**Analysis of Opportunities for Expanding Autonomous Supply as a Key Element of Industry 4.0 in a Multinational Slovak Company**

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**Abstract:** This paper addresses the first phase of the automation of logistics processes using autonomous vehicles, with the ultimate goal of enabling fully autonomous delivery of materials directly to their designated locations. The focus was set on analyzing the potential for expanding autonomous material supply within a prominent multinational company in Slovakia and proposing a solution that enables seamless integration of an additional autonomous vehicle system with the existing one. To achieve this, the authors conducted a comprehensive analysis of the current state of the art and industrial practice in production logistics, with a particular focus on logistics process automation and the deployment of autonomous vehicles. This analysis served as the basis for clearly reinforcing and defining the motivation and relevance of the study within the company, where Industry 4.0 initiatives are actively pursued in a strategy to fulfill by 2030. Based on these insights, the paper presented a conceptual solution for expanding the existing autonomous supply system. The proposed approach includes a detailed system design, comparative evaluation of multiple autonomous vehicle suppliers, and simulation-based validation using Tecnomatix Plant Simulation to ensure technical feasibility and performance. The final sections highlight the key outcomes and practical contributions of the study, culminating in a fully developed proposal with high potential for real-world implementation.

**Keywords:** Autonomous mobile robots, autonomous guided vehicles, autonomous material supply, Logistics 4.0, logistics process automation, simulation.

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