

The Integration of Artificial Intelligence with ERP Systems and Its Impact on Human Resource Management: A Case Study of IBM watsonx Orchestrate

تكامل الذكاء الاصطناعي مع أنظمة تخطيط موارد المؤسسة وأثره على إدارة الموارد البشرية:

دراسة حالة IBM watsonx Orchestrate

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Abstract:

This research focuses on examining the influence of Enterprise Resource Planning (ERP) systems enhanced by artificial intelligence on the improvement of human resource management. It emphasises the significance of offering a thorough understanding of these systems' applications, which aids organizations in boosting their operational efficiency. Additionally, the study utilises the IBM model to provide practical insights into achieving success. Key findings indicate that the recruitment process has been optimised through task automation, leading to faster talent acquisition, along with the provision of precise analytics that facilitate informed decision-making and enhance overall performance. Furthermore, the research contributes to enhancing the candidate experience, which positively impacts the organisation's reputation. Based on these insights, the study presents recommendations to help organisations effectively implement ERP systems and ensure the long-term sustainability of the benefits gained.

Keywords: Enterprise Resource Planning, human Resource Management, Artificial Intelligence IBM Watsonx Orchestrate

JEL Classification Codes: M52, O33, J24

ملخص:

يهدف البحث إلى توضيح تأثير أنظمة تخطيط موارد المؤسسة (ERP) المدعومة بالذكاء الاصطناعي في تطوير إدارة الموارد البشرية، كما يسلط الضوء على أهمية توفير فهم متكامل لتطبيقات هذه الأنظمة، لما لها من دور في تمكين المؤسسات من رفع كفاءتها التشغيلية. يعتمد البحث على نموذج مؤسسة (IBM) لتقديم رؤى تطبيقية تساهم في تحقيق الهدف. من أبرز النتائج التي توصلت إليها البحث: تحسين عملية التوظيف من خلال أتمتة المهام، مما ساهم في تسريع استقطاب الكفاءات، إلى جانب توفير تحليلات دقيقة تدعم اتخاذ القرارات الصائبة وتعزيز الأداء المؤسسي. إضافة إلى ذلك، يساهم البحث في توضيح تحسين تجربة المرشحين، مما ينعكس إيجاباً على صورة المؤسسة وسمعتها. في النهاية، وبناءً على هذه المعطيات، يقدم البحث مجموعة من التوصيات التي تساعد المؤسسات على تطبيق أنظمة تخطيط موارد المؤسسة (ERP) بكفاءة، وضمان استمرارية العوائد الإيجابية المحققة على المدى البعيد.

كلمات مفتاحية: تخطيط موارد المؤسسة، إدارة الموارد البشرية، الذكاء الاصطناعي، IBM Watsonx Orchestrate

تصنيفات JEL : M52, O33, J24

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INTRODUCTION:

In today's rapidly evolving global environment, the integration of institutional functions has become a strategic requirement for achieving operational efficiency and sustaining competitive advantage. Accordingly, organizations are increasingly adopting Enterprise Resource Planning (ERP) systems, which consolidate data, processes, and technologies within a unified platform. These systems serve as a fundamental enabler of coordination across administrative, production, and marketing activities, thereby streamlining operations, reducing costs, and enhancing decision-making effectiveness.

Within this context, human resource management (HRM) has been particularly transformed by the emergence of AI-driven ERP systems and cloud-based solutions, which automate routine tasks and support evidence-based talent management through advanced data analytics. By leveraging these technologies, HR departments have evolved from administrative units into strategic partners that enhance employee experience and align individual performance with organizational goals. Thus, this study underscores the critical role of ERP systems in advancing HRM and promoting sustainable organizational excellence through digital integration.

Research problem: How does an ERP system integrated with artificial intelligence contribute to the development of human resource function performance? How can we benefit from studying the case of IBM Watsonx Orchestrate system?

Research questions

- How does an AI-powered enterprise resource planning system contribute to improving human resource performance?
- What are the main benefits and challenges of implementing an AI-powered ERP system in organisations?
- What lessons can be learned from IBM's implementation of an ERP system for human resource management?
- How can other organisations benefit from AI technologies in human resources?

Hypotheses

1. The integration of artificial intelligence and machine learning technologies into the IBM Watsonx Orchestrate system contributes to enhancing the accuracy and effectiveness of the recruitment process through the automatic analysis of résumés and the prediction of candidate-job compatibility.
2. The use of intelligent automation tools, such as Digital Workers and Chatbots within the Watsonx Orchestrate system leads to a reduction in time and effort required to perform administrative tasks related to human resources, including payroll preparation, interview scheduling, and training management.
3. The integration of the Watsonx Orchestrate system with other digital platforms improves the efficiency of data flow and decision-making within human resource management, thereby enhancing organizational performance and increasing employee productivity.

Research objectives

- To understand the role of enterprise resource planning and human resource management by analysing how an AI-supported ERP system contributes to improving the overall efficiency of an organization;
- To clarify the impact of artificial intelligence on human resources performance through a case study of IBM Watsonx Orchestrate system;
- Proposing mechanisms for implementing the system and making recommendations for improving human resource strategies through ERP systems;
- Enriching knowledge about human resource digitisation while exploring the possibility;
- of applying similar strategies in other organisations.

Significance of the research

The importance of this research is highlighted in the following:

Theoretical importance:

- Providing an in-depth understanding of ERP systems and their applications in human resources.
- Developing tools that assist in the digitisation of institutional functions.

Practical importance:

- The study provides practical insights that help organisations enhance their operational efficiency through the effective implementation of ERP systems.
- Analysing a practical model (IBM) to illustrate how to achieve success.

Future relevance

This research contributes to preparing organisations for upcoming digital and technological transformations

1- Theoretical framework

1.1- The concept of enterprise resource planning systems

An enterprise resource planning system is defined as: technology platforms that provide a centralised database where data related to human resources, finance, and supply chains are collected, with the aim of improving coordination between different processes and enhancing institutional performance. (Kavanagh, Thite, & Johnson, 2020, p. 45). In addition, it also aims to integrate organisational resources and various processes within a single platform in order to improve organisational efficiency and enhance communication between departments. (McLeod, 2019, p. 121). Some researchers have gone beyond defining ERP as a means or tool limited to a digital platform, saying that it is: an organisational strategy that relies on information technology to unify operational and administrative processes within an organisation, facilitating access to information and increasing transparency between departments. (Collins, 2018, p. 62). When ERP systems are strategic tools, they can bring about fundamental changes in how organisations operate. By integrating processes, organisations have the ability to improve productivity, save time, and reduce operational errors made by individuals.

An enterprise resource planning system is a series of applications capable of managing every function of an organisation, from human resources to all other functions. With the increasing prevalence of enterprise resource planning software, and instead of working with other fragmented software, ERP systems have the ability to uncover new knowledge and significantly impact business processes, as well as provide new ways to enhance business

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intelligence. During the first decade of the 21st century, ERP systems became essential for managing and analysing big data, as modern organisations produced and collected more information than any individual could process. (Hayes & Downie, 2024)

1.1.1. The role of ERP systems in organisations

Enterprise resource planning systems offer many direct and indirect benefits, some of which are quantitative (tangible) while others are qualitative (intangible). Tangible benefits are those that can be measured in financial terms, while intangible benefits cannot be measured in financial terms but have a significant impact on business. The following is an explanation of some of the advantages: (Satzinger, Jackson, & Burd, 2020, p. 145)

Process automation : An integrated ERP system automates routine tasks and processes, reducing manual effort and human error, thereby increasing efficiency and productivity.

Data visibility: The system displays real-time core business data that enables management to make appropriate decisions. It also allows for cross -departmental visibility, helping users understand how their actions impact other parts of the organisation.

Integration: The system integrates data and processes from different departments into a single system, eliminating data duplication.

Improved human resource management: The system helps simplify and improve human resource management by tracking personal information and monitoring all information related to employment, training, salaries, and benefits for each employee, enabling organisations to improve team management.

Cost reduction: The system eliminates data re-entry and reduces manual work, saving costs and allowing employees to focus their efforts on more strategic tasks.

Coordination between the human resources department and other departments in the organisation: The system fosters cross-departmental coordination, streamlining workflows and improving communication while reducing data fragmentation. As a centralised platform, it consolidates all organisational data, resulting in greater efficiency and operational coherence.

Improved decision-making: The system provides comprehensive reports and analyses on the organisation's performance, enabling executive leaders to make sound strategic decisions. The organisation's key data and indicators can be analysed to identify trends and directions and make data-driven decisions.

Improved communication: The system helps improve integration and communication between different departments within the organisation, allowing employees to easily share information and data, reducing gaps and duplication and contributing to improved collaboration and teamwork among members of the organisation.

1.1.2. The impact of enterprise resource planning on enterprise functions

ERP has changed the way organisations operate by improving communication between departments, standardising processes and enhancing operational efficiency. These systems also have a significant impact on key functions such as human resources, production, marketing and finance. Below, we explain this impact on each function (Sumner, 2019, p. 80):

Human resources (business continuity, attendance management, regulatory compliance, payroll management, improved employee data management and continuous monitoring, enhanced recruitment process, etc.).

Finance and accounting function (closing accounts, managing ledgers, tracking supplier and customer accounts, preparing financial reports, complying with product registration standards, improving financial transparency and improving cost management).

Production function (quality management, implementation follow-up, planning and simplification of operations and production, improving production efficiency and reducing errors).

Research, development and engineering function (design and development, compliance with standards, product lifecycle management).

Procurement function (automatic issuance of purchase orders, creation of purchase contracts, price management, supply management).

Supply chain function (improving inventory management, transport management, tracking supply chain operations throughout the entire supply chain).

Sales function (centralisation of commercial exchanges, creation of sales contracts, invoicing, sales order management, sales performance monitoring).

Marketing function (marketing communication, tracking marketing campaigns, improving understanding of customer behaviour and managing customer relationships)

1.1.3. Use of artificial intelligence in enterprise resource planning

The use of artificial intelligence (AI) in enterprise resource planning (ERP) refers to the integration of AI technologies such as machine learning (ML), natural language processing, and predictive analytics into ERP systems. These AI-powered systems can automate routine tasks, perform advanced predictive data analysis, and enhance decision-making. The goal of using AI in ERP is to improve operational efficiency and streamline business processes.

With AI, traditional ERP systems can be transformed into intelligent platforms that learn from data, adapt to changing circumstances, and improve business intelligence in real time, increasing overall efficiency and reducing costs. Therefore, organisations that implement their own artificial intelligence solutions will achieve greater profitability.

There are three reasons for the integration of ERP systems with AI (Hayes & Downie, 2024):

The large size and diversity of data: ERP systems provide the basis for general artificial intelligence models to learn and generate highly relevant outputs.

Structuring and organising data in ERP: This enables general AI models to process information more efficiently and extract valuable insights.

Trust in ERP data: Since organisations rely on ERP systems for core operations, they strive to maintain accurate, well-maintained, and secure data, which enhances trust in AI models trained on this data.

1.2.The concept of human capital management (HCM)

Human capital management is defined as: the application of human resource strategies that focus on investing in human capital as one of the most important assets for achieving sustainable competitive advantage (Becke, Huselid, & Ulrich, 2001, p. 15). On the other hand,

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human capital is viewed as: a set of processes and procedures aimed at improving human and creative capabilities within an organisation to ensure operational and organisational efficiency (Armstrong, 2006, p. 65). It can also be viewed as: all activities that manage individuals as a valuable resource, with the aim of achieving comprehensive development for them and the organisation (Dessler, 2016, p. 6).

Human capital management focuses on adding value to the organisation's employees so that they can achieve the best results. It also covers human resources, compensation and other key areas that are vital to the organisation's vision and mission. HCM has several components to improve the performance and efficiency of an organisation's employees and provides a comprehensive strategy for talent guidance and attraction, recruitment, preparation and training, benefits management, and reporting. These elements are outlined below (Noe, 2019, p45):

- Talent management;
- Attraction and recruitment;
- Development and training;
- Benefits management;
- Time, attendance, and payroll;
- Employee Services and Self-Service;
- Reporting and analytics.

The greatest benefit of human capital management is that it enables organisations to get the most value from their employees. It also simplifies human resource tasks and offers many other advantages, including matching the right employee to the right job, increasing workforce productivity, reducing costs, increasing return on investment and promoting employee development. These benefits include the following (Torrington, Hall, & Taylor, 2017, p. 91):

- Hiring the right people for the right positions
- Increasing workforce productivity and efficiency
- Simplifying human resources functions
- Reducing costs and increasing return on investment
- Enhancing employee development and career planning
- Reducing staff turnover
- Support innovation and creativity
- Improve adaptation to organisational changes

2. The Role of Artificial Intelligence-Integrated Enterprise Resource Planning (ERP) Systems in Human Resource Management

We have already explained that human resources is no longer a function isolated from other functions, as it was before the advent of resource planning software. Without it, the system cannot provide a comprehensive view of the organisation's current and future position.

2.1. ERP system and human resources management

ERP provides two types of human resources systems, and organisations wishing to obtain these programmes can choose all or some of them, depending on their objectives, capabilities and degree of need. These programmes are (Monk & Wagner, 2020, p. 120):

Human Capital Management (HCM) System: This is a programme that includes a set of advanced sub-programmes such as performance management programmes, learning management systems (LMS), and strategic analysis and planning systems. It is aimed at managing and developing employees in the organisation, focusing on the value that employees bring and developing their skills and abilities to maximise organisational returns. HCM is dedicated to managing individuals within an organisation, such as recruitment, training, development, evaluation, motivation, and performance management. It also focuses on investing in human capital by providing opportunities for employees to grow and contribute to the organisation's goals strategically. The HCM system aims to transform employees into a strategic resource and maximise their skills and potential through continuous development and a motivating work environment.

Human Resource System (HRS): HRS is a set of systems and software such as payroll systems, attendance systems, and electronic document management systems. This system manages administrative functions related to human resources such as employee data management, payroll, holidays, and benefits. These systems focus more on day-to-day and administrative processes rather than strategic employee development. HRS aims to improve operational efficiency in managing human resource administrative functions and reduce manual work and human error in these processes.

The main differences between human capital management and human resource management software can be illustrated in the following table:

Table (01): difference between HCM and HRC programmes

Criterion	HCM	HRS
Objective	Developing human capital within the organization and turning employees into a strategic resource.	Managing daily administrative operations related to human resources.
Scope	Comprehensive, encompassing all aspects of employee management from recruitment to development and motivation.	Focused on managing employee data and routine administrative processes.
Focus	Developing training programs, performance management, and job satisfaction.	Daily operations such as payroll, attendance, and recruitment.
Tools Used	Analytical tools, performance management, training, and strategic planning.	Payroll systems, attendance tracking, and employee record management tools.
Strategic Orientation	Long-term, aimed at continuous employee development and utilization.	Short-term, focused on the practical execution of daily administrative tasks.

(Kavanagh, Thite, & Johnson, 2020, p. 80)

The software provides powerful organisational capabilities that streamline HR tasks, provide real-time access to data, avoid compliance penalties, improve security, and enhance reporting. These programmes offer several advantages (Hayes & Downie, 2024):

Integrated systems for human resources functions They streamline HR tasks, enhance overall efficiency, ensure easy access to employee information, and minimise human errors in record keeping, ultimately improving the accuracy and reliability of HR operation

Data -driven decision making: Human resource function software can be integrated with other function software from production, marketing, and accounting to access real-time data for use in decision making.

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Improved regulatory compliance: It is important to comply with legal regulations to avoid significant penalties and fines. The system automates workflows, checklists, reports, files, and documents required to help employees remain compliant.

Data security and privacy : Human resources solutions can reduce work-related security risks, as these systems can include strict security protocols with access rights carefully tailored to the needs of the organisation.

