinformation (Grzybowski et al., 2024).

## **C. EXTERNAL CHALLENGES**

### **1) POTENTIAL DATA LEAK**

In general, BD systems have external challenges when implemented, such as the threat of data leakage. Digital giant companies like Google try to protect their company data in various ways, even to the point of limiting internet access and device use to minimize cyber attacks on Google servers (Jennifer Elias, 2023).

### **2) ETHICS AND LAW**

The issue of implementing AI and BD is potentially problematic ethically and legally. Although in some countries this has not yet become a concern, especially developing countries such as Southeast Asia, it is likely that these countries are predicted to imitate the European Union's policy regarding AI by releasing a "White Paper on Artificial Intelligence." (Faqihi & Miah, 2023). The government's role through policy is very necessary in supporting digital transformation through AI and BD management. Big Data Pilot Zone (BDPZ) in China has proven that this policy has an impact that can improve company sustainability through infrastructure effects, talent effects and transaction effects (Wang et al., 2023).

### **3) SOCIO-TECHNICAL**

Barrier to digital economic development can be seen from a socio-technical perspective, especially in rural areas in developing countries like Indonesia. Socio-technical factors that hinder people's reluctance to transform digitally can be caused by 1) Community habits, 2) Access to digital technology, especially in the regions and 3) Digital literacy problems (Aminullah et al., 2022).

## **D. RECOMMENDED STRATEGIES**

The following recommendations are solutions to technical and psychological problems in implementing AI and BD in TM systems outside of funding problems which can only be solved through the presence of investors.

### **1) BUILDING SKILLS AND ADAPTATION FOR WORKERS**

Companies need to recruit HR with specific skills or develop an AI and BD-based TM system. Several skills that need to be developed in HR circles (either through recruitment or training) include: 1) Business Analyst, 2) Data Scientist, 3) BD Developer and 4) BD Engineer (De Mauro et al., 2018).

Collaboration between AI and humans (AIX) can solve psychological problems related to concerns about the use of independent (autonomous) AI which is considered less credible (Eisbach et al., 2023). In one case study, AI helped psychologists read moods and alternative actions the psychologist could take, but mental health therapy decisions remained in the psychologist's hands. This collaboration is supporting evidence that the benefits of collaboration are quite high compared to decisions made independently by AI or human (Rebelo et al., 2023). The motivation and accuracy of information that emerges from the AI-Human (AIX) combination can improve employee performance and trust through high-quality recommendations (Eisbach et al., 2023).

In the HR process of adapting to the presence of new technology, there are several strategies that can be used with several approaches such as Diffusion of Innovation (DOI), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Adaptive Structuring Theory (AST) and The Technology-Organisation-Environment (TOE) (Faqihi & Miah, 2023).

### **2) LEGAL ISSUES**

Legal issues need to be handled by governments such as the EU which issued a "White Paper on Artificial Intelligence" to regulate privacy protection, protection of people's freedom and the reliability of AI (Faqihi & Miah, 2023). Through this law, it is hoped that the government can guarantee data security for workers whose personal data is collected by BD and analyzed by AI.

### **3) MANAGERIAL STRATEGY**

Organizations need to look beyond technical resources and place emphasis on developing non-technical resources such as human skills and competencies,



leadership, team coordination, organizational culture and innovation mindset, governance strategies, and AI-HRM integration strategies, to benefit from AI adoption (Chowdhury et al., 2023).

#### **4) AI BIAS PROBLEM**

Expecting AI to be objective, neutral, or impartial is unreasonable because objectivity, neutrality, and impartiality do not exist at all in AI without human programming, so it all comes back to the humans who built it. Therefore, what must be done is to provide a series of strict and transparent methodologies to achieve certain results by adhering to a series of principles, guidelines and regulations that have been formulated to create justice, welfare and human safety (Delecraz et al., 2022). (Fjeld et al., 2020) presents eight guidelines for ethical, rights-respecting and socially beneficial AI, that are: 1) privacy, 2) accountability, 3) safety and security, 4) transparency and explainability, 5) fairness and non-discrimination, 6) human-controlled technology, 7) professional responsibility and 8) human values.

#### **4. CONLCLUSIONS**

The process of implementing AI and BD in TM practices faces several challenges such as: 1) availability of expert human resources, 2) employee data security and 3) employee psychological barriers. Apart from that, there are strategies that can be implemented, such as 1) building skill and HR / HRM adaptation, 2) legal readiness, 3) managerial strategy and 4) Strategy for reducing AI bias. Further research related to empirical research is recommended based on the limited number of references to empirical research in this field to support and enrich the literature review in this field.

#### **5. LIMITATIONS**

There are not many research journals on TM that are integrated with AI and BD with a good reputation, only 18 articles were recorded that met the ideal criteria for discussion. So in this paper there is additional literature that is close to describing the mechanisms of AI and BD when applied in TM Systems. It is hoped that it can provide a broad perspective to describe the application of AI and Big Data in TM System.

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