

IS2184 Coursework

Application of Decision Support Systems (DSS) and Big Data Analytics (BDA) in Human Resource Management (HRM)

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1. Abstract

With the perennially changing technological landscape, organisations are incorporating digital systems in their businesses to analyse data and make decisions more effectively. This research essay will demonstrate the application of DSS and BDA in the area of HRM. The case study will examine how AI-solutions like DSS and BDA have revolutionised talent acquisition and retention for Unilever, a British multinational consumer goods company. However, this digital transformation is not without its concerns and ethical considerations.

2. Introduction and Context

Companies are withdrawing from traditional HRM methods, which often rely on manual resume screening, intuition-based decision-making, and extensive face-to-face interviews.^[1] These approaches are not only time-consuming but also prone to human biases, inefficiencies, and high costs. Manual resume screening can take weeks to months, making it difficult for companies to fill critical roles quickly. Since decisions are typically made based on gut feeling rather than data,^[2] unconscious biases are introduced. These inefficiencies inflate recruitment costs and limit companies' competence in attracting and retaining top talent in a saturated job market.^[3] Moreover, without internal mobility, employees leave the company eventually to search for a new role to align with their career aspirations and skill development goals.^[4]

DSS refines decision-making by providing HR managers with data-driven insights, predictive hiring models, and real-time analytics, reducing subjective judgement. BDA leverages artificial intelligence (AI), machine learning, and predictive algorithms to automate candidate screening, assess job suitability, and streamline workforce planning. These technologies promote better hiring efficiency, reduced costs, and diversity by removing decision biases. Hence, modern HRM has advanced into a more strategic and data-driven function, allowing companies to enhance hiring decisions and employee retention for organisational growth.

3. Information System Management Issue

A traditional HRM entails a time-consuming hiring process, unconscious bias in hiring decisions, and a lack of career and talent mobility.

3.1 Time-consuming hiring process



Figure 1: Existing recruitment methods ^[6]

Figure 1 sources data from a 2017 CareerBuilder survey, which found that the typical hiring process can take 42 days and the cost of a bad hire can be around 200% of an employee's annual income.^[6] Repetitive tasks like resume screening and interview scheduling are often handled manually, making the process slow and resource-intensive.^[5] This reduces HR productivity and extends time-to-hire, making it demanding to secure top talent. Thus, without AI-driven solutions, the hiring process lacks scalability and efficiency. A modern solution is able to automate video interviews, using AI to quickly analyse candidates' responses, reducing time-to-hire and improving screening efficiency.

3.2 Unconscious bias in Hiring Decisions

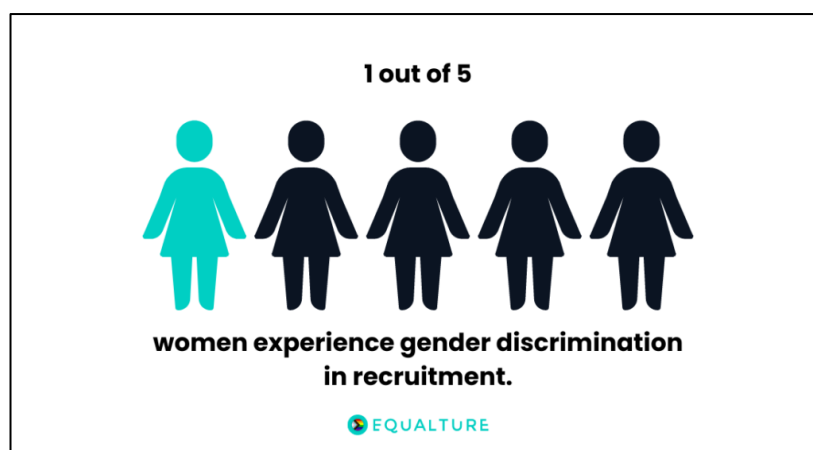


Figure 2: Gender discrimination ^[7]

Without data-driven decision-making, hiring managers often rely on intuition and personal impressions, leading to unconscious bias.^[2] Figure 2 sources data from a 2017 international diversity survey by Opinium Research, which found that 20% of women experienced gender discrimination in recruitment.^[8] Demographic biases like age and race also influence recruitment. Additionally, affinity bias, whereby recruiters tend to favour candidates from

similar backgrounds, affect workplace diversity and inclusion efforts.^[9] A modern solution is able to replace biased assessments with gamified AI-driven cognitive tests, ensuring data-driven, fair hiring decisions based on neuroscience.

