

ABSTRACT

The aim of the dissertation was to develop a method for assessing the relationship between the resilience to disruptions of the logistics system and the reliability of product deliveries in the high-tech industry. The dissertation consists of seven numbered chapters. The first chapter, titled “Introduction”, demonstrates the existence of a research gap – the need to develop a method based on a digital model that allows ensuring the optimal level of resilience of the supply chain of materials of a company from the high-tech industry to possible threats. The structure of the work and the used methods and techniques was also in the chapter described. Hypotheses were formulated. The second chapter presents the development of logistics, the emergence of supply chain management, and current trends. In the chapter attention was paid to the implementation of the Just in Time concept, viewing global supply chains as additional opportunities to increase margins by minimizing costs, disregarding their resilience to disruptions. The chapter presents available solutions and actions that can increase supply network resilience, but these do not guarantee supply continuity on their own and are general in nature. The third chapter provides a comprehensive overview of the high-tech industry. The chapter focuses on the industry's impact on maintaining and achieving a technological advantage. The challenges faced by supply networks in the industry are also described. The fourth chapter analyzes the current logistics system using the IDEF0 method. A summary of information sources and the individual stages of the simulation study are also described in the fourth chapter. The fifth chapter presents the selected market segment for conduct research. The CaF₂ segment was chosen due to its excellent representativeness compared to other segments and the clear classification criterion, which was the input material. The elements of the simulation model were also defined. In the sixth chapter, a sensitivity analysis was first conducted based on the actual situation to verify the metrics, and then additional tests were conducted using the defined model settings. For this purpose, three scenarios were developed using surveys among the entity's employees. In the last, seventh chapter the research conclusions were presented. A description of the newly developed method and operational recommendations for the studied supply chain and potential directions for further research are also provided in this chapter. A summary was written at the end. Importantly, based on the conducted research, it was possible to confirm the existence of a connection between the resilience to disruptions of the logistics system and the reliability of product deliveries in the advanced technology industry.