

# Role of Artificial Intelligence in Workforce Management: An Overview of its Benefits

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## Abstract

Organisations have long relied on arduous manual processes in managing their workforce planning activities. HR professionals are under intense pressure to keep up pace with the dynamic workforce scheduling in light of the persistent labour market disruptions. Recent advancements in Artificial Intelligence (AI) have made it possible for advanced data applications that help optimize many business processes. Managements are now enabled with AI solutions that range from automation of routine tasks to assisting them create strategies for talent management and retention. This research paper analysis how AI-powered tools are transforming the HR landscape and are being increasingly utilised by business entities to optimize their workforce management functions. The indispensable role played by AI in workforce planning in the retail, healthcare and finance industries in overcoming their challenges and optimizing their performance is examined. This research study demonstrates how adoption of AI has led to increased productivity and efficiency and emphasizes the crucial role it would continue to play in the future HR workforce management functions.

**Keywords:** Artificial Intelligence, Workforce Management, Predictive Analysis, Optimizing Schedules, Decision Making

## Introduction

Human Resource professionals are increasingly utilising Artificial Intelligence (AI) in workforce management to streamline their processes. Advanced algorithms such as machine learning algorithms, natural language processing and predictive analysis are based on large amounts of data. These enable HR executives to make accurate predictions and recommendations thereby reducing errors in their workforce planning. Central dashboards powered by AI consolidate data from various sources such as attendance records, productivity metrics and employee performance. This provides real time visibility into various workforce management metrics enabling managers to monitor important performance indicators, identify trends or challenges, and make data-driven decisions to optimize workforce management strategies. Artificial intelligence brings in more efficiency with tasks such as scheduling, time tracking and resource allocation. Automating repetitive time-consuming jobs ensures optimum resource utilisation and reduces labour costs. HR managers now enjoy greater flexibility as AI algorithms enable them to automate scheduling by providing data on employee availability, skill sets, and consumer demand patterns. This ensures optimal workforce schedules leading to improved operational efficiency. Centralised dashboards foster collaboration and help management identify and solve potential bottlenecks.

Artificial intelligence generates holistic performance reports of employees' strengths, improvement needs, and probable growth prospects. An objective analysis of their productivity metrics, project outcomes, feedback from customers, and peer evaluation facilitates a performance management process free of subjectivity and bias. The synergy between AI and workforce management will continue to play an increasingly indispensable role in shaping the future work environment and in fostering efficiency, innovation and employee satisfaction.

### **Review of Literature**

Human Resource function is bridging a gap between technology and manpower (Murugesan, et al., 2023). In recent years AI usage has got involved in most of the fields including HRM. The researcher has analysed the correlation between HR and AI in the organisation recruitment process. Artificial Intelligence not only helps in selection process but also how AI can help in payroll management, safety of the worker in the work place and improving in their productivity which benefits the organisation to improve the feedback of the workers. The purpose was to understand how AI application usage can ease the HR department responsibility to a great extent. AI has the potential to enhance the efficiency and accuracy in HR practices. Using AI, better securitisation of candidate can happen and that lead to selection of appropriate candidate for the right job. The author has used statistical Package for Social Science (SPSS) tool and Analysis of Moment Structure (AMOS) in the paper by preparing questionnaire. As industry is evolving towards digitalisation there are notable major changes in HR operation and in employee well-being. AI can recommend the knowledge gap and assist in proper training for the employee in the organisation. AI algorithms can monitor the safety hazards and suggest preventive measures to mitigate risks. Application of AI in HR operations can bring a major revolution in the industry. The success of any technology depends on how well it is implemented in the organisation.

Daly (2023) noted that one aspect that never changes in today's business environment was the significance of right talent at the right place and at the right time, regardless of how industries change at a rapid pace. Companies need to know what they want to be ready for tomorrow. Artificial Intelligence will help them to prepare for the future workforce planning. Using the available data forecasting about the future staffing needs, AI can constantly predict the future based on the new data available within the organisation. In HR traditional method, HR department has to manually assess the needs of the organisation based on past experience in the same projects. The AI driven approach analyse the past and present data from multiple projects including estimated time, project outcome and number of skilled labours required, forecast the demand of placement required for the organisation.