3.3 Lack of Career and Talent Mobility

Career mobility is associated with employee retention.^[10] Employees with limited visibility of internal opportunities are 61% more likely to leave the company.^[10] When internal opportunities are not centralised or transparent, employees are unable to explore new tasks to fuel their career growth. Without a skills inventory, HR teams also lacked real-time data on employee competencies, challenging the optimisation of talent mobility.^[11] This resulted in talent shortages and overlooked internal potential in some areas. A modern solution can increase employee satisfaction by matching employees with internal opportunities through AI, while aiding HR teams in reallocating talents internally. By improving workforce agility and career mobility within the organisation, employee retention will increase.

4. Discussion and Arguments

AI-driven solutions like DSS and BDA enhance HRM by providing quality talent acquisition and retention methods. A supporting case study of Unilever demonstrates how the company uses AI-powered recruitment tools to enhance its hiring process and internal mobility.

4.1 Case Study Introduction

Unilever is a global consumer goods company headquartered in London, UK, operating in 190 countries with a diverse portfolio of brands, including Dove, Lifebuoy, and Magnum.^[12] As one of the world's largest employers, Unilever hires countless employees annually to support its operations across its five Business Groups: Beauty & Wellbeing, Personal Care, Home Care, Foods, and Ice Cream.^[12]

In 2016, Unilever started a business transformation programme, Connected 4 Growth, which aimed to make the company more consumer-driven, customer-centric, productive, and efficient.^[13] As part of this major transformation, Unilever integrated AI into its talent acquisition strategy to attract a competent millennial workforce and reduce hiring inefficiencies. The company faced the challenge of selecting 800 employees from a pool of 250,000 applicants, a process that takes 4-6 months due to manual resume screening, phone interviews, and other traditional assessment methods.^[14]

To address these challenges, Unilever partnered with AI-driven platforms such as HireVue and Pymetrics to create a data-driven, automated recruitment process. HireVue uses an AI-based DSS to hire employees, while Pymetrics uses BDA to create individual candidate profiles and assess the suitability for the company. Additionally, Unilever also launched an internal online talent marketplace called FLEX Experiences in 2019, which assists employees in their career progression through AI-powered matching algorithms.^[15]

4.2 Hiring Process (Talent Acquisition)

Applicants start by completing an online application form. Successful applicants are then required to play Pymetrics' game assessment. Top performers of the game are granted HireVue's video-recorded interview, which utilises AI-enabled technology. The new hiring process chose 300 out of 45,000 applicants, securing a 25% higher offer rate and a remarkable 82% acceptance rate.^[16] Hence, AI-driven solutions are essential in strategic talent acquisition.

4.2.1 Pymetrics

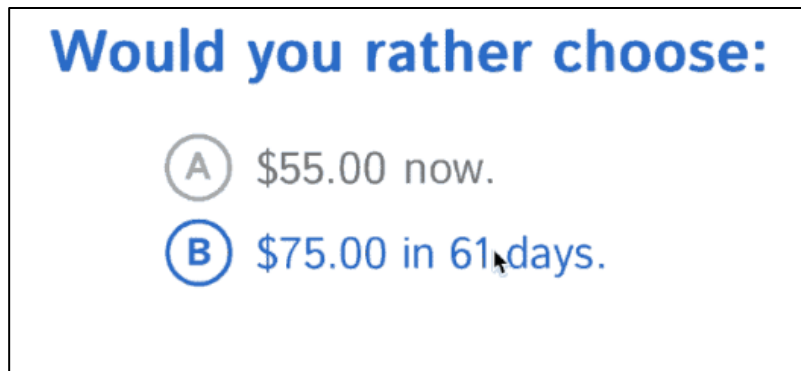


Figure 3: Pymetrics assessment ^[17]

Over 49 companies in sectors like insurance, banking and financial services, use Pymetrics as a hiring assessment tool.^[18] Pymetrics specialises in creating 12 different online neuroscience games like the one in Figure 3, only requiring less than 30 minutes to measure 90 cognitive, social, and behavioural traits.^[17] The collected data is further analysed using Pymetrics' AI algorithms to gauge suitability. Moreover, these algorithms do not use demographic information in its analysis, ensuring fairness in its assessments that objectively identify underlying skills fit for the job.

Unilever uses Pymetrics' matching algorithm to select candidates with similar skills or traits as the current top talents at the organisation.^[17] This AI-driven analysis helps to assess potential hires more accurately, enabling Unilever to fill entry-level and mid-level corporate positions^[17] faster and more efficiently. Recruiters spend 75% less time screening applications, while candidates save 50,000 hours since the assessment can be done remotely with just a smartphone.^[19] Thus, AI-driven cognitive games provide fast and data-backed assessments, eliminating manual screening delays.

4.2.2 HireVue

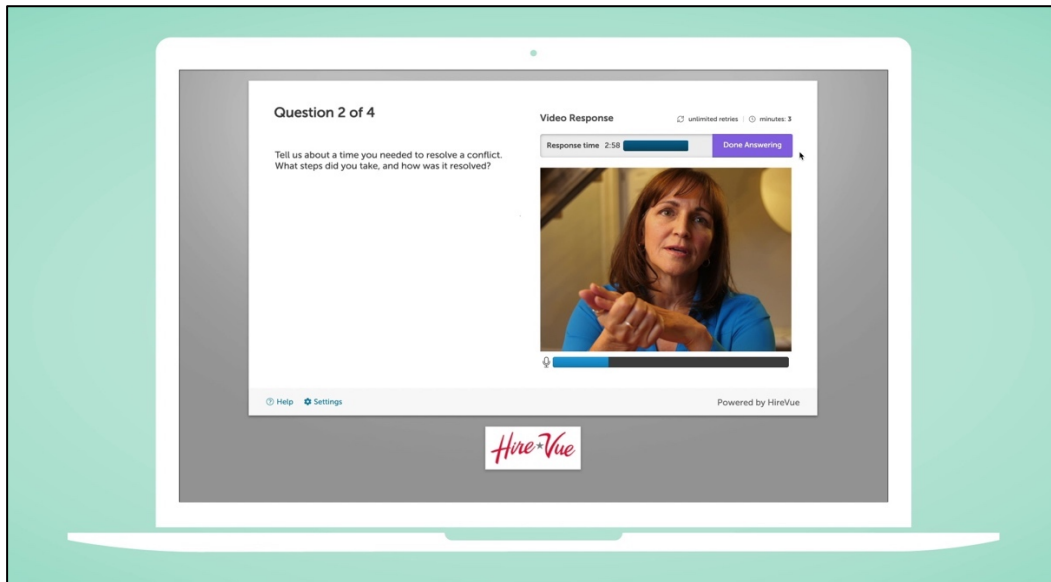


Figure 4: HireVue video interview ^[20]

HireVue automates resume screening and interviews by integrating AI into video interviewing, as seen in Figure 4. Natural language processing is used to analyse the content and wording of responses recorded by applicants to pre-set questions. Body language analysis is used to collect personality traits for more data. HireVue is partnered with the globe's most renowned brands like KraftHeinz, Dow Jones, and Sodexo.^[21] They have observed an average of 90% decrease in time-to-hire, 16% increase in new hire diversity, 131% return on investment, and an engagement of over 70 million interviews across its partners.^[21]

Unilever's hiring process has become dramatically shorter, narrowing the application-to-offer window down from an average of 4 months to 4 weeks.^[22] 83% of those who reach the physical interview stage are given employment offers, a 33% increase from before.^[22] By reducing the time-to-hire, resources can be focused on areas like employee onboarding and development. A 10% increase in the hiring of non-white staff was also observed,^[22] emphasising AI's success in removing interviewer bias. Furthermore, Unilever secured over 80% candidate feedback as positive,^[14] highlighting the satisfactory HireVue experience.

