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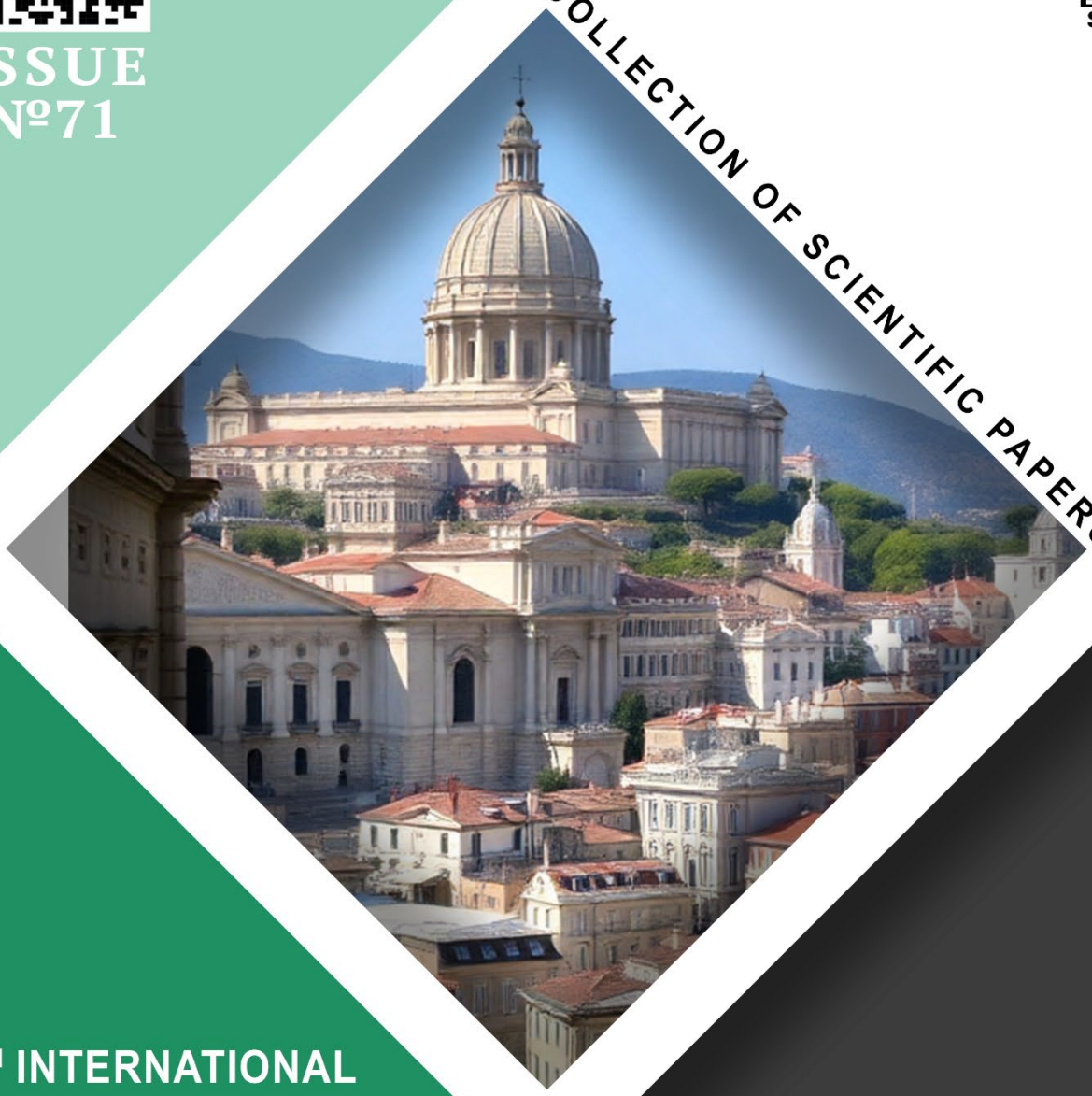

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SCIENTIFIC
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SCIENTIFIC INNOVATION: THEORETICAL INSIGHTS AND PRACTICAL IMPACTS

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DEVELOPMENT OF INTELLIGENT MODELS BASED ON ARTIFICIAL INTELLIGENCE METHODS TO IMPROVE THE EFFICIENCY OF HUMAN RESOURCE MANAGEMENT IN SERVICE COMPANIES

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Abstract. This paper examines the application of intelligent models based on artificial intelligence methods to improve the efficiency of human resource management in service companies. The aim of the study is to develop and substantiate the concept of an intelligent human resource management model for service companies based on artificial intelligence methods. To achieve this aim, the study addresses the following objectives: analyzing contemporary approaches to HR analytics, investigating the potential applications of machine learning methods in personnel management, and developing a conceptual model for intelligent support of managerial decision-making in the HR domain.