Good reporting: Using an integrated ERP system solution, employee information can be tracked and reports can be generated. This information helps in making various decisions as needed and requested

2.2. The role of AI-powered ERP systems in the recruitment process

Artificial intelligence -powered enterprise resource planning (ERP) systems represent a paradigm shift in the way human resources are managed, especially in recruitment processes. These systems not only integrate various activities and data within the organisation, but also rely on artificial intelligence technologies to deliver benefits that enhance efficiency and support decision-making.

Improved recruitment data management: AI-powered ERP systems collect human resources and recruitment data such as CVs, candidate test results, interview evaluations, and more. This data is stored in a unified, easily accessible database, reducing the time spent searching for information and improving the quality of decisions thanks to reliable, up-to-date data. This integration ensures a comprehensive and rapid overview of the recruitment status, allowing the human resources function to improve process efficiency and reduce human errors resulting from inconsistent data (Monk & Wagner, 2020, p. 140).

Automation of routine tasks: AI-enabled ERP systems rely on automation to handle routine tasks such as sorting CVs using specific criteria, automatically scheduling interviews with candidates, and sending update notifications for their applications. Automation offers many advantages for human resources functions, such as freeing up the HR team from repetitive tasks and reducing errors. Through automation, the time spent on tasks is reduced and the candidate experience is improved, as candidates feel that their applications are being handled professionally and quickly (Russell & Norvig, 2021, p. 210).

Better candidate selection (perfect match): The systems use machine learning algorithms to automatically analyse CVs, comparing candidates' skills and experience with the advertised job requirements and ranking candidates according to their suitability for the job. This reduces personal bias by recruiters towards one candidate over another and ensures a focus on actual competencies rather than other subjective considerations. On this basis, smart systems increase the chances of finding ideal candidates, which contributes to improving the quality of recruitment and reducing turnover rates due to inappropriate candidate selection. (Davenport Kirby, 2018, p. 85)

Predicting future staffing needs: AI-enabled ERP systems rely on analysing current performance and productivity data to predict future staffing needs, with advance plans created to cover these needs. This helps organisations avoid sudden skill shortages and reduce

recruitment gaps by preparing in advance, ensuring continued productivity and maintaining the stability of internal operations (Chui & et al, 2021, p. 65).

Personalising the candidate experience: Systems provide personalised online portals for each candidate, showing them the status of their application, offering advice on how to improve their CV, and suggesting training and development opportunities to build the required skills. These processes improve the organisation's image in the eyes of candidates and increase the chances of attracting highly competent talent (Sun et al., 2020, p. 20).

Providing accurate analyses and reports: The systems provide real-time performance reports such as: the rate of accepted applicants, the time taken for each recruitment process, and recruitment quality based on the performance of new employees. Recruitment strategies are improved using actual data and decisions are made based on facts rather than intuition. The data analysis process ensures continuous improvement in tasks, which enhances human resource efficiency and reduces costs. (Kavanagh, Thite, & Johnson, 2020, p. 125)

2.3. The role of AI-powered enterprise resource planning (ERP) systems in the training process

Artificial intelligence-supported enterprise resource planning (ERP) systems play a key role in enhancing the formation and training process within the human resources function, as these systems integrate smart technology to develop training strategies, improve resource allocation, and accurately analyse employee needs. This role is explained below:

Training needs analysis: AI-enabled ERP systems rely on data analysis tools to identify skill gaps among employees. They collect data from performance evaluations and productivity reports to identify areas that require improvement. This process enables the human resources function to design customised training programmes for each employee or work team. This preliminary analysis helps improve training efficiency and avoid the excessive costs of general training programmes that do not meet employee needs (Monk & Wagner, 2020, p. 165).

Customising training plans: The system creates customised training plans based on each employee's level and actual needs. Suggestions are then automatically sent to employees about courses or training programmes that are suitable for them, focusing on individual weaknesses, which leads to faster improvement in job performance. The goal of this process is to develop employee skills with high efficiency, which enhances productivity and achieves the strategic objectives of the organisation (Russel & Norvig, 2021, p. 245).

Automating training management: The system coordinates and manages training schedules, tracks employee development, and prepares reports on trainee performance, sending automatic messages about course attendance or the completion of training programmes. This reduces the administrative burden on the human resources team and improves adherence to training schedules. Automation thus frees up time for human resources to focus on more strategic aspects, such as designing long-term training plans (Davenport & Kirby, 2018, p. 105).

Measuring training effectiveness: Systems provide analytical reports on the impact of training on employee performance by comparing pre- and post-training data using key performance indicators (KPIs) such as productivity, commitment and quality. This process enables management to evaluate the effectiveness of training programmes and make appropriate decisions to improve them. Measuring results also enables the human resources

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function to improve the design of future training programmes and make them more effective in practical and financial terms. (Chui & et al, 2021, p. 95)

Predicting future training needs: Systems rely on big data analysis to identify the skills that will be required in the future based on market trends and technological developments. This is achieved by preparing proactive training plans to qualify employees for these skills. Predicting training needs helps the human resources function prepare for future challenges and improve employee readiness for anticipated changes (Kavanagh, Mohan, & Johnso, 2020, p. 180).

2.4. The most popular AI-integrated ERP systems used in human resource management

ERP systems that integrate artificial intelligence have become indispensable tools for the development of human resources functions. The following are the most prominent ERP systems integrated with artificial intelligence used in human resources.