4.3 FLEX Experiences (Talent Retention)

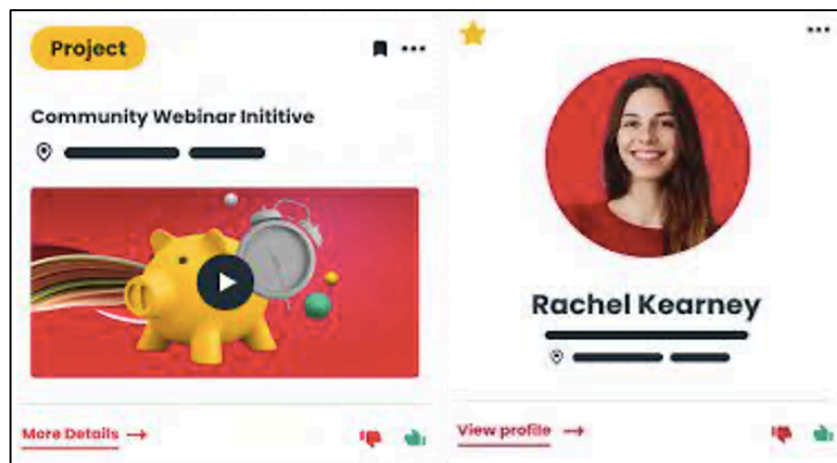


Figure 5: Marketplace ^[30]

94% of employees stay loyal to a company that invests in career mobility.^[15] In this AI-powered internal job marketplace, employees can participate in short-term or long-term projects to enhance or acquire new skills and competencies. Opportunities are suggested based on their profile and goals using AI, with access to every opportunity available worldwide, regardless of the division,^[15] as seen in Figure 5. This offers more visibility and transparency for personal talent development. Since employees are matched to projects based on competency, manager bias is removed. Hence, this AI matching algorithm improves internal mobility, while increasing employee satisfaction and retention.

While the platform benefits employees who pursue career mobility, it also doubles as a skills inventory. HR teams can collect real-time data of employee capabilities to optimise talent mobility and fill roles quickly.^[11] Thus, concerns of talent shortages and overlooked talent potential are also addressed with FLEX Experiences.

4.4 Privacy Concerns

As companies increasingly integrate AI into hiring processes, it has become critical to address privacy and ethical considerations. In 2018, Amazon removed an AI-hiring tool that was discovered to show prejudice against female applicants.^[23] Since most of the training data was collected from top male employees, the algorithm could distinguish resumes written by women and reject them, demonstrating the importance of transparency and fairness in algorithms. Could our AI systems possibly be exacerbating active biases under this false pretence of efficiency? Applicants are worse off as they are unaware if they are truly being evaluated with algorithmic fairness. Hence, organisations should conduct frequent audits on their AI tools to ensure compliance and mitigate biases.

Beyond mitigating bias, the ethical boundary also involves the full recruitment information life cycle. In 2024, LinkedIn updated its data collection policy, allowing personal data to be used for AI training without consent.^[24] LinkedIn had not properly notify users of this change and only responded with instructions on how to opt out after. It is unclear what data is being used, how it is disseminated, and who it is being shared to. Unfortunately, nothing can be done about the data already used to train AI before users opted out. Thus, enforcing tighter data handling policies is paramount but ensuring transparency is also crucial for ethical hiring

practices. Deloitte research discovered that transparency is a vital aspect of trust.^[25] By mishandling transparency, organisations are undermining trust. People are less inclined to use a particular service and have a negative image of the service provider, which can be detrimental to the interests of the business. Hence, organisations can safeguard themselves legally by prioritising ethical considerations and privacy, while cultivating a positive workplace environment, leading to higher employee satisfaction and retention.

