State-of-the-art imperative for adaptive traffic management systems and their development in the city

Gleb Savin*, *Svetlana* Tsaregorodtseva, and *Valeria* Savina

Ural State University of Economics, Yekaterinburg, Russia

Abstract. Today, processes designed to develop the transport and logistics system (TLS) are focused on the consumer and providing an increase in the services number and quality before material production. The choice of an alternative way of developing a transport and logistics system aimed at rationalizing resources could be provided by the theory and methodology of digital logistics focused on the partnership between economic agents and the superiority of transaction costs over technological improvements. The main objective of such a system would be to provide a new degree of streaming processes coordination considering their organization and management.

1 Introduction

Today, inter-organizational coordination is complicated, but the introduction of ICT [1-4] enables increasing the quality level of interaction between economic agents, accompanied by developing a TLS that ensures the efficient flow of economic resources. In this situation, logistics is transformed into the field of information space [5-8], the evolution of which is associated with the introduction of an intelligent system [9] and its transport, industrial components, and networks.

To form digital-type TLS, it is necessary to, primarily, create a conceptual and categorical apparatus encompassing streaming processes coordination; secondly, to develop a reasonable research methodology that allows assessing its performance indicators; and finally, to propose a multivariable algorithm for its development.

2 Materials and Methods

We emphasize that evolutionary theory has defined numerous theories concerning determining the uncertainty, dynamics and limited rationality of complex systems and economic agents in the movement of economic thought towards an institutional paradigm. Today, the prominent formal development institutions determine the "basis" of evolutionary development. In the era of the digital economy, these institutes experience a reduction in

*Corresponding author: glebsavin@ya.ru

their life cycle and require refinement concerning the infrastructure designed for using modern information and communication technologies, including in digital logistics.

3 Results

With a diversity of existing research on streaming processes in TLS, a comprehensive refinement of the methodology for their analysis is required, implying a reduction to easily measurable and objective research methods, which significantly affect the methodology for studying the digital-type TLS in the field of ICT implementation, human capital development, mobility [1, 3, 7], etc. The study of one of the elements of the TLS from the technological approach of intelligent transport system point of view is not fully presented in the analysis of evolutionary and sustainable development. However, as an independent director, it develops: coordinated work is carried out in the field of standardization and implementation of its intellectual elements.

Understanding the methodology for the study of TLS of the digital-type position of co-temporal science allows us to consider it as a holistic theory at the junction of inter-disciplinary interaction. It stands out as an independent, conceptual basis for the study of complex systems (Fig. 1).

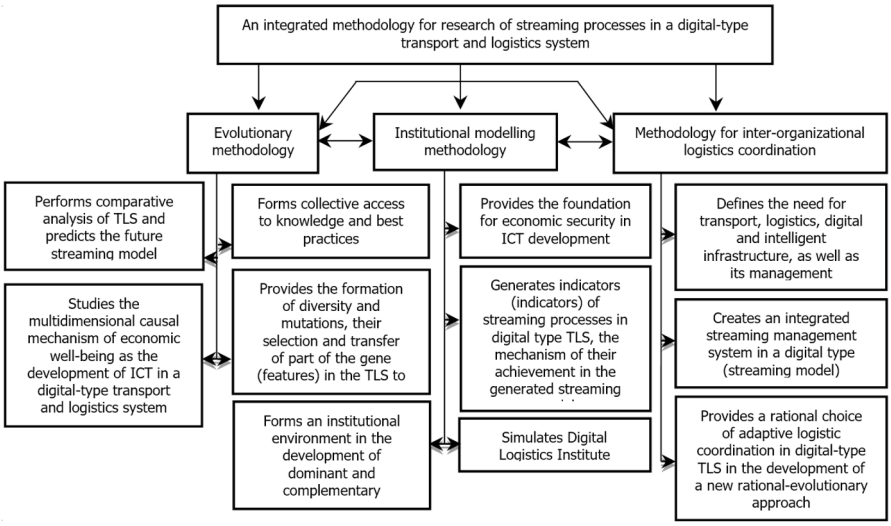

Fig. 1. Digital-Type Transport and Logistics System Research Methodology

We note the accelerated trend towards the transfer of transactions to the information field with the decentralization of economic resources is characterized by the absence of clear rules for building a new type of economic relations, as well as not ensuring the implementation of legal norms and requirements of economic security of the State in the global economic system.

An evolutionary methodology that focuses on the long-term development and presentation of future advancement through the lens of biological laws in the "creative destruction" of traditional systems and relationships through the introduction of ICT. When making managerial decisions, limited human rationality constrains people from fully engaging in economic agents but prioritises their behavioural patterns.

