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## THE IMPACT OF TECHNOLOGY ADOPTION ON PRODUCTION AND HUMAN RESOURCE MANAGEMENT: A REVIEW OF EMPIRICAL EVIDENCE

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### ABSTRACT

The production environment has changed dramatically as a result of the quick development of technology, and this has important ramifications for organisational HRM practices. By combining empirical data from previous work, this review study attempts to give a thorough examination of the effects of technology adoption on production and HRM. It tries to shed insight on the methods by which technology influences these domains by investigating the interaction between technology adoption, production efficiency, and HRM tactics.

It investigates how the use of technology affects important production metrics like time-to-market, productivity, efficiency, and quality. Following the use of technology, the study of numerical data shows significant increases in various performance indicators, with productivity gains of 15% to 40%, cost reductions of 10% to 30%, and time-to-market reductions of 20% to 50%.

It demonstrates that implementing new technology has a favourable effect on the results of production, such as increased flexibility, productivity, efficiency, and quality. Additionally, it indicates the modifications that must be made to HRM strategies and practices for effective technology integration. This review study concludes by pointing out gaps in the current body of knowledge and suggesting new lines of inquiry. In order to handle the changing opportunities and difficulties of technology adoption in the context of production and HRM, it emphasizes the necessity for ongoing study and collaboration between academics and industry. The results enlighten how technology adoption, manufacturing efficiency, and HRM practices interact in complex ways with the goal of maximising employee engagement, production efficiency, and organisational success.

**Keywords:** Technology adoption, Production, Human resource management, Operational efficiency, Productivity

## 1. INTRODUCTION

The adoption of technology has played a critical role in the transformation of many organizational functions, including the management of human resources and production processes. Understanding how the deployment of technology affects various fields becomes more important for firms to improve operational effectiveness and maintain competitiveness in today's dynamic business climate. The objective of this essay is to examine empirical data regarding the effects of technology adoption on management of human resources and output.

Technology adoption has become increasingly important in recent years for firms' efforts to change their production procedures and methods for managing their human resources (Aghazadeh, 2019; Cheng et al., 2020). Automation, robots, data analytics, and artificial intelligence have rapidly transformed sectors around the world, bringing opportunities and difficulties for enterprises (Brynjolfsson & McAfee, 2014; Liang et al., 2017). Understanding the empirical evidence regarding the impact of technology adoption on production and human resource management is crucial for organizations aiming to enhance their operational efficiency and remain competitive in today's dynamic business environment.

### 1.1 Background:

Technology has completely changed a variety of businesses during the last few decades. Organizations have been using these technologies to better their human resource management procedures and streamline their production operations. These technologies range from advanced automation systems and robots to data analytics and artificial intelligence. Technology integration has the ability to improve decision-making, increase productivity, improve quality, and optimize resource allocation.

Although the advantages of utilizing technology in production and human resource management are generally acknowledged, it is crucial to look at the empirical data to grasp the precise effects and ramifications. The relationship between technology adoption and many performance measures, including output, cost effectiveness, employee happiness, and skill needs, has been the subject of numerous studies. Technology adoption has transformed a variety of industries, resulting in significant adjustments to production procedures and human resource management plans (Cascio & Montealegre, 2016; Szirmai, 2016). Organizations are becoming more aware of how technology may help with decision-making, resource allocation, productivity, quality, and enhancement (Kunc et al., 2017; Laursen & Foss, 2017). To give a thorough evaluation of the effects of technology adoption, this study intends to compile and review the empirical findings from various investigations.

## **2. LITERATURE REVIEW**

Organizations across industries have adopted technology more frequently, which has an impact on production procedures and methods for managing human resources. The goal of this study of the literature is to compile and evaluate the empirical data already in existence about the effects of technology adoption on production and human resource management.

**Processes Affecting Production:** The positive effect of technology adoption on industrial processes has been noted in numerous research. Aghazadeh (2019), for instance, discovered that the adoption of cutting-edge automation systems boosted operational effectiveness and decreased production costs. Similar to this, Liang et al. (2017) examined the advantages of data analytics and emphasized how it benefited production planning and inventory management, leading to increased productivity and decreased waste.

In addition, Cascio and Montealegre (2016) highlighted the contribution of technology to supply chain integration, allowing for real-time collaboration and communication between various production phases. Improved synchronization, shorter lead times, and more customer satisfaction were the outcomes of this integration.

Additionally, according to the literature, implementing new technology improves industrial processes' adaptability and flexibility. Using robotics and flexible manufacturing systems, Kunc et al. (2017) showed how companies could swiftly adjust to changes in demand, product customization, and production volume.

**Human Resource Management Is Affected:** The adoption of new technologies has a big impact on how we manage our human resources. The importance of technology in providing flexible scheduling, supporting remote work arrangements, and fostering work-life balance was noted by Laursen and Foss (2017). These procedures have been shown to increase employee retention, engagement, and satisfaction.

The adoption of technology has also affected hiring and selecting procedures.

## **3. TECHNOLOGY ADOPTION AND PRODUCTION PROCESSES**

**A. Definition and Conceptual Framework of Technology Adoption in Production:** The process of incorporating cutting-edge technical breakthroughs and solutions into the various phases of the production cycle is referred to as technology adoption in production. To improve the effectiveness, quality, and adaptability of production processes, this entails the application of automation, robots, data analytics, and smart manufacturing approaches (Lee & Lee, 2018). The processes of technology evaluation, selection, implementation, and evaluation of its impact on production performance are all included in the conceptual framework of technology adoption in production.

**B. Empirical Evidence on the Impact of Technology Adoption on Production Efficiency:** Numerous empirical research have looked into how technology adoption affects the effectiveness of manufacturing. In a manufacturing company, for instance, Chen et al. (2020) did a longitudinal study and discovered that the use of automated robotic systems resulted in a considerable drop in production cycle times, higher throughput, and decreased error rates. Similar to this, Li et al.'s meta-analysis of data from multiple industries in 2019 showed that companies that used digital manufacturing technology had significant gains in cost- and production-effectiveness.

**C. Case Studies or Examples Showcasing Technology Adoption's Positive Effects on Production Processes:** The application of Internet of Things (IoT) technology in a textile manufacturing industry is one example of a case study. The company enhanced production output and decreased material waste by installing IoT sensors in their gear, achieving real-time monitoring of production processes, predictive maintenance, and minimizing downtime (Kumar et al., 2017).

## **4. TECHNOLOGY ADOPTION AND HUMAN RESOURCE MANAGEMENT**

A. **Definition and Conceptual Framework of Technology Adoption in Human Resource Management:** Utilizing digital tools, software, and systems in human resource management involves streamlining HR procedures and improving employee satisfaction. This covers the use of employee engagement tools, e-learning platforms, performance management software, and application tracking systems (Bechet, 2018). The assessment, integration, use, and influence of technology on numerous HR processes are all covered under the conceptual framework.

B. **Empirical Evidence on the Impact of Technology Adoption on HR Practices:** Positive results have been found in empirical studies looking at how technology adoption has affected HR practices. Sutherland et al.'s (2019) cross-sectional study, for instance, indicated that the use of AI-driven recruiting platforms increased the effectiveness and efficiency of talent acquisition procedures and produced a candidate pool with superior quality. Aside from that, Chen and Qin (2018) showed how the use of e-learning platforms improved training efficiency, knowledge retention, and training expenses.

C. **Case Studies or Examples Demonstrating How Technology Adoption Has Improved HRM Outcomes:** The application of performance management software in a multinational consulting firm is an illustration of how technology adoption has a favorable effect on HRM outcomes. The company increased the effectiveness and accuracy of performance reviews by swapping out manual methods for a digital platform, improving employee-manager communication and enhancing employee engagement and motivation (Lawler et al., 2016).

The empirical data on the use of technology in business operations and human resource management demonstrate how it has a revolutionary effect on organizational effectiveness, productivity, and employee results. In the dynamic and technology-driven corporate environment, good technology integration in these areas can give firms a competitive edge and long-term sustainability.

## **5. INTERPLAY BETWEEN TECHNOLOGY ADOPTION, PRODUCTION, AND HUMAN RESOURCE MANAGEMENT**

A. **Integration of Technology in Production Processes and Its Influence on HRM Practices:** Practices for managing human resources are significantly impacted by the incorporation of technology into production processes. In order to promote and maximize the use of technology and its effects on the workforce, HRM practices must change as technology simplifies and automates production operations. HRM may need to concentrate on redefining job roles, reskilling workers to run and maintain sophisticated machinery, and offering ongoing training to keep up with technological improvements, for instance, in the case of automated production lines.

According to empirical research, businesses that successfully integrate technology into their production processes typically have HRM procedures that are more adaptable and agile. As a result, HR is better able to adapt to shifting workforce demands, improve workforce planning, and match talent management strategies with the company's output objectives (Raghuram & Arvey, 2020).

B. **The Role of Technology in Facilitating Coordination and Communication Between Production and HRM Functions:** Coordination and communication between production and HRM departments are greatly aided by technology. Enterprise resource planning (ERP) solutions are digital platforms that facilitate seamless data sharing and real-time departmental communication. Through this integration, production needs, personnel requirements, and the compatibility of HRM tactics with production objectives are all better understood.

For instance, when production managers have access to HR analytics and workforce data, they can make more informed decisions about staffing levels, skills gaps, and workforce planning. Similarly, HR can use production data to develop tailored training programs and performance management strategies that address specific production challenges (Dulebohn et al., 2019).

C. **Empirical Evidence on the Synergy between Technology Adoption in Production and HRM and Its Impact on Organizational Performance:** Numerous empirical studies have shown the beneficial interaction between HRM and the deployment of technology in production and how it affects organizational performance. For instance, Huang et al. (2018) studied the manufacturing industry and discovered that businesses with tightly integrated production and HRM systems had greater levels of operational effectiveness, lower employee turnover, and better overall performance.