The Workforce Department deals with fresh issues and needs on a daily basis (Mrinoy, 2021). It is essential that the department act immediately to determine the appropriate course of action in each individual case. In a compromised environment with almost continual changes in forecasts and scheduling, growing customer demands, and shifting hiring and personnel retention, it is ambiguous. Global workforce management has started utilising workforce management (WFM) software powered by artificial intelligence (AI) to address the aforementioned issues and accomplish objectives. These technologies enable to foresee and prepare both short- and long-term planning, which transforms workforce management. By assisting in the prediction of short- and long-term scheduling and recruiting requirements, communicating with staff, and connecting clients with the appropriate agent at the appropriate time, these solutions enhance Workforce Management.

Simeunović, et al. (2017) studied about workforce planning and scheduling decision assistance tool. Their research focuses on batch type production, which is common in workshops, smaller production systems, and service systems. The research generated model is based on historical data from the Public Utility Service Billing Company. Artificial Neural Networks (ANN) fitting techniques are used by the model. Eight input indicators are created, and two variants with two distinct outputs from the model were examined. To enhance prediction results, numerous extensive parameter setup tests were conducted. Empirical case studies of historical data from public weather databases and community consolidated billing services demonstrate how challenging it is to forecast the necessary staffing levels for front-desk servers and employees.

Joshbersin (2023) indicated that HR is a design, support, and integration function much like Finance, IT, and other internal departments. Hiring, onboarding, training, leadership development, performance management, pay, incentives, benefits, hybrid work, organisation design, diversity strategy, culture, and many other complex issues are handled by HR in partnership with the business. Moreover, the majority of these operational tasks were carried out in some degree autonomously before the development of what is known as systemic HR. In the modern workplace, organisations must contend with a highly competitive labour market, significant employee turnover and stress, as well as the need to internally reskill and upskill employees. Concerns regarding employee experience, productivity, and internal efficiency are also top priorities for HR teams, along with issues like diversity and inclusion, culture, and leadership development.

Koochaki, et al., (2012) examined condition-based maintenance (CBM) which is widely regarded as an appealing maintenance strategy for a single component. It attempts to prevent unscheduled downtime and needless maintenance by predicting a failure occurrence based on the component's current condition. However, the focus of operations managers is typically on maximising the performance of the entire asset system, which may involve grouping maintenance tasks and having maintenance personnel available. The impact of either age-based replacement (ABR) or CBM in serial and parallel multi-component systems is therefore the main emphasis of this article. Three scenarios considered are (1) without worker boundaries; (2) with a single internal maintenance worker; and (3) with external maintenance workers who have a substantial response time.

Glenn (1972) noted that with the societal, systemic, and pandemic repercussions in the modern world, decision makers encounter a consequence of organisational adaption problems. When the cause and effect give a multitude of reasonable and implausible options, it is challenging to make strategic plans and then take decisive action in an uncertain future. It investigates the effects of varying proportions of artificial intelligence (AI) and human intelligence (HR) on future organisational operating models, 110 participants were invited from 36 different organisations. Using the Futures Wheel, five operating models were examined. A technique to establish a causal relationship between a scenario's future consequences and change is called the Futures Wheel.

### **Need of the Study**

Intense competition and changing employee/customer priorities have made it a priority for organisations to strategize with the latest technologies to stay ahead. AI with its real-time visibility into workforce management metrics help increase productivity by streamlining organisational processes. It monitors critical performance indicators and assists managers in enhancing efficiency among their workforce. AI identifies emerging trends and this leads organisations to be proactive and better prepared to meet the

upcoming changes. This makes it significant to understand the role of AI in workforce management functions. The study also attempts to analyse how AI helps to overcome challenges in a few industries and the benefits derived. This study assumes significance as 76% of HR leaders (Gartner) believed that their organisation would lag behind in organisational success if they failed to adopt and implement AI solutions in the next 12 to 24 months.

