

**Elenica Sofijanova, Ivona Kovacevska, Pavle Apostoloski, Katerina
Zlatanovska, Natasha Longurova, Verica Toneva Stojmenova, Julija Zarkova
Atanasova, Sandra Atanasova**

Strategic human resource and economic management in AI-integrated dental laboratories: organizational transformation in the digital era

Interdution:

The integration of Artificial Intelligence (AI) into dental laboratory workflows represents a significant transformation in operational efficiency, workforce structure, and economic performance. AI-driven technologies, including CAD/CAM systems, automated manufacturing, and predictive analytics, enhance precision, standardization, and productivity in prosthetic dentistry while requiring substantial organizational adaptation.

WORK FLOW



Materials and Methods:

A multidisciplinary review-based approach was used to assess the impact of Artificial Intelligence on human resource management and operational performance in dental laboratories. Peer-reviewed literature, economic models, and case studies on AI-integrated dental workflows were analyzed. The evaluation focused on production time, labor costs, error reduction, material efficiency, workforce transformation, and return on investment. Comparative analysis was applied to identify the main benefits, challenges, and strategic requirements for sustainable AI implementation.

Aim:

The aim of this study was to evaluate the impact of Artificial Intelligence (AI) on human resource management, operational efficiency, and economic sustainability in modern dental laboratories, with particular emphasis on workforce transformation, productivity, and long-term organizational performance.



Conclusion:

Artificial Intelligence significantly improves the efficiency, accuracy, and productivity of dental laboratories while transforming the roles and competencies of the workforce. Successful implementation requires strategic human resource management, continuous professional training, and effective integration of digital technologies with human expertise. These factors are essential for achieving sustainable operational performance and long-term economic competitiveness.