The transformation of the TLS to the digital-type provides an irreversible evolutionary process for several reasons. Firstly, the global economic system provides access to information resources and technologies and successful practices. At the same time, research

institutes, laboratories, and economic actors continuously offered ideas only within the framework of their companies in the past, which, with the current digital transformation of the economy, has created prerequisites for the appearance of diminishing efficiency of improving the system in future.

Secondly, the change in traditional economic relations in the context of the development of shared economies and social innovations enables distinguishing the information space, which provides a stream of innovations for its permanent improvement.

Thirdly, the improvement of the system with the use of a comparative and genetic approach allows us to form a vector of its long-term development, focusing on rational choice of streaming processes optimization. In general, evolutionary methodology defines the essential representation and foundations of transformation processes in a digital-type trans-port-logistics system and offers scientific-and-sound ideas and ways of its development.

Institutional modelling methodology allows for:

• ensuring the safety of its functioning with decentralization and limited economic resources, as well as accelerating the implementation of established rules and norms with adaptive logistical coordination,

• shaping a streaming model of digital-type TLS,

• predicting and extending the life cycle of the digital logistics institute and trans-forming it in the future.

The methodology of inter-organizational logistic coordination solves the following optimizes the rational selection of streaming processes and initiates cooperation and partnership between economic agents.

The author's highlighted a new rational-evolutionary approach, which contributes to rigid optimization in certain states and historical retrospect, and at the same time relates to it more flexibly in the context of emerging contradictions between economic agents.

The use of logistics in the Institute of Digital Logistics modelling will ensure a rational choice of optimizing limited resources at the stages of design, distribution, measurement, and evolution, thereby providing a lower indicator of the dysfunctional state (Fig. 2).

During the development and application of a new rational-evolutionary approach, the transfer process of part of the gene is implemented by the mechanism for the completion of criteria for the transformation of the digital-type TLS in the context of "regulatory sandboxes".

4 Discussion

In this situation, the development of the TLS ecosystem [2, 4, 7, 9, 10, 11, 12], which operates in the transport and communication corridors system with controlled traffic and smart-contract network [1, 13, 14].

Note that the formed system of organization and control of streaming processes of digital-type TLS in operation in P2P networks is the next stage of development of modern intelligent systems. The use of smart contracts with distributed data registry technology, CDNs would ensure the reliability of information and reduce the need for constant up-dating of in-infrastructure. The development of peer nodes, including smartphones, personal computers, and ACS, allowed to redistribute the network load and reduce in-vestments in the formation of data processing systems since computing power was combined.

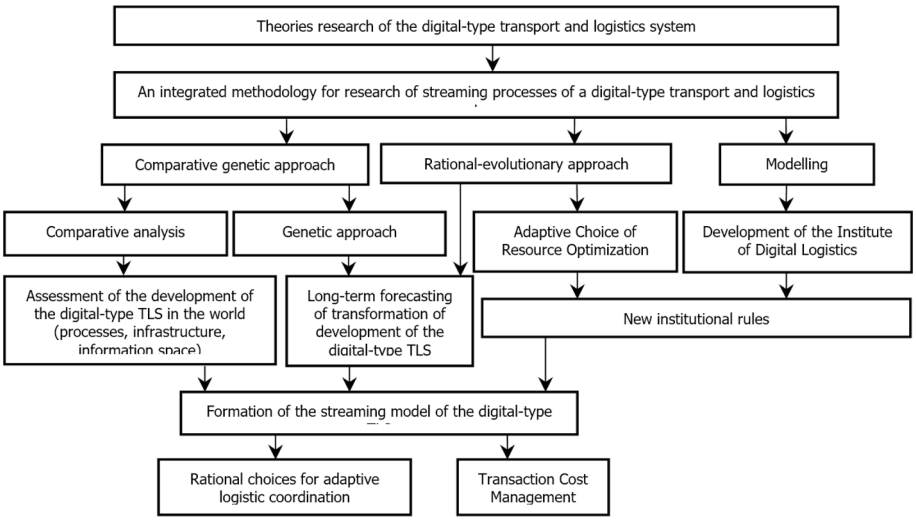

Fig. 2. Author's methodological approach

5 Conclusion

Today, the need to research the organization and management of streaming processes [8, 9, 15] in the TLS is due to public and scientific views on de-scribing the rules for managing streaming processes while achieving a future vision of the evolutionary development of these systems. In that connection, it was essential to analyse the transformation of digital logistics and its institutions to make scientific sense of its use in highly automated economic systems, which were in constant motion and showed complex dynamics.

We believe that digital logistics allows for a complete assessment of TLS and the formation of a single streaming model (digital twin) to rationally analyze limited economic resources.

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