### Research Objectives

- To comprehend the role of AI in workforce management functions.
- To analyse the challenges overcome in workforce planning using AI, by the Retail, Healthcare and Finance sectors.
- To evaluate the benefits gained by organisations with adoption of Artificial Intelligence.
- To assess the potential concerns around AI in workforce management
- To examine factors leading to selection of appropriate AI workforce management tool.

### Analysis and Discussion

#### Role of AI in Workforce Planning

**AI in Decision Making** – AI tools identify trends and patterns by scrutinizing vast amounts of data which assist HR executives make informed decisions such as identification of peak times for employee productivity or diminishing potential issues with workflows ([Workstatus, 2023](#)). AI helps management to consider each employee's unique preferences, skills, and provide a customized solution for every employee. Its predictive analytics tools give managers an advantage in planning for upcoming projects or seasonal fluctuations. As AI handles routine tasks, employees are freed of the fatigue from making too many routine decisions. They can now concentrate on those important issues that require a genuine human touch.

**AI and Predictive Analytics** - Predictive Analytic tools help management anticipate busy periods and plan their staffing needs to ensure optimal performance. They assist managers in planning optimal schedules by taking into consideration employee availability, business needs, and seasonal patterns and help them stay ahead of the curve. With AI, managers have information regarding workload or engagement levels and this helps them to proactively address issues before they escalate thereby ensuring optimum talent management and retention. It also helps them identify training opportunities and improve customer experience and thus contributing positively to their brand image. By leveraging AI technology, managements can be better prepared to meet opportunities or challenges that come their way and have a more engaged, productive team.

**Automation and Efficiency with AI** - AI assists in workforce management by automating and streamlining repetitive tasks such as scheduling individual employees' jobs and performance indicators. In reality, these mundane tasks translate into a full-time job for a manager. Automated scheduling based on employee availability, preferences, and company requirements saves time as well as ensure a fair and balanced schedule leading to satisfied employees. Automating time tracking confirms precise work hours record and managers can focus on more important tasks while monitoring their employees' productivity. As attendance is automatically tracked with reminders, employees are more informed and micromanaging can be avoided. AI collects and analyses performance metrics which provide insightful reports and highlight areas that might need attention. AI helps management to be proactive in case of changes such as

requirement of new hires or unexpected changes which can be easily adjusted thereby ensuring continuity and efficiency.

**Enhanced Employee Engagement with AI** – It is essential for HR professionals to keep their employees enthusiastic, committed, and invested in their work. In meeting day-to-day responsibilities, it becomes a big problem for managers to boost their employees' engagement. AI tools help customise employees' schedules - such as work hours or days off - in terms of their preference assisting them with their work life balance. Employees feel their needs are being valued by the organisation. As their tasks are aligned with skill and experience, employees become more engaged and committed to their work and organisation. AI tools track employee performance and achievements and provide timely feedback and recognition. Recognizing and appreciating an employee's hard work serves to boost workforce morale. AI highlights skills gaps where employees might benefit from additional training and help them advance professionally. Streamlining communication channels and better collaboration help workers connect. AI assists in designing employee surveys and listening to employees make them feel their opinions matter and that their organisation is committed to creating a positive work environment.

### **Analysis of challenges overcome by Artificial Intelligence in Retail, Healthcare and Finance sectors**

In retail sector, AI is being increasingly used for demand forecasting, labour optimization, optimization of schedules and employee experience. Demand forecasting has become more precise as it encompasses all customer touchpoints. AI has been able to capture even intricate patterns and their analysis being spread over prolonged periods translates into accurate demand forecasts. For example, it is now possible for retailers to be able to automatically predict demand by item and channel every fifteen minutes. AI enables continuous learning from fresh data and this results in better forecasts that help retailers to better adapt to changing business conditions. Business needs such as labour budgets, compliance requirements and staffing policies are matched with their employees' skills and preferences more than 96 per cent of the time with the help of AI (Kaur, 2023). Intelligent automation helps retailers to streamline labour operations and managers are now free to focus on what matters most. Automated scheduling technologies enable retail employees to exchange shifts automatically keeping their managers in the loop with automated actions and intervention anytime they desire. Many retailers are resorting to generative AI algorithms which optimize scheduling employees on the basis of customer footfall, sales data, and individual salesman performance metrics. These systems assured optimized schedules as they aligned peak shopping hours with sufficient staffing thereby improving customer service, reducing labour costs, and increasing employee satisfaction.