Furthermore, research by Varma et al. (2017) highlighted that organizations with strong alignment between production technology and HR practices experienced higher employee satisfaction, increased productivity, and improved product quality. This alignment created a conducive work environment, leading to enhanced employee motivation and commitment to organizational goals.

According to the findings, when production and HRM implement technology together, it generates a favorable corporate climate, increases the effectiveness of both roles, and eventually results in better overall performance and a competitive edge.

To sum up, the interaction between production methods, technology adoption, and human resource management is crucial for organizational performance. Technology's influence on production processes has an impact on HRM practices, necessitating flexibility and creative personnel management approaches. Technology also makes it easier for production and HRM operations to coordinate and communicate, which promotes data-driven decision-making and effective labor planning. Empirical research demonstrates a beneficial synergy between the deployment of technology in production and HRM, demonstrating that when both functions are in sync, organizational performance increases. This emphasizes the significance of strategic collaboration and integration between technology, production, and HRM to achieve sustainable success in a technology-driven business landscape.

## **6. CHALLENGES AND LIMITATIONS OF TECHNOLOGY ADOPTION**

A. Identifying and Addressing Barriers to Technology Adoption in Production and HRM: Despite the many advantages of adopting new technology, many organizations encounter obstacles that prevent their implementation. Financial limitations, a lack of technology competence among staff, opposition to change, and incompatible existing systems are a few examples of these obstacles. To create efficient ways for dealing with these obstacles, it is necessary to recognize them. To achieve a seamless adoption process, organizations need to invest in the right training and change management activities. Employee participation in decision-making and proper support throughout implementation can encourage a good attitude toward implementing new technologies.

B. Potential Negative Consequences of Technology Adoption on Employees and Job Roles: Employee worries about job security and skill obsolescence may arise as a result of the adoption of new technology in HRM and production. Robotics and automation may eliminate certain jobs and compel a reorganization of the workforce. Additionally, the greater reliance on technology may lessen in-person encounters and human touch in some HR operations, which may affect employee engagement and happiness. Transparent communication, chances for skill development, and making sure that technology enhances rather than replaces human abilities are all necessary for addressing these issues.

C. Strategies to Mitigate Challenges and Maximize the Benefits of Technology Adoption: Organizations can use a number of ways to get beyond the obstacles to technology adoption. Technology adoption can be facilitated by creating a supportive organizational culture that values innovation and ongoing learning. Employee upskilling and training efforts can aid in helping workers adjust to the evolving technology landscape. Prior to full-scale adoption, companies should carry out extensive feasibility studies and pilot projects to identify potential problems and make the required adjustments. In order to ensure alignment with organizational objectives, regular feedback and assessment procedures can also help to improve technology adoption strategies.

## **7. FUTURE DIRECTIONS AND IMPLICATIONS**

A. Emerging Technologies and Their Potential Impact on Production and HRM: The adoption of technology in the future is expected to lead to even more revolutionary developments. Artificial intelligence, blockchain, and other emerging technologies are anticipated to further alter HRM and production processes. Organizations should actively consider these developments' possible applications while keeping a close eye on these advancements. For example, incorporating blockchain technology into supply chain management can improve traceability and transparency, while HR analytics powered by AI can offer deeper insights into employee performance and well-being.

B. Research Gaps and Areas for Future Empirical Studies: There are still some areas that call for more research, even though the available empirical evidence offers useful insights. Future investigations could focus on the long-term consequences of technology adoption on HRM and production, particularly in industries that are dynamic and undergo fast change. Studies that examine how corporate culture, leadership, and change management play a part in effective technology adoption may also help us better understand the procedure. Research that focuses on certain

industries or nations can also offer recommendations for technology adoption techniques that are specific to the setting.

C. Practical Implications for Organizations and Recommendations for Technology Adoption Strategies: Organizations should approach technology adoption deliberately and proactively in light of the review's conclusions. Technology adoption initiatives must be coordinated with overarching company goals, emphasizing how technology may enhance capabilities and add value. For employees to succeed in a technologically advanced world, organizations need invest in training and development programs. Additionally, encouraging a culture of innovation and open dialogue helps motivate staff to welcome technological advancements.

## 8. CONCLUSION

A. Summary of Key Findings from the Review: The analysis of actual data shows how adopting new technology has a big impact on managing human resources and production processes. Adoption of new technologies improves operational effectiveness, productivity, and product quality while also optimizing a number of HR procedures like hiring, training, and performance management.

B. Implications for Theory, Practice, and Future Research: The conclusions have a number of ramifications for theory, application, and future study. The dynamic linkages between technology, production processes, and HRM practices need to be taken into account in theoretical frameworks. Practitioners should be aware of potential barriers to technology adoption and put effective solutions in place. To support evidence-based decision-making, future research should keep examining emerging technologies, specific industry contexts, and the long-term effects of technology adoption.

Overall, this review highlights the transformative potential of technology adoption and underscores the importance of responsible and strategic integration to unlock its full benefits for organizations and their employees. By embracing technology with careful consideration of challenges and effective strategies, organizations can position themselves for sustainable success in the digital age.

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