SAP SuccessFactors: SAP ERP appeared in 1972; it's one of the most popular ERP systems for human resource management supported by artificial intelligence technologies. This system provides a comprehensive solution for managing the employee life cycle from recruitment to retirement (Qu'est-ce que l'ERP SAP? (n.d.) <https://www.sap.com/>)

functions: Predictive analytics: Helps predict future recruitment needs and identify skills gaps. Recruitment automation: Uses artificial intelligence to screen CVs, select candidates, and schedule interviews. Training personalisation: Provides customised training plans based on employee performance and needs analysis. Impact: Improves hiring accuracy, reduces administrative costs, and enhances the employee experience in training and development.

Oracle HCM Cloud: An integrated ERP system that uses artificial intelligence to improve human resource functions, characterised by its flexibility in meeting the needs of large and medium-sized organisations (Russel & Norvig, 2021, p. 240).

functions: Performance management: Provides analytical reports on employee performance using artificial intelligence.

art recruitment: Helps select the best candidates by comparing their qualifications and job requirements. Predictive analytics: Enables the prediction of future human resource needs based on current trends.

Impact on human resource management: Facilitates strategic decision-making, increases employee productivity through customised development plans, and enhances employee and management satisfaction.

Microsoft Dynamics 365 Human Resources: This system is part of the Microsoft Dynamics 365 suite and offers integrated AI- powered human resource management solutions. (Kavanagh, Mohan, & Johnso, 2020, p. 175)

functions: Machine learning; Used to predict training needs and improve talent management. Workflow automation, Reduces the time spent on administrative processes such as leave requests and benefits.

Smart reporting: Provides interactive dashboards for analysing human resources data. Impact on human resources : Improves operational efficiency, supports digital transformation in human resource management, and enhances the employee experience with easy-to-use technologies.

BambooHR: A cloud-based system designed for small and medium-sized organisations, it uses artificial intelligence to provide simplified and effective human resource management solutions. (Sun & et al, 2020, p. 110)

Its functions: Data management: Provides a unified database for storing employee information. Recruitment: Provides smart tools for conducting interviews and tracking the status of applicants. Employee performance measurement: Relies on data analysis to improve evaluations and development plans. Impact on human resources: Improves coordination between work teams, simplifies administrative processes, and enhances communication between management and employees.

2.5. Challenges associated with AI-integrated ERP systems in human resource management

Despite the many benefits that AI -powered ERP systems offer in improving human resource management, these systems face several challenges that affect their effectiveness. These challenges are technical, administrative and human.

High implementation and maintenance costs: AI-powered ERP systems are costly solutions due to software, hardware and training requirements. Organisations therefore need to allocate a large budget to cover installation, customisation and maintenance costs, which poses a barrier for small and medium-sized organisations that may find it difficult to bear these costs. (Monk & Wagner, 2020, p. 190)

Resistance to change from employees: Organisations face resistance from employees due to fear of losing their jobs or difficulty adapting to new technology, which leads to poor commitment to using the system and failure to achieve the desired results. This reduces the effectiveness of the system in improving human resource performance and may also delay the full implementation of the system (Russel & Norvig, 2021, p. 270).

Complexity of customisation and integration: ERP systems rely on the integration of all enterprise functions, which makes customisation complex, as enterprises face difficulties in connecting the system to legacy systems or integrating it with other technological solutions. This results in delays in implementation and increased costs, which can negatively impact the organisation's daily operations. (Davenport & Kirby, 2018, p. 115)

Poor quality of input data: AI-powered ERP systems rely on data to analyse patterns and make decisions. If the input data is inaccurate or incomplete, the results will be incorrect, negatively affecting the quality of recruitment, performance evaluation, and human resource planning, requiring additional time to correct errors resulting from poor data. (Sun & et al, 2020, p. 145)

Data security and privacy challenges: AI-powered ERP systems require the collection of vast amounts of personal data from employees, posing a significant challenge in terms of protecting this data from breaches or misuse. This results in a loss of trust between employees and the organisation and may have legal and financial repercussions for the organisation. (Kavanagh, Mohan, & Johnso, 2020, p. 210)

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Lack of technical skills among the human resources team: AI-powered ERP systems require advanced technical skills to understand and manage them, and the human resources team may not have sufficient skills to handle these systems. This results in the organisation relying on external experts, which increases costs and weakens the organisation's ability to take full advantage of the system's features (Chui & et al, 2021, p. 201).

3. Study of the IBM Watsonx Orchestrate system in human resource management

3.1. An overview of IBM.

The following table provides a brief overview of IBM

Table (02): Brief overview of IBM

Element	Details	Sources
Full name	International Business Machines Corporation (IBM)	Watson, T.J. IBM: A Business History. Harvard Press, 2021, p. 45
Slogan	"Let's put smart to work"	IBM official website, www.ibm.com .
Date of establishment	1911 (under the name Computing-Tabulating-Recording Company); became IBM in 1924. Armonk, New York, United States.	Watson, T.J. IBM: A Business History. Harvard Press, 2021, p. 12.
Headquarters		IBM's official website: www.ibm.com .
Founder	Charles Ranlett Flint.	Collins, J. Business Innovators in Technology, McGraw-Hill, 2022, p. 85.
Core business	- Information technology (software and hardware). - Artificial intelligence (IBM Watson). - Technical consulting.	IBM official, Website www.ibm.com .
Notable achievements	- Development of the IBM Watson platform. - Design of the first personal computer (1981). - Top of the patent rankings for several years.	Collins, J. Business Innovators in Technology, McGraw-Hill, 2022, p. 120
Revenue (2023)	Approximately \$60 billion.	IBM Financial Report 2023, Source: IBM Annual Report 2023
Number of employees	Approximately 260,000 employees in more than 170 countries.	- IBM Annual Report 2023
Services and technologies	- Watson AI. - Hybrid Cloud. - Blockchain. - Quantum Computing.	IBM official website, www.ibm.com .
Awards and Honours	IBM is considered one of the most innovative companies in the world and has won awards in artificial intelligence and sustainability.	-Forbes Innovation Awards, 2023.
Official website	www.ibm.com	IBM official website, www.ibm.com

