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The dissertation concerns the problem of the efficiency evaluation of supply chains and their elements in which radio frequency identification (RFID) technology has been implemented. The dissertation proposes a method for evaluating the effectiveness of logistics facilities from the perspective of implementing RFID identification technology in a specific logistics process based on estimating the labour consumption of the process and the structure of committed and detected errors.

Chapter 1 identifies the research problem. The basic structures covered by the dissertation are described, i.e. logistics networks, supply chains and logistics facilities. The essential RFID technical solutions are discussed with an indication of their use in logistics systems. The fundamental engineering decisions related to shaping the efficiency of supply chains are presented. On this basis, chapter 2 defines the dissertation's purpose, thesis and scope, which outlines the research program to be carried out in subsequent chapters.

Chapters 3, 4 and 5 provide an overview of the knowledge on the various aspects of RFID implementations in supply chains. Chapter 3 covers the different application areas of RFID in supply chains, including emerging RFID applications involving Industry 4.0 solutions such as the Internet of Things and blockchain. The potential of using RFID technology in these areas was discussed, and the growing trend in this field was shown.

Chapter 4 discusses methods and tools for measuring the effectiveness of supply chains, including multidimensional measurement methods for supply chains and logistic process evaluation measures. Principles of evaluating logistics processes efficiency on the example of warehouse facilities were presented. The tenets of simulation to estimate logistics processes' parameters necessary to determine their efficiency were discussed. The AHP method was selected and debated for the multi-criteria assessment of RFID implementations in the supply chain from the efficiency perspective.

Chapter 5 presents warehouse facilities as RFID implementation sites. Logistic processes in warehousing and technical and organizational aspects of RFID implementations in warehousing, including logistics costs, were discussed.

Chapter 6 presents a decision model for assessing the effectiveness of RFID implementation in a logistics facility such as a warehouse and projecting the results onto the supply chain. The model allows for mapping the material flow structure, warehouse process, labour resources, selected characteristics of the RFID technology and the resulting costs and process efficiency.

Chapter 7 presents the scheme and algorithm of the effectiveness assessment method. Chapter 8 presents a numerical example of the proposed approach for various variants of RFID implementation in a test facility. The implications for the supply chain are also discussed, supported by the assessment of RFID implementation options in the supply chain using the AHP method. Chapter 9 summarizes the results of the work. The theoretical and practical effects of the work were defined, and future research directions were discussed.