MODERN LOGISTICS SYSTEMS FOR AUTO PARTS SUPPLY

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Abstract. *The thesis discusses new expansions in the development of logistics and approaches to industrial growth during the evolution from a linear to a circular economic model. It shows how processes in production systems, logistics and services are organized and play a role in driving sustainable green growth.*

Keywords: *current trends, logistics, spare parts, globalization.*

Modern trends in automotive industry show that to ensure the competitiveness of business it is necessary to have a developed logistic system. Such system is a basis for interaction between production and service systems in implementation of principles of circular economics and green technologies. If it concerns the organization of effective delivery of spare parts, firstly such tasks, as the choice of delivery mode, transportation mode, as well as the best route selection should be considered and solved. Since transportation of automotive spare parts is a very complex process, decisions are often made under condition of incomplete information. In order to identify all significant factors, the complete, relevant and adequate information, as well as the application of tools and methods of its processing and analysis is needed. Multicriteria analysis methods, online analytical processing technologies, simulation, as well as the elements of situational management have to be used to make final managerial decision. In addition, since any error in supply chain management can lead to financial, time and other losses, methods of risk analysis and management have to be used. Managerial decisions in complex systems must be comprehensive, consistent and scientifically based. Therefore, it is proposed to create a Decision Support System (DSS) consisting of modules, each of which will perform its function using all of the above methods. In developing acceptable variants of logistic chains, Vehicle Routing Problem takes an important place. It is especially important in transition to green logistic, because in this case factors that influence on ecological situation are also added to a wide range of factors that need to be considered when routing and scheduling. In various studies, such factors as speed, weighted load, traffic load on the route and their complex influence on different objective functions (apart from such usual ones as logistics operating costs and transportation time): either fuel consumption, total CO2 emissions, or their combi-nations were considered. The paper provides decision support methodology that unites network science, green logistics and transportation accessibility research. A detailed presentation and description of studies that consider the problem of

"green" vehicles routing can be found in the research. In planning spare parts delivery reasonable transportation mode selection is a priority task. The authors of the article have considered such alternatives as rail, truck and air mode of transport, but this study does not consider the possible options for intermodal transportation. At the same time, globalization lengthens supply chains so that companies tend to expand their production patterns offshore or source from more distant locations, the use of intermodal transport can provide cost effective solutions for long distance transport needs of supply chains, as well as for reverse logistics. Moreover, the use of terminal transportation will reduce overruns and minimize concentration of harmful emissions along the main roads due to breaking up the delivery lots into smaller units. Intermodal transportation can ensure the benefits of each mode of transport used in supply chain. However, in this case companies face such problems as lack of coordination at various intermodal transfer points, causing delays. That is why intermodal technologies not only include physical movement and terminal handling technologies but also cover information and communication technologies required for coordination. Moreover, the use of different modes of transport for one shipment requires technical solutions for fast transfers from one vehicle to another. There are several different technologies for solving this problem. They are containerization, swap bodies, the so-called KAMATEYNER (project of the plant KAMAZ), etc. The widespread of the Internet of Things and additive technologies can make significant changes both to production logistics and to supply chain management. According to Gartner Inc. (NYSE: IT), a leader in the sphere of information technologies researches, the impact of Industry 4.0 on supply chain management will subsequently show itself in four key aspects:

– creation of intelligent factories (production) based on flexible automated processes. Such enterprises will be integrated with each of stakeholders' groups and will cover each of the stages of product life cycle;

– virtual production on the basis of Internet of Services, requiring the creation of new business models, changing the existing design of supply chains;

– predictive analysis based on Big Data, which will allow flexibly managing all the processes, not just the production lines themselves;

– usage of intelligent production, in which the complexity of machines and technologies will require focusing on employee's knowledge, skills and engineering excellence at every stage of supply chain.

Identification of inventory items, which makes it traceable in the production process and the entire supply chain, is the most important task of Industry 4.0. This allows determining the responsibilities of each participant of supply chain and production process, as well as ensuring return or recall defect product. Another opportunity to satisfy the increasing demands of consumers for environmental friendliness and product's safety is reliable and objective

information on the origin of components (raw materials) and its constituents, which can be implemented using “smart chips”. Thus, according to all forecasts and estimates, the impact of neo industrialization on supply chain management and logistics as a whole will be very significant.