3.2. Analysis of the IBM Watson× Orchestrate system in human resource management

3.2.1. Definition of the IBM Watsonx Orchestrate programme

IBM Watsonx Orchestrate is a system that offers innovative solutions for any organisation that wants to simplify repetitive tasks and processes, boost productivity, and free up time to

focus on more strategic and higher- value activities. IBM Watsonx Orchestrate automates time-consuming tasks so that employees can focus on the tasks that matter most.

Through IBM watsonx Orchestrate and IBM watsonx , IBM partners with numerous organisations to improve existing AI assistants or create new ones using its developed suite of software for partners. Among these organisations is EY.ai Workforce, with which IBM is partnering to increase employee productivity, simplify task completion, increase or decrease human capacity, and manage costs by transforming and expanding human resource processes without compromising the employee experience. IBM also aims to partner with IBM Watsonx Orchestrate , and other partners to build an advanced workforce for the future in order to strengthen the position of individuals among thought leaders in the new world of digital employees and ensure that the organisation has successful leadership in the future.

IBM is collaborating with Thisway, a leading human resources technology company that provides governments and organisations with a database of highly skilled job candidates. It also partners with FloCareer, which has a platform for conducting rapid recruitment interviews (<https://www.ibm.com/sa-ar/products/watsonx-orchestrate/partners>).

3.2.2.Programme advantages

The programme offers many benefits to its users, including (<https://www.ibm.com/sa-ar/ai-human-resources>):

Improved employee support: Human resources managers and employees find it difficult to navigate complex human resources tasks, such as reviewing lengthy human resources policy documents and using unfamiliar applications. To avoid this, the programme leverages interactive artificial intelligence and data-driven automation to simplify work and enhance employee performance.

Reducing administrative tasks: IBM watsonx solutions, powered by artificial intelligence and automation, save time for human resources employees by reducing tasks, especially those that are time-consuming for human resources departments. This time savings allows managers to focus on developing their employees and managing their performance. and enables them to focus on the effective implementation of strategies to retain top talent.

Improving the recruitment process: By automating tasks related to candidate search and recruitment, talent can be attracted more quickly, enabling recruiters to focus their energy on building relationships. Their use of predictive analytics improves job postings and ensures that they comply with organisational standards and talent retention goals.

3.2.3. integration with other systems

Organisations use many different applications and business systems, and in many cases these systems do not communicate with each other, so users have to enter the same information multiple times. IBM Watsonx integrates easily with other software already in place at the organisation and does not require the software to have an open interface through which to work, as it uses robots to automate processes and simplify work. This integration helps increase the number of potential job applicants and boosts operational efficiency by working through a single centralised platform, reducing data duplication and ensuring accuracy, which helps make the hiring process more effective (IBM, Watsonx Orchestrate Overview, 2024). This integration includes 27 different human resources platforms, some of which are shown in this table

Table (03): Some Watson Orchestrate partners

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Logo						
The Foundation	ThisWay Global	Amazon	Asana	FloCareer	Gmail	Box

<https://www.ibm.com/sa-ar/products/watsonx-orchestrate/integrations>

3.2.4. Software tools

The IBM Watsonx programme uses several sub-programmes, each of which is dedicated to performing a specific task, whether in human resources or other functions within the organisation. These technologies can be summarised as follows (IBM, digital-workers-vs-chatbots, 2024):

Digital Worker (Ask HR):

IBM Watsonx uses artificial intelligence (AI) and its subsets of machine learning (ML) and natural language processing (NLP) to reduce the tasks assigned to employees, speed up processes, eliminate errors, reduce costs and increase competitiveness. These tasks are performed by robots called digital workers.

A digital worker is defined as a type of software robot, a non-human team member trained to use intelligent technologies to automate multiple tasks to meet business needs. These robots perform complete tasks, such as processing job applicants' CVs (talent) and processing invoices. These robots are referred to as virtual or digital employees. They use artificial intelligence and machine learning to perform repetitive daily tasks. They are intelligent and ask questions if they need additional information. They can also be trained to handle exceptions or learn through practice. The worker has the ability to remember previous interactions, so that it does not forget what it has done previously when it is turned off.

Advantages: The digital worker has several advantages:

- Not only does it save human employees time, but it can also help them do more creative work by providing the right information and recommendations at the right time.
- It can perform actions within and across multiple processes and systems.
- It can handle more dynamic conversation flows.
- The most advanced digital workers can remember previous task interactions to make workflows more efficient

Chatbots

chatbot is an automated programme that uses artificial intelligence supported by natural language to simulate human dialogue by understanding user questions and then providing the correct answers to help, making it seem as if two people are talking. Simple chatbots respond to written words or questions programmed into the system. They understand basic language and communication and can understand the different ways an employee might ask the same question. They can also help with complex tasks, understand different ways of requesting

things, and offer multiple suggestions. Job candidates feel as if they are talking to a human employee in real time.