Keywords: ANALYSIS, INTELLIGENT MODELS, HR ANALYTICS, KPI, CLASSIFICATION, REGRESSION, DECISION-MAKING.

Service companies are characterized by a high dependence on the human factor, specifically employee motivation, engagement, and the quality of internal communication, for their performance outcomes. At the same time, in practice, personnel management is often based on simplified performance indicators and retrospective KPI analysis. This creates a contradiction between the complex and dynamic nature of human behavior and formalized indicators that do not always accurately reflect the actual state of teams, hindering timely responses to negative trends. Studies by P. Cappelli and reviews of contemporary HR analytics suggest that traditional approaches have limited adaptability and often result in delayed managerial decisions [1].

Recent studies increasingly explore the use of machine learning methods to predict employee turnover, engagement, and productivity. Zhao et al. demonstrate that classification and regression models based on behavioral and organizational data can accurately predict employee attrition risk, highlighting the importance of combining quantitative indicators with qualitative team interaction characteristics, particularly in service companies [2].

Within this study, a concept of an intelligent human resource management model is proposed that integrates performance analysis, motivational factors, and social dynamics within teams. The methodological foundation is based on data-driven management approaches and human-centered artificial intelligence, which emphasize supporting managers in the decision-making process rather than fully automating it [4].

Special attention is paid to management under conditions of uncertainty, which are typical for service companies with high task and client request variability. The use of intelligent models enables scenario-based analysis of managerial decisions in the HR domain and assessment of the potential consequences of personnel actions prior to their practical implementation.

Similar approaches to supporting managerial decision-making under conditions of uncertainty are also applied in related fields. In particular, the work by Brynza N. and Mazepa A. examines the use of simulation games for building and analyzing decision-making scenarios under uncertainty, as well as their integration into decision support systems, which can be adapted to the tasks of human resource management [5].

The results obtained allow the conclusion that intelligent models based on artificial intelligence methods can be an effective tool for improving the quality of human resource management in the context of digital business transformation [6].

Further research should focus on the practical aspects of implementing intelligent HR management models in service companies, considering organizational maturity and digital readiness. Special attention should be given to the ethical issues of HR analytics, including data protection, risks of discrimination, and the impact of algorithmic recommendations on managerial autonomy [4]. The development of explainable AI approaches remains a promising direction to ensure model interpretability and trust.

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BIAS IN ARTIFICIAL INTELLIGENCE ALGORITHMS

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In this thesis, I will examine the issues around modern artificial intelligence, focusing on the ethical questions and biases it raises.

Bias in AI models usually arises from two main sources: the design of the models themselves and the training data they use [2]. In terms of design, models can sometimes reflect the assumptions of the developers who code them, causing algorithms to favour certain outcomes. In terms of data, AI bias develops through the information used for training. AI models function by analysing large datasets during the machine learning process, identifying patterns and correlations to make predictions. When algorithms detect patterns of historical bias or systemic imbalances embedded in the data, their conclusions inevitably reflect these imbalances. Because machine learning tools process information on a massive scale, even small distortions in the original data can lead to widespread discriminatory outcomes. Experts warn that automation can reinforce existing biases because, unlike humans, AI may not be equipped to consciously counteract learned stereotypes.

To gain a deeper understanding of the problem, it is worth considering key theoretical concepts, including algorithmic bias. This is a systemic error in AI decisions that leads to unfair treatment of certain groups. Another important phenomenon is the so-called ‘black box’ - a situation where the internal decision-making process of an algorithm remains unclear, creating risks of opacity, inability to explain decisions, and legal challenges. We should also mention Amara's Law, which states that we tend to overestimate the impact of technology in the short term and underestimate its impact in the long term. This means that although AI is now perceived as a breakthrough, its real social consequences will only become apparent over time. Another interesting concept is Moravec's Paradox, which describes reverse complexity: high-level logical tasks are easy for AI, while basic sensorimotor skills and empathy remain extremely difficult. In a legal context, this means that AI can analyse texts but cannot understand the moral context or the uniqueness of human circumstances. This brings us to the

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