

Innovative Technologies in Personnel Management of Modern Organizations

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Abstract: This paper focuses on the innovative technologies in the personnel management of modern organizations. Firstly, it expounds on the importance of innovative technologies in improving management efficiency and quality. It analyzes how emerging technologies such as artificial intelligence and big data analysis are applied to various personnel management processes, including recruitment, training, and performance evaluation. The advantages brought by these technologies are explored, including precise talent screening, personalized training program development, and objective performance evaluation. At the same time, challenges such as data security and employee resistance during the application process are also studied, and corresponding countermeasures are proposed. The aim is to provide theoretical reference and practical guidance for modern organizations to better utilize innovative technologies to optimize personnel management.

Keywords: Modern Organizations; Personnel Management; Innovative Technologies; Artificial Intelligence; Big Data Analysis

1. Methodology

1.1 Research Design: Systematic Review

Systematic reviews are a type of study that applies a variety of methods to gather secondary information and analyze it (Nunn & Chang, 2020). An analysis of 8 manuscripts between 1996 and 2006 identified the terms/phrases “review of the evidence”, “comprehensive review”, “literature review”, and “overview” as the most used references to the systematic review method (Grant & Booth, 2009). Essentially, systematic reviews are a form of evidence synthesis designed to address research questions that can vary in scope, from broad to specific (Nunn & Chang, 2020). They collect and combine data that directly corresponds to the review question. Although some scholars link systematic reviews with meta-analysis, several types of systematic reviews do not involve meta-analyses (Trifu et al., 2022). Certain reviews evaluate research studies critically and combine findings either qualitatively or quantitatively. Systematic reviews are typically structured to deliver a comprehensive overview of current evidence relevant to a research topic (Nunn & Chang, 2020). A systematic review spares researchers from cost and time implications of conducting primary research which is typically more expensive and tedious because one has to collect the data from the field[1].

1.2 Inclusion and Exclusion Criteria

The study's eligibility criteria were informed by the study design, PICO approach, and date. To ensure relevance and quality of papers, the inclusion criteria defined studies explicitly addressing blockchain technology and its applications in HRM; research articles, systematic reviews, and case studies published in peer-reviewed journals; and articles discussing blockchain's benefits, challenges, or implementation strategies in HR. The exclusion criteria included, first of all, defining paid publications, unrelated, duplicated, unavailable full texts, or abstract-only papers as inappropriate[2]. Additionally, studies not focused on HRM or blockchain technology were excluded. Grey literature, editorials, or non-peer-reviewed content, apart from organizational reports, also constituted the criteria as articles with insufficient methodological detail or inaccessible full texts.

2. Results

2.1 Recruitment and Credential Verification

Recruitment is a very labor-intensive process as it involves background checks, verification of credentials, and validation of references. It is also time-consuming for the same reasons (Yi et al., 2020). For example, between 2015 and 2018, employers took an average of 38 days to recruit job applicants (Bohne, 2018). Moreover, in 2018 companies with more than 5000 employees took an average of 35 days to hire while it took longer as the size of the company reduced. Several

scholars have studied the challenges related to the recruitment process[3]. An Egypt-based study to examine recruitment practices by companies showed that small and medium enterprises (SMEs) adopted recruitment processes more actively than large enterprises (LEs)(Darrag et al., 2010). It also found that candidate-related and organization-related issues were the biggest challenges with SMEs reporting more candidate-related problems than LEs (Darrag et al., 2010. As for the verification of credentials, Subramanian et al., (2023) argue that the need for an accurate process is becoming greater due to organizations' shift to person-organization fit (PO approaches. This shift is also notable in academic research as an analysis of 887 journal articles showed that PO fit and its impact on employee engagement during their employment was the most salient topic (Darrag et al., 2010). Thus the recruitment process is increasingly being required to pool the candidates with the highest potential for acceptance[4].

Blockchain simplifies the credential verification processes by providing a tamper-proof ledger of candidates' educational and professional qualifications (Rao et al., 2024). Some studies suggest that hiring organizations can provide job applicants with a blockchain-distributed database where they can build, manage, and retain access to their CVS (Rao et al., 2024). Various researchers have developed test models for the application of blockchain in recruitment systems. For instance, Onik (2018) designed a model which has being piloted in some firms.