5. Conclusion

By running DSS and BDA platforms like Pymetrics, HireVue, and FLEX Experiences, organisations can optimise candidate screening and internal mobility at a larger scale. Interview technologies streamline the hiring process, reduce unconscious biases in HR decisions, and enable recruiters to quickly discover top talent from data-driven insights. Thus, candidate screening is less resource-intensive yet more efficient. Likewise, talent marketplace technology provides career mobility for employees and talent mobility for the organisation, resulting in higher employee retention. As businesses increasingly recognise the value of a diverse and multi-skilled workforce, AI-driven solutions are becoming pivotal tools to attain strategic employee recruitment and retention goals.

Ultimately, the eternal evolution of AI-driven solutions harbours limitless potential of the future. Once these solutions become more intricate, even nuanced behavioural dynamics can be analysed to a more precise degree, leading to more compatible jobs. Talent matching algorithms will also be refined, elevating employee engagement. Thus, the transformative nature of AI changes flaws and complexities in existing solutions into predictive capabilities, increasing accuracy over time by uncovering valuable data-driven insights for self-improvement. For companies to sustain a competitive edge in a fast-paced job market, integrating innovative AI into candidate screening and internal mobility platforms will likely become the norm, renewing talent acquisition and retention strategies.

6. Critical reflection

A study into Customer Relationship Management (CRM) and Corporate Social Responsibility (CSR) can generate critical insights into the application of AI-driven solutions like DSS and BDA in the area of HRM.

6.1 Enterprise Resource Planning - CRM

CRM involves all customer interactions with a company across various channels, including the company's website, emails, and social media etc. Essentially, the company manages and analyses interactions throughout the customer lifecycle to increase customer retention and loyalty by meeting customers' needs. Unilever implemented Salesforce's CRM to develop automated solutions to control its customer platform more effectively. A new solution enables Unilever's sales representatives to manage accounts, capture orders and fulfilment, and offer a variation of customer services.^[26] Collaborating and communicating with retailers to carry out promotional campaigns has been effortless due to a new trade promotions management solution.^[26]

There are three forms of CRM which involves operation, analytics, and collaboration.^[31] Through operational CRM, Unilever tailors its interactions with customers by automating platforms like telemarketing and call centres, to enable more predictive insights based on

customer needs and preferences. Through analytical CRM, Unilever can identify trends and patterns to optimise pricing strategies and boost profitability by delivering a cohesive customer experience. Through collaborative CRM, Unilever enables comprehensive workflow across its divisions, including sales, marketing, and customer support. Thus, by standardising information sharing and improving efficiency using data-driven insights across all business units, Unilever transforms Information and Communication Technology (ICT) planning and usage for the better. Hence, digital solutions are undoubtedly crucial to enhance CRM, and they attest to the potential of revolutionising traditional HRM.

6.2 Social Issues - CSR

CSR involves a company taking the initiative to operate ethically, considering the environmental and social impact of its business practices. This is usually observed by participating in community service, promoting diversity and inclusion within the workplace, and ensuring responsible treatment of employees, all while making business decisions conformed to ethical principles. Unilever is committed to build “a fairer, more socially inclusive world”.^[27] They do this by nurturing a workplace that gives equal opportunities to employees to realise their potential, reinventing traditional systems that discriminated against women, and partnering with lesser-known suppliers for diversity.^[27] These key issues have to be addressed in their business model as it can increase scrutiny by customers, which directly impact brand loyalty. By being socially accountable to the company, its stakeholders, and the general public, CSR initiatives help to manage externalities and generate sustainable value as a whole.

Delving into the complexities which mainly revolve around biases, Unilever supports diversity and equal opportunities for employees in their Code of Business Principles.^[28] By enforcing business integrity, Unilever assures all old and new employees that they are valued and that the organisation holds its business principles in high regard. Moreover, 55% of their managers were women in 2023,^[29] supporting their stance against hiring stereotypes. Through the empowerment of its employees, Unilever fosters a sustainable relationship in the long run, increasing its potential for employee retention. Hence, CSR might be valuable to re-address the concerns of traditional HRM.

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