INTERACTION OF PARTICIPANTS IN SUPPLY CHAIN IN THE CONTEXT OF NEOINDUSTRIALIZATION

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ABSTRACT

The rapidly changing industrial and information environment inevitably makes it necessary to transform the usual management approaches and technologies. For supply chain participants, factors of the Internet networking, possibility to increase the value of the existing system for clients due to logistics resources, closer communication contacts of goods suppliers, carriers and consignees are especially important. That revolutionary construction of neo-industrial relations is shown by the author extremely laconically, referring first of all to essential aspects of the ongoing process.

Keywords: transport, management, logistics, supply chain, neoindustrialization, communication.

Background. *Creation of highly efficient goods transport technologies and development of forwarding and logistics activities are impossible today without a rapid response to evolutionary changes in scientific and technological progress. Under the influence of industrial changes, existing management mechanisms can be substantially transformed, and supply chains are not an exception. To catch the development guidelines in the conditions of the coming neo-industrial revolution correctly and timely is the requirement necessary for formation of both a logistics strategy and the economy as a whole. Change in global market dynamics, higher expectations of clients against the backdrop of neoindustrialization pave a way for reforming long-established processes and relationships of participants in the supply chain.*

Objective. *The objective of the author is to consider interaction of supply chain participants in the context of neoindustrialization.*

Methods. *The author uses general scientific methods, comparative analysis, evaluation approach, statistical method.*

Results. *Industry 4.0, which is based on the power of the Internet of things (Internet of Things, IoT), replaces earlier industrial revolutions related to the strength of water and steam (Industry 1.0), electricity (Industry 2.0), computer power (Industry 3.0). The Internet of things, originally proposed as an idea for a marketing campaign to promote RFID tags, pretty soon went beyond selling things with radio frequency tags. Interaction of objects on the basis of creation of permanent or temporary networks, adapting to the external environment and changing their properties, provides for the possibility of data exchange between all components of the production system and the system with the external environment. The supply chain participants must anticipate the changes and try to increase the value of the system for the customer, using traditional approaches taking into account new technologies [1]:*

• Close communications with suppliers and their suppliers, customers and their customers. The flow of information should be processed faster and with greater accuracy, to which the new information technologies of Industry 4.0 can contribute.

• Postponement – the process by which production on customer orders begins as late as possible. The main production is postponed until

Table 1

Nine technological areas of Industry 4.0

Technological area	Characteristics
Horizontal and vertical integration	Revision of the attitude to networks and interaction of structural units as partners in the production cycle.
Internet of things	Information exchange between devices and integrated sensors in real time.
Cybersecurity	Creation of secure protocols and mechanisms to maintain information flows.
Clouds	Creation of support of multiple device types and array of the data generated by using cloud services.
Analysis of large data	Changing the understanding of the production process due to the availability of data for all phases of development, production and product testing.
Modeling	Possibilities of the virtual simulation of product usage scenarios.
Additive manufacturing (3D-printing)	Possibility of manufacturing according to individual orders of small batches of products that combine the advantages of complex structures with minimum weight, with a reduction in transportation costs and a decrease in inventories.
Augmented reality	Using virtual training and instruction in the course of operation (stage of the production process) in order to increase productivity and quality of decision making.
Robots	Improvement of intelligence of robots for more complex tasks than performing assembly operations.

Source: compiled using [3].

Table 2

Trends in supply chain management in the transition to Industry 4.0 [5]

Main factors of transition to Industry 4.0	Directions in the development of supply change management
Physical convergence of groups collaborating in design, marketing and production	Communication
Reducing the time of products' delivery	Infrastructure
Improving the process of design integration by reducing the time periods for presentation of a new product design	Technology
Ability to adapt to the consumer demand for continuously evolving products	Information
Improving the quality of relationships and closer interaction between end users and manufacturers in both B2B and B2C	Competences

the time of receipt of a specific order using 3D-technology.

• Flexibility replaces a traditional sequence of a stable manufacturing process, where production depends on orders. It is reflected in incentive systems, preparation time, labor time models and investment programs.

• Product design – the need to more develop products that meet the individual needs of the customer, specially selected by a modular approach. This element opens new approaches in design and radically changes the production process when using additive technologies.

Considering possible technological changes that are likely to affect all participants of supply chains, one should turn to experts in the field of studying information technologies. According to research by Gartner Inc, a leader in this field, supply chain management in the context of neoindustrialization will manifest itself in four key aspects [2]: creation of intelligent plants (manufactures) based on flexible automated processes; virtual production on the basis of Internet services with the creation of fundamentally new production business models; predictive analysis based on large amounts of data; focusing on employee's knowledge, skills and engineering skills in every link of the supply chain. According to the Boston Consulting Group [3], Industry 4.0 suggests changes in nine technology areas, each of which in the future can significantly affect the interaction of participants in the supply chain (Table 1).

Leaders in the supply chain must respond quickly to these changes in order to increase efficiency, productivity and customer satisfaction. Already emerging under neoindustrialization trends in supply chain management can be classified into five main areas, affecting infrastructure, technology, communications, information and competence of the participants of the logistical system [4]. Each of them is characterized by several elements (characteristics) that can be considered as guidelines for formation of a logistics strategy in the new manufacturing paradigm for the system as a whole and for its individual participants (see Table 2). Cooperation of partners in the supply chain will require more attention to speeding up delivery time, adaptability to changing demand, fusion of design and production, integration of producers and consumers.

Conclusion. *To understand the importance of the issue today, I think, upcoming changes associated with Industry 4.0 should be discussed. The interaction of supply chain participants in terms of neoindustrialization becomes a key to finding and creating low-cost paths between sources of raw materials and production centers, security in distribution channels, research and development of alternative forms of delivery, development of new kinds of identification of material assets, forming a new ideology of concentration of the basic types of resources, development of staff competencies.*

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