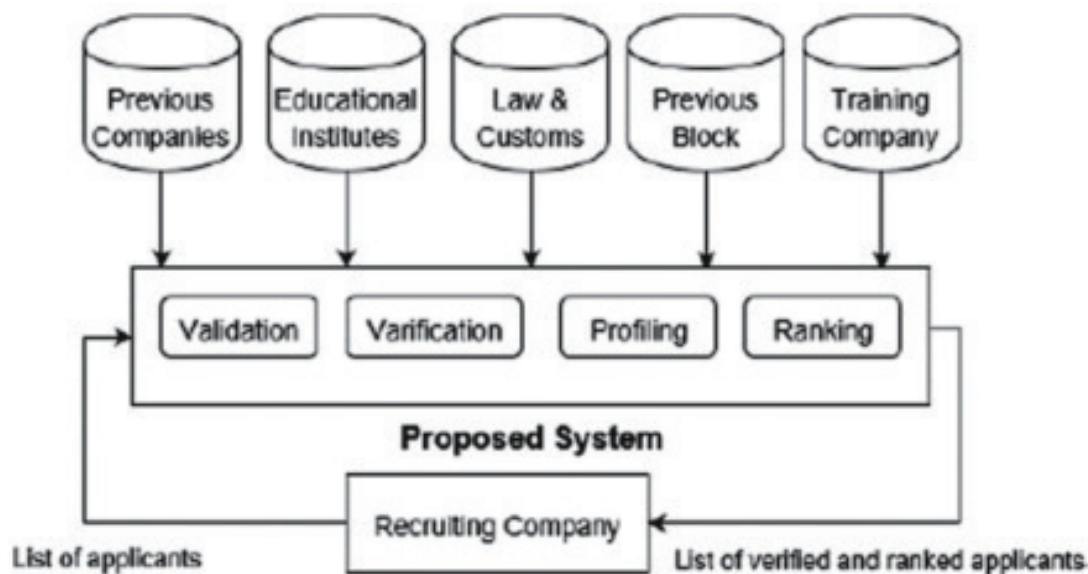


Figure 1. Blockchain-based recruitment process (Shaheen et al., 2023).

As illustrated in the figure above, this BC model handles the essential stages of any recruitment process, but with utmost accuracy and efficiency compared to traditional HRM hiring mechanisms (Shaheen et al., 2023). However, concerns arise over the safety of applicants' data with inadequate privacy protection and unlawful use of their data topping the list of reservations over using blockchain as a data pool for prospective candidates' data (Rao et al., 2024). However, this is also a concern in traditional databases and EHRM systems, so it is not unique to BC. Blockchain technology makes it harder for third parties to access the applicants' data.

2.2 Addressing Workforce Skills and Competency Gaps

A study by Fachrunnisa and Hussain (2020) has indicated an increasing mismatch between the skills that the workforce possesses and the competencies required by the industries in the wake of digital transformation. This mismatch leads to inefficiencies within organizations, slowing down productivity and innovation. Other studies contend that his workforce skill resources are not keeping up with the rapid transition to Industry 4.0, across several countries and sectors (Saucedo-Martínez et al., 2018).

Fachrunnisa and Hussain (2020) have identified that the labor skills gap persists because of one major issue. That is training institutions typically provide old curricula rather than curricula that reflect today's fast-changing industries. This has been happening because there is little coordination between the industries and training centers as to what kinds of skills are to be imparted. That is to say, there is no set framework through which companies and providers reach an agreement on the competencies that the industry needs most urgently. Perhaps, one company wants automation skills; the next may want creative problem-solving competencies. But nobody gets a sense of which is important across the sector, creating variability

in workforce preparation[5].

To tackle these challenges, the study proposes using blockchain technology to create a consensus-based framework that ensures training curricula meet industry requirements (Fachrunnisa and Hussain, 2020). Blockchain could be the platform on which companies, training providers, and industry associations can work together to identify the most needed skills. In this system, input is gathered in a transparent and automated process that validates feedback and reaches consensus on the critical competencies to be used in selection. Fachrunnisa and Hussain (2020) propose a blockchain-based framework in which stakeholders within an industry will contribute and agree on what worker skill is required[6].