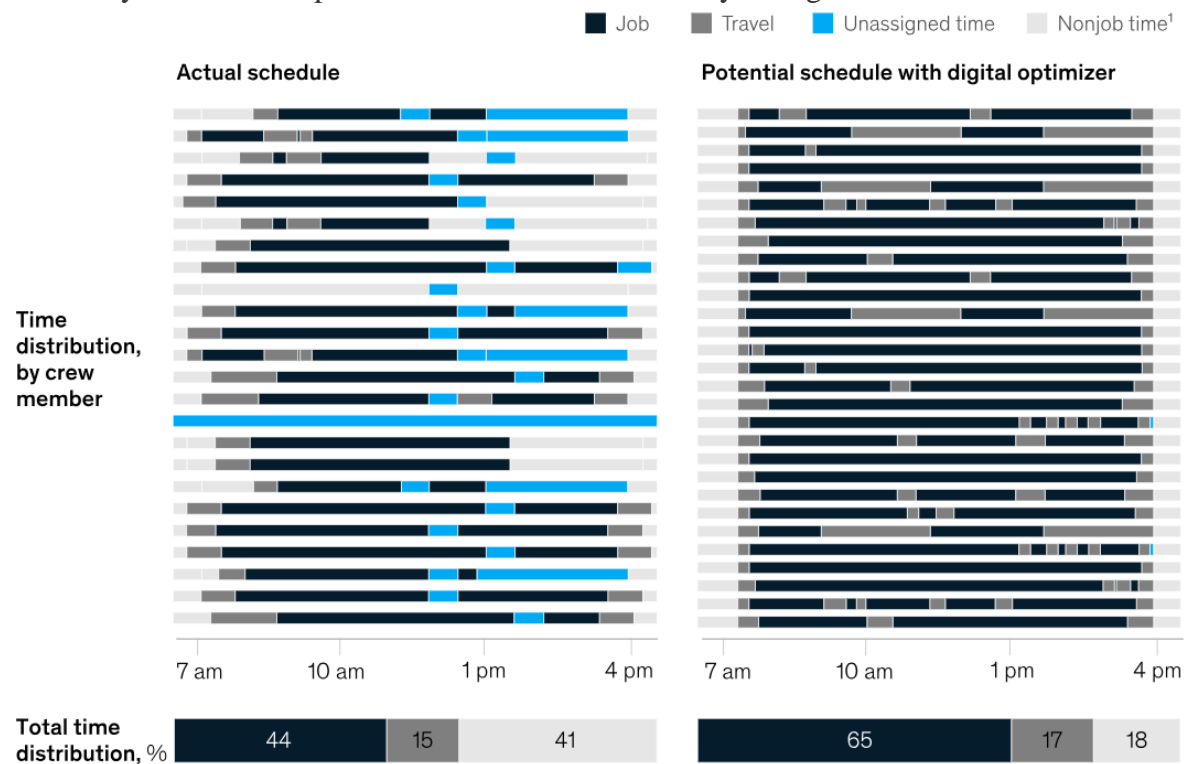
Healthcare industries have often struggled with workforce forecasting leading to staff shortages, wasted resources, and reduced patient care. AI becomes a valuable asset for this sector in intelligently analysing various factors such as patient data, medical records, and staff skills which leads to improved patient care, reduced wait times, and enhanced resource allocation. AI algorithms help in assigning the right staff to the right patient at the right time, ensuring maximum efficiency. Reports from hospitals have shown people wait for months for a complex surgery because of a need for prior authorisation from insurance payers and AI implementation would speed up this process (George & Phadnis, 2023). Additionally, AI is utilised for future predictions of the number of physicians and nurses needed to meet potential patient demand and achieve an optimal schedule that balances employee preference, organizational policy and regulatory constraints (Larson, 2023).

