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Managing teams based on cooperation between people and robots/artificial intelligence. Behavioral analysis and the new management model

Abstract

The dynamic development of technology and the increasing automation of production and logistics processes have led to the growing integration of robotic systems and artificial intelligence (AI) into human work environments. This dissertation aims to conduct a behavioral analysis and develop a management model for teams based on human-robot collaboration. The research addresses the challenges of management transformation resulting from the introduction of autonomous systems into organizational structures.

The theoretical analysis examines contemporary trends in robotics, classifications of human-robot interaction levels, and key factors influencing collaboration, such as trust, responsibility, and the anthropomorphization of robotic systems. The scientific literature distinguishes between two fundamental levels of cooperation: interaction (human-robot influence without a shared goal) and collaboration (joint execution of tasks within a mixed human-robot team). Trust in robots is crucial for effective cooperation and is shaped by factors related to humans (personality, competencies, experience), robotic systems (reliability, operational transparency), and the organizational environment (task characteristics, company strategy, and organizational culture).

Empirical research conducted in four organizations implementing robotics involved a behavioral analysis of human-robot interaction using case study methodology and in-depth interviews with employees and managers. The research findings indicate that successful human-robot collaboration requires consideration of psychosocial factors, such as the perception of robots as team members and the distribution of responsibility between humans and machines. Based on these findings, the Human-Robot Team Management Model (MZZL-R) was developed, integrating elements from the Harvard Human Resource Management Model and the Service Robot Acceptance Model (sRAM).

The MZZL-R model identifies key areas in managing mixed teams, including situational factors, functional aspects (safety, failure rates), relational aspects (trust, interaction), and psychosocial factors (robot anthropomorphization, technology acceptance). This model was validated through a survey conducted among managers who participated in the field research, and its implementation supports more effective management of teams in robotized organizations.

The conclusions of this dissertation have significant theoretical and practical implications, highlighting the necessity of redefining traditional management processes in response to dynamic technological advancements and the increasing role of artificial intelligence in the workplace. The proposed model provides a foundation for further research and implementation in organizations seeking to optimize the potential of human-robot collaboration.