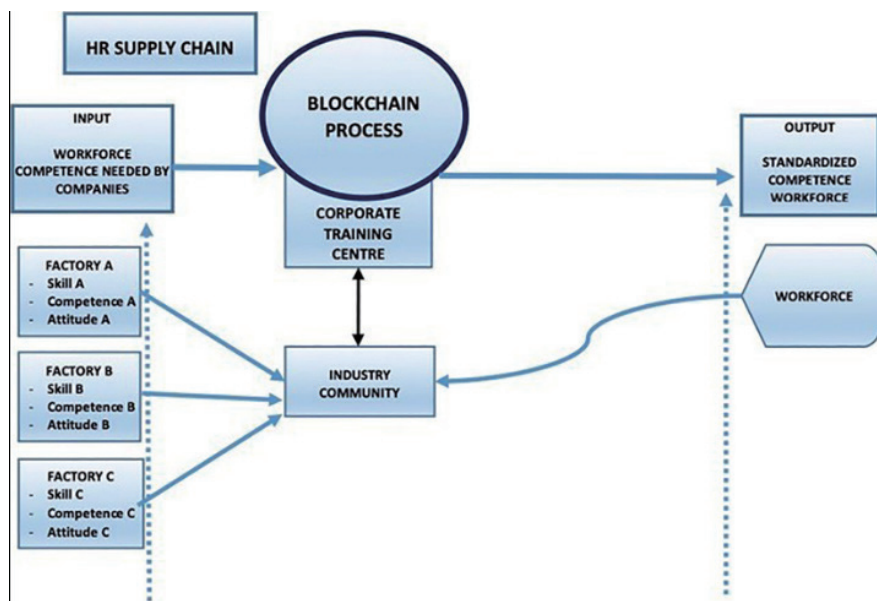


Figure 2. Illustration of the Methodology (Fachrunnisa and Hussain, 2020).

Here is how it works:

Input Phase: Industry and professional expert contributions or feedback regarding the requisite skills and competencies. As an example, a manufacturing company will call for skills such as robotics and automation while a software company will request coding or cybersecurity skills.

Consensus Mechanism: This input is then fed into the blockchain technology and identifies the most critical skills, which blockchain collects and records in such a way that all stakeholders have to vote and agree on the most critical skills. This vote is important in making sure the chosen competencies reflect the needs of the entire industry and not one single company. Once voting is completed the top-ranked skills are final and safely stored on the blockchain.

Training Development: The pre-tested list of skills is given to Corporate Training Centers and other training institutions that will make use of the same for developing standardized training courses for the workers, who thus get trained precisely in the type of skill required by industries.

This framework acts like an online negotiation table where companies, training providers, and industry associations identify, rank, and agree on the most relevant skills related to a given sector. Blockchain makes this process fair, secure, and tamper-proof; thus, nobody can alter the results.

3. Discussion

This section brings together results, theories, and concepts discussed in the literature review, and the research objectives to give a complete analysis of findings.

The foremost theoretical school of thought that is apparent from this study is the UTAUT as it explains why blockchain is not a popular technology in Kazakhstan, at least in the last decade or so. According to UTAUT, new technologies are mostly influenced by factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions that guarantee their acceptance (Venkatesh et al., 2003). In Kazakhstan, the facilitation conditions in terms of internet infrastructure and skilled workers remain underdeveloped. Most HR professionals are unfamiliar with blockchain, and organizations show concerns about the time required to learn and use it. Without having clear short-term benefits, companies remain skeptical about adopting the technology[1].

RBV theory also goes well with the results. RBV emphasized that among the most crucial resources of any organization are the knowledge, skills, and talents of its employees (Wernerfelt, 1984). Regarding human resource management, blockchain may bring substantial benefits. The process of recruitment will be improved, for instance; it will speed up and secure the verification process of candidate credentials, thus helping the companies to hire the best candidates. It can also improve performance management and payroll systems, making all HR tasks more efficient. However, the findings also indicate that the workforce in Kazakhstan lacks technical skills to support the blockchain system, and hence companies need to invest in digital skills training and workforce development.

The Human Capital Theory reinforces this by emphasizing investments in employees' skills and education. In support, the theory indicates that organizations that invest in their workers realize productivity and long-term growth; Kaufman & Geroy (2007) support this notion. This study revealed discrepancies in Kazakhstan's educational system concerning modern workforce requirements, particularly in digitization. This mismatch makes it hard for the HR teams to recruit and manage employees, which is why blockchain adoption is unrealistic at present. Therefore, Kazakhstan should develop an education and training system to equip a tech-savvy workforce to bridge the gap.

4. Conclusion

This study makes a substantive case for the potential of blockchain technology to transform the HRM sector in Kazakhstan. Its core features such as decentralization, immutability, and smart contracts can solve some of the biggest challenges organizations are grappling with such as inefficient processes, payroll errors, and weak data security. However, Kazakhstan, while being an upper-middle-income country is lagging in the human capital as far as technical skills are concerned and lacks an elaborate regulatory framework to oversee the large-scale adoption of BCT. These barriers can be overcome by Kazakhstan through investments in education, digital infrastructure, and supportive policies that will prepare it for the adoption of BC technology within the next decade. Worth noting is that Kazakhstan has been on this path since 2018 but it remains to be seen how impactful it will be as far as blockchain mainstreaming goes. The insights provided by this research shine a pathway for businesses, policymakers, and HR professionals on blockchain technology including how they can collaborate in building a modern, efficient, and secure HR system that corresponds to the world's technological trends. If the current developments continue, Kazakhstan is poised to lead the way for digital HR solutions in Central Asia.

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