Machine learning algorithms and pattern recognition help finance professionals reduce default rates. Smart lending platforms streamline credit and reduces time required to approve a loan applicant. AI filter large volumes of transaction data to highlight suspicious activity and block suspicious logins and fraudulent transactions (Bowman, 2023). AI can be used for customer service with chatbots to offer quotes and process claims. It speeds up the insurance process and finance professionals acknowledge they are able to settle close to half its claims today using AI technology.

**Benefits accrued by organisations with adoption of Artificial Intelligence.**

**Manage and schedule workforce using AI**

In the last ten years, it has been observed that the organizations' adoption of digital solutions for workforce management has increased consistently. The cost of deploying end-to-end AI-driven solutions for optimizing schedules has been reduced by the invention of new technologies and cloud-based computing. These AI digital solutions generate schedules that are as efficient as possible so that the right resources reach the right places at the right times. These solutions can capture unexpected changes in operations more efficiently than current spreadsheet-based models thereby taking less time to schedule the workforce.

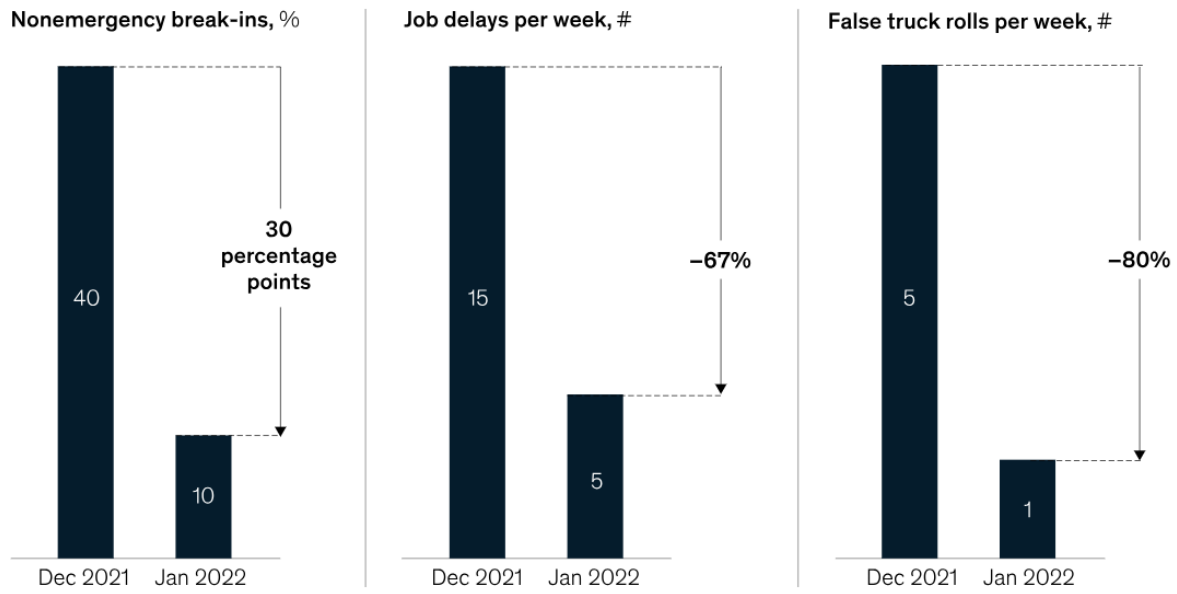


Source: McKinsey and Company  
**Fig1: Comparison of daily schedule**

Smart scheduling as shown in above fig1 can transform the job duration of the workforce. Jobs are now assigned more efficiently and it can be seen that there is a reduction in the unassigned time. Smart scheduling helps in streamlining the daily activities, reducing travel time and increasing the overall productivity and efficiency of the organisational workforce. The left-hand side depicts the time traditionally spent on jobs, travel, and unassigned or nonjob work, such as training sessions. The right-hand side depicts the smart optimized schedule that allocates time for the workforce.

