

Abstract

The aim of the dissertation was to develop an integrated Knowledge and Competence Management Model (KCM) and, based on it, to prepare the concept of an IT system supporting these processes in a manufacturing enterprise. The dissertation identified ways of overcoming the often-present silo approach to knowledge and competence management in organizations, which leads to reduced organizational efficiency and deteriorated cost-effectiveness. Therefore, a unified and coherent model has been developed, which represents a significant contribution to the theory of mechanical engineering in the area of production engineering, by strategically addressing the manufacturing technologies applied and planned to be applied within the enterprise. Moreover, the knowledge and competence management system designed on the basis of the aforementioned model contributes to industrial practice by improving product quality and enhancing the organization's competitiveness as a result of more effective knowledge and competence management.

The dissertation consisted of three parts: research methodology, literature analysis, and the design-empirical section. The methodological chapter outlined the key assumptions of the author's research and the methodology used to carry out the work, which ultimately led to the creation of the model defined in the dissertation's objective. The literature analysis presents the results of the author's review of specialist sources, discussing knowledge and competence management processes, as well as the models, strategies, and tools associated with them. In the design-empirical part, the original KCM model and a prototype version of the IT system (KCM Portal) were presented. The system was created based on user needs analysis using the Design Thinking methodology. Its verification was conducted with the participation of experts and end-users through survey research.

The dissertation confirmed that the KCM model and the KCM Portal system design address the key needs of users and manufacturing organizations. The author's model integrated knowledge and competence management in four areas: inputs (e.g., employee lists, required competences, business needs), the competence matrix (as a central knowledge and assessment base), outputs (diagnoses, training strategies, identification of critical areas), and knowledge management processes (location, acquisition, development, sharing, usage, storage). This integration enables more effective recording, planning, and evaluation of competences, as well as facilitating information flow within the organization. Additional benefits relate to reporting, assigning, and monitoring competences, which support the practical activities of managers

responsible for knowledge and competence management. The dissertation not only constructed the model but also indicated directions for its further development (together with the KCM Portal IT system).

The dissertation thus demonstrated that the integration of knowledge and competence management within a coherent model and IT tool supports both employee development and the efficiency of production processes, contributing to building a competitive advantage for industrial enterprises. This constitutes a contribution to the discipline of mechanical engineering within the field of production engineering.

Keywords:

1. Knowledge management;
2. Competence management;
3. Knowledge and competence management;
4. Integrated Knowledge and Competence Management Model (KCM Model);
5. Competence matrix;
6. Systems supporting knowledge and competence management processes;
7. KCM Portal application;
8. Mechanical engineering and production engineering;
9. Design Thinking;
10. Process digitalization;
11. Innovations in production engineering;
12. Artificial intelligence in knowledge and competence management.