Benefits of chatbots, the most notable benefits are as follows:

- They enable fast and personalised communication with job candidates, can answer questions about the job, and provide immediate responses to candidates' queries around the clock.
- Chatbots can conduct initial interviews with candidates and ask them programmed questions to help determine how well the candidate matches the job requirements based on their answers, reducing the time needed to manually sort through hundreds of job applications.
- They save recruitment teams time on tasks such as scheduling interviews and sending emails.
- Chatbots operate with objective criteria when screening job offers, reducing the likelihood of personal bias and lack of transparency. They evaluate candidates based solely on skills and experience, without being influenced by personal factors.
- Chatbots collect data from candidates, such as qualifications, experience, and professional preferences, in an organised manner, to be used in trend analysis and decision-making support.
- They can communicate with all candidates, regardless of their diverse cultural backgrounds, geographical locations, and natural languages.

Robotic Process Automation (RPA)

Unlike digital workers, who perform tasks from start to finish, communication -focused chatbots, also known as robots, internet robots, or business robots, are network- based software applications programmed to perform specific, repetitive tasks that are typically performed by employees. These robots operate without specific instructions from a particular person and are valuable because they perform the work faster than a normal employee and without errors.

Advantages of robots:

- They speed up simple tasks that can be accurately documented and have a specific sequence of steps.
- It eliminates human error and provides complete accuracy.

Regarding the value of these three technologies, John Lester, Director of Human Resources at IBM, says, "Conversational AI and RPA are useful and valuable, but there are things they cannot do that a digital worker can. Our chatbot Ask HR does its job well. It has saved IBM employees and managers a lot of time, but it can only perform tasks one at a time and cannot link transactions across multiple processes or systems. The chatbot also lacks long-term memory; when it is turned off, its memory is erased.

3.2.5. The programme's role in attracting employees (talent)

In the field of talent acquisition, Watsonx Orchestrate represents a qualitative leap forward in talent acquisition thanks to its use of artificial intelligence and process automation. It enables organisations to improve the efficiency of their recruitment processes, reduce bias and enhance the candidate experience. Despite the challenges associated with initial costs and integration

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with existing systems, its long-term benefits make it a strategic tool for organisations seeking to excel in attracting the best talent (IBM, Watsonx Orchestrate Overview, 2024).

Automating routine tasks to attract talent efficiently

Watsonx Orchestrate automates tasks that require significant time and effort from human resources teams, such as posting job advertisements across different platforms, tracking and reviewing applications, setting up interviews with candidates, and automatically scheduling meetings. This automation reduces the time required to complete traditional manual tasks, giving HR teams the opportunity to focus on strategic aspects, such as improving work culture and analysing talent needs. It also reduces human errors that may occur during application review or appointment scheduling, shortening the recruitment cycle by up to 40%. It also reduces the operational costs associated with manual tasks and improves the efficiency of the human resources team. (IBM, 2024)

Sorting and analysing CVs using artificial intelligence

Using machine learning, the system analyses submitted CVs based on a set of criteria, such as: skills and experience required for the job, level of education and qualifications, and cultural fit with the organisation. Watsonx Orchestrate also uses predictive models to assess candidates' potential for success in the job, resulting in the selection of candidates who are most compatible with the organisation's needs. It reduces human bias in the assessment, and the speed of analysis helps to quickly access talent before they are hired elsewhere. This process results in a 30% increase in the quality of appointments, enhances transparency and objectivity in recruitment, and provides a positive experience for candidates through faster and more accurate responses (Davenport & Kirby, 2018, p. 105).

Personalising the candidate experience with chatbots

Watsonx Orchestrate uses interactive interfaces powered by chatbots to guide candidates through the application process, including: answering questions about the job and the organisation, providing real-time information on the status of the job application, and helping candidates upload documents and update their data. This process fosters good communication with candidates, enhancing the user experience. Studies show that candidates who receive faster responses and accurate information are more motivated to complete the application process. Enhancing the candidate experience has many benefits, including increased application completion rates, improved reputation as a technologically advanced organisation, and increased candidate satisfaction with the process (IBM, 2023).

Providing intelligent insights and recommendations for talent acquisition Watsonx Orchestrate provides intelligent recommendations for talent acquisition by analysing historical data, such as the performance of former employees and the needs of operational teams, to identify the skills to focus on during the recruitment process. This system helps organisations make sound hiring decisions based on accurate data rather than personal estimates, and provides predictions of future challenges, such as skills shortages or high employee turnover. The result is improved alignment between job requirements and suitable candidates, while supporting strategic planning for the recruitment of talent with rare skills (Chui & et al, 2021, p. 110).

3.2.6. The Function of the System in Employee Training

IBM has developed an AI-powered career coach to improve employee retention, reduce turnover and enhance career development opportunities. The programme performs the following functions (IBM, What's new in IBM® watsonx Orchestrate, 2024):

Customising individual training plans

Watsonx Orchestrate uses artificial intelligence to analyse employee performance and current skills, and identify each individual's specific training needs. Personalised training plans are created based on data such as job history, strengths and weaknesses, and current and future job requirements. This task helps increase the effectiveness of training programmes by focusing on the skills each employee needs, reducing the use of resources on general, non-customised training, saving time and money. It also enhances the employee's sense of being cared for, which increases their commitment and engagement with training. This task aims to improve employee productivity by up to 25% and increase job satisfaction through personalisation.

Automated training management and training programme scheduling

The system automates training management by scheduling courses, sending follow-up reminders, and preparing detailed reports on their progress in training programmes. This automation helps reduce the administrative burden on human resources teams, enabling them to focus on talent development, while improving punctuality and achieving training goals, reducing administrative errors by 30% and increasing the percentage of employees completing training courses.

Providing intelligent training content

The programme offers dynamic training content that adapts to the development of trainees, suggesting training courses based on each trainee's needs and level of understanding. This system also provides a flexible learning experience that suits the trainee's expectations, reducing pressure and promoting a deeper understanding of the training content by adapting to individual learning styles. This task results in a 20% increase in educational effectiveness and improves the retention rate of acquired knowledge.

Training impact assessment and analysis

Watsonx Orchestrate uses data analysis techniques to evaluate the impact of training by measuring job performance before and after the training process. Providing reports that show return on investment, this function continuously evaluates training programmes to improve them and make them more effective, helping organisations develop training strategies based on accurate data to improve the design of future training courses and enhance management's ability to make decisions based on reliable information.

3.2.7. Watsonx Orchestrate programme for employee retention

Employee retention is one of the most important challenges in human resource management. The Watsonx Orchestrate system provides a set of automated tasks based on data analysis, which contribute to improving employee retention and providing a suitable work environment. The following are the program's tasks (IBM, Watson Assistant for Talent Acquisition, IBM Documentation, 2023, 2023):

Analysing the reasons for employee turnover

Watsonx Orchestrate uses artificial intelligence to analyse the causes of employee turnover by collecting data on job satisfaction, employee performance, and periodic surveys distributed to employees regarding the challenges and problems they face in performing their tasks and in

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the organisation in general. Based on the results of the analysis, the reasons that may prompt employees to leave are identified. This knowledge enables organisations to take proactive measures to address issues quickly and effectively, resulting in a reduction in employee turnover of up to 40% and improved engagement strategies, which enhances job stability.

Improving the reward and incentive system

The system collects and analyses employee performance data to allocate fair and effective rewards based on their performance, which enhances their sense of appreciation and motivates them to stay and contribute effectively to the organisation. It also helps reduce human bias in reward management and enhances trust between employees and management, resulting in improved employee loyalty and increased productivity, while creating a sustainable culture of appreciation in the workplace.

Enhancing employee satisfaction

The programme provides tailored training opportunities to develop employees' skills based on their career goals, ensuring they feel a sense of career progression and personal development, which enhances their commitment to their job and reduces the likelihood of them leaving the organisation. Linking training to employees' personal goals increases their loyalty to the organisation by up to 30%, which raises the retention rate of skilled employees.

Providing specialised professional guidance

Watsonx Orchestrate includes chatbots that can quickly answer employee queries, provide guidance on policies and procedures, and offer personalised advice for improving performance. This support helps reduce the time needed to resolve issues, which boosts employee satisfaction and makes them feel continuously supported. It also contributes to creating a positive work environment that enhances employee loyalty to the organisation.

Conclusion

This research paper examined the role of enterprise resource planning programmes integrated with artificial intelligence in the development of human resource management, focusing on a case study of the IBM Watsonx Orchestrate system as a successful practical model. After describing and analysing all the data, the research reached a set of conclusions aimed at helping organisations to effectively adopt these systems and ensure the sustainability of the benefits achieved.

Results

The results showed that enterprise resource planning (ERP) systems supported by artificial intelligence have brought about a qualitative development in human resource management, as these systems have contributed to the automation of daily routine processes such as recruitment and payroll preparation, thereby reducing human error and increasing operational efficiency. AI-powered predictive analytics have also enabled accurate strategic decision-making, helping organisations improve organisational performance.

The study also showed that the implementation of these systems has improved the employee experience through customised training plans and continuous performance analysis. Tailoring training to the needs of each employee has helped to enhance their satisfaction, which has had a positive impact on their productivity and, consequently, reduced staff turnover rates

within the organisation. This approach, which focuses on skills development and career path building, effectively contributes to strengthening employee engagement with the organisation and reducing the costs associated with losing talent.

In the field of recruitment, the results showed that the use of artificial intelligence within ERP systems enabled organisations to reduce the time needed to screen CVs by 40% and increased the accuracy of candidate selection by 30%. These systems also helped eliminate personal bias during recruitment processes, which improved the quality of appointments and contributed to building more efficient and sustainable teams.

In terms of digital transformation, the study confirmed that ERP systems have enhanced integration between different departments and facilitated the use of real-time data, leading to improved internal communication and reduced data duplication. These capabilities have enabled organisations to achieve comprehensive digital transformation, helping them to achieve their long-term strategic goals.

Despite these benefits, the study revealed challenges facing the implementation of these systems, including high initial costs associated with installation and maintenance, resistance to change by employees, and technical complexities related to integrating legacy systems. Furthermore, the lack of technical skills among some human resources teams can slow down the implementation process and increase reliance on external experts, thereby raising costs. Overcoming these challenges therefore requires additional investment in employee training and the implementation of effective strategies for managing organisational change.

In the end, the study confirmed that AI-powered ERP systems are a strategic tool for enhancing human resource management efficiency and achieving functional integration that contributes to organisational sustainability and improved long-term performance.

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