**Machine learning-based schedule optimizer**

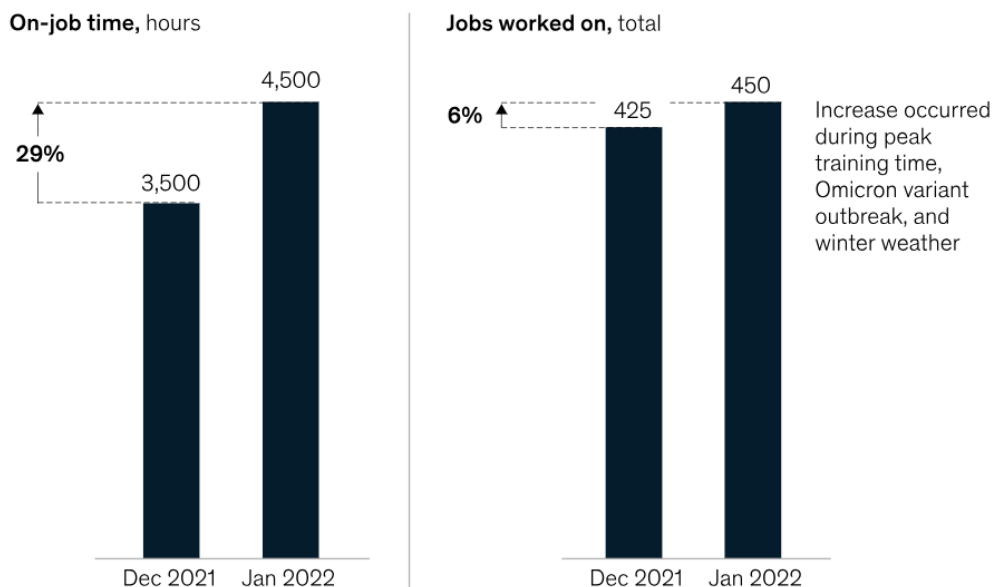
To overcome the challenges or issues relating to job delays, false starts, job prioritization, schedule preparation, and execution, AI-driven machine learning-based schedule optimisers are used. These are automated and create proper schedules when jobs cannot be started or completed on time because workforce, equipment, or materials are not available thereby, reducing rework among schedulers and increasing productivity.



Source: McKinsey and Company

Fig 2: Comparison of traditional and smart scheduling

The issues like false truck rolls fell by 80 percent, job delays by 67 percent and non-emergency break-ins by 30 percent as shown in figure 2. Thus, the usage of AI-driven tools made employees more available for jobs, and fewer break-ins meant that more work was completed.



Source: McKinsey and Company

Fig 3: Comparison of traditional and smart scheduling

AI-driven schedulers usage increased the on-job-time by 29 percent and total jobs worked by 6 percent as shown in Figure 3. Hence, smart scheduling ensures that workforce, equipment, and materials are available to optimize each job.

Workforce optimization has been the most challenging problem for businesses along with labour disruptions and higher wages. AI-driven schedule optimizers offer solutions for smooth and speed-up workforce management processes. By adopting customized AI-driven schedulers, businesses can optimize across all their verticals of operation to save time, money and for an effective increase in their productivity.

### **Addressing concerns around AI in workforce management**

A thoughtful and strategic approach is required for addressing concerns around AI in workforce management. Involving employees in the decision-making process regarding AI implementation leads to a committed workforce. Managements should clearly communicate the goals as well as benefits of AI introduction which builds trust among employees and help enhance productivity and efficiency. This ensures employees that AI is not to replace them but help in building a more collaborative environment. Firms should be cautious and select reputable providers who would not compromise on data security and have appropriate inbuilt systems to protect information. Performance of the AI systems have to be monitored regularly such that any issues are rectified without disrupting the smooth functioning of the organisation. Care has to be taken to ensure compliance with relevant laws and regulations to alleviate legal risks and build trust. Though implementation of AI is expensive, managements must realize its valuable input in terms of saved time, reduced costs, increased productivity and enhanced employee engagement and loyalty.

### **Choosing the right AI tool for workforce management**

Workforce management involves various tasks related to the scheduling, monitoring, and optimization of a workforce. When implementing AI tools for workforce management, certain factors such as data privacy, ethical considerations, and the need for clear communication with employees are to be considered to ensure a smooth integration and acceptance of these technologies. AI tools commonly used in workforce management are as follows:

**AI-Powered Scheduling Software:** These tools use AI algorithms to optimize employee schedules based on historical data, demand forecasting, and employee preferences. They help in reducing labour costs, improving employee satisfaction, and ensuring adequate coverage.

**Predictive Analytics:** Predictive analytics tools use AI to analyse historical data and make predictions about future workforce trends. This can include predicting employee turnover, identifying potential performance issues, and anticipating peak work times.

**Chatbots and Virtual Assistants:** AI-powered chatbots and virtual assistants can handle routine HR queries, provide information about company policies, and assist employees with basic HR-related tasks. This helps in freeing up HR staff for more complex issues.

**Time and Attendance Tracking:** AI can be applied to time and attendance tracking systems to automate timekeeping processes. Facial recognition, biometrics, and other AI-driven technologies help in accurate and efficient tracking of employee attendance.

**Employee Engagement Platforms:** AI tools can analyse employee sentiment and engagement through surveys, feedback forms, and other sources. This information can be used to identify areas for improvement, address employee concerns, and enhance overall workplace satisfaction.



**Performance Management Systems:** AI is used to assess employee performance by analysing various data points such as project outcomes, key performance indicators (KPIs), and feedback. This assists in providing more accurate and timely performance evaluations.

**Learning and Development Platforms:** AI-driven learning platforms can personalize training programs based on individual employee needs and learning styles. This ensures that employees receive relevant training to enhance their skills and contribute more effectively to the organization.

**Workforce Analytics Tools:** These tools use AI to analyse large datasets related to workforce metrics. They can provide insights into trends, identify areas for improvement, and support data-driven decision-making in areas such as talent acquisition, workforce planning, and diversity and inclusion.

**Robotic Process Automation (RPA):** RPA involves the use of software robots to automate repetitive and rule-based tasks (Malik, 2012). In workforce management, RPA can be applied to streamline processes such as data entry, onboarding, and offboarding.

**AI-driven Recruitment Tools:** These tools leverage AI to enhance the recruitment process by automating resume screening, identifying suitable candidates, and even conducting initial interviews through chatbots (Roy, 2021).

Managements have to analyse their needs and select those AI tools that would integrate easily with the software systems that they are currently using. More importantly, employees should find the AI systems implemented to be simple with a clear user interface and feel comfortable using it.

## Conclusion

The objective of the current research is to analyse the process of integration of humans into systems so that they can communicate and share knowledge. There are a lot of opportunities to make better decisions using AI interfaces, especially when dealing with complex issues where the environment is more complex than our capacity to understand and establish relationships between variables. The difficulty lies in creating intelligent decision support systems that are affordable, offer real advantages, and yield outcomes that the workforce and organization can accept.

The role of AI in workforce management is transformative, offering a range of tools and capabilities that enhance efficiency, productivity, and overall employee satisfaction. By leveraging artificial intelligence, organizations can automate routine tasks, optimize processes, and make data-driven decisions that contribute to a more agile and responsive workforce

## Scope for Future Research

The scope for future research in AI is vast - a few topics could be

- Study of AI in workforce management in various other industries such as Supply Chain Management, Manufacturing, etc.
- Study on Cost Reduction with implementation of AI.
- Study on Employee engagement before and after implementation of AI in workforce management.

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