

THE ROLE OF DIGITAL TECHNOLOGIES IN ASSESSING THE QUALITY OF TRANSPORT SERVICES

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Annotation. This thesis analyzes the role of digital technologies in assessing the quality of transport services and their impact on service efficiency. The study examines modern digital approaches to assessing transport service quality, particularly the impact of GPS monitoring, IoT (Internet of Things), electronic logistics platforms, and digital management systems on transport service quality indicators.

Key words: transport services, digital technologies, service quality, logistics, GPS monitoring, IoT, transport efficiency.

Annotatsiya. Mazkur tezisda transport xizmatlari sifatini baholashda raqamli texnologiyalarning roli va ularning xizmat ko'rsatish samaradorligiga ta'siri tahlil qilingan. Tadqiqotda transport xizmatlari sifatini baholashning zamonaviy raqamli yondashuvlari, xususan GPS monitoring, IoT, elektron logistika platformalari va raqamli boshqaruv tizimlarining transport xizmatlari sifati ko'rsatkichlariga ta'siri o'rganilgan.

Kalit so'zlar. transport xizmatlari, raqamli texnologiyalar, xizmat sifati, logistika, GPS monitoring, IoT, transport samaradorligi.

Аннотация. В данном тезисе проанализирована роль цифровых технологий в оценке качества транспортных услуг и их влияние на эффективность предоставления услуг. В исследовании рассмотрены современные цифровые подходы к оценке качества транспортных услуг, в частности влияние GPS-мониторинга, IoT (Интернета вещей), электронных логистических платформ и цифровых систем управления на показатели качества транспортных услуг.

Ключевые слова. транспортные услуги, цифровые технологии, качество услуг, логистика, GPS-мониторинг, IoT, эффективность транспорта.

In the world economy, digital transformation of transport and logistics systems is becoming one of the important factors for improving the quality and efficiency of transport services. The expansion of global trade volume, the complexity of international logistics chains, the rapid development of electronic commerce, and the increase in consumer demand for fast and reliable transport services require the introduction of modern mechanisms for evaluating and managing the quality of transport services. As a result, in addition to assessing the quality of transport services based on traditional methods, the issues of monitoring, analysis and management based on digital technologies are becoming scientifically and practically important.

Digital technologies cover all stages of the process of providing transport services, allow real-time monitoring of transport processes, optimization of logistics operations, tracking of vehicle movements and accurate assessment of service quality indicators. In particular, the introduction of GPS monitoring, IoT (Internet of Things), RFID technologies, electronic logistics platforms, artificial intelligence and big data (Big Data) technologies into the transport sector significantly increases the

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accuracy and speed of evaluating transport service quality indicators. These technologies serve to automate the monitoring of the quality of transport services, shorten transportation times, optimize transport costs, and improve the quality of services provided to consumers.

International experience shows that the use of digital technologies in the assessment of the quality of transport services plays an important role in increasing the operational efficiency of transport enterprises, reducing logistics costs, ensuring the continuity of supply chains and strengthening competitiveness in the market of transport services. Through digital monitoring systems, the ability to obtain real-time information on the location of vehicles, cargo movement status, delivery times and service quality increases the effectiveness of management decision-making. At the same time, the use of digital indicators in evaluating the quality of transport services serves to ensure the transparency and reliability of the service process.

In the Republic of Uzbekistan, large-scale reforms are being implemented aimed at digitizing the transport and logistics system, developing electronic transport services, modernizing the logistics infrastructure, and bringing the quality of transport services to international standards. However, the level of use of digital technologies in assessing the quality of transport services, their impact on service quality indicators, and improving the assessment methodology have not been sufficiently studied. In particular, there is a need to improve scientific approaches to comprehensively assess the quality of transport services based on digital technologies, integrate service quality indicators with management decisions, and develop digital monitoring systems in transport enterprises.

The quality of transport services is determined not only by the technical condition of the vehicle or compliance with the schedule, but also by the overall experience of the passenger in the process of using the service, the ability to obtain information, comfort, safety, speed, and the attitude of the service provider to the consumer. Therefore, there is an increasing need to take into account the capabilities of digital technologies in assessing the quality of transport services, along with traditional indicators.

In the study of the quality of transport services, the general theoretical foundations of the concept of service quality were initially formed. In particular, the SERVQUAL model developed by Parasuraman, Zeithaml and Berry allows assessing service quality through the gap between consumer expectations and actual service perception. In this approach, factors such as reliability, speed, trustworthiness, empathy and material aspects are considered as the main criteria. By adapting this approach for transport services, it is possible to comprehensively assess the level of passenger satisfaction with the service. In the transport sector, assessing service quality is more complex, in which indicators such as time, convenience, safety, availability, accuracy of information and regularity of service are of particular importance. Studies conducted on railway transport have indicated that the main factors affecting passenger satisfaction are reliability, convenience, safety and organizational aspects of transport services. An empirical study on Istanbul railway transport also confirms that service quality has a multidimensional nature.

The development of digital technologies is also introducing significant changes in the methodology for assessing the quality of transport services. Previously, passenger opinion was mainly determined through questionnaires and surveys, but now there is an opportunity to use mobile applications, GPS, electronic ticketing systems, geolocation, real-time traffic monitoring, electronic payments and digital feedback platforms. Such technologies allow for rapid identification of the real state of transport services and a more accurate assessment of the consumer experience.

A study by Eriksson, Freeman and Norman examined the e-service quality of services providing information about public transport via the Internet. According to the results of the study, the speed and convenience of obtaining information have a significant impact on the overall satisfaction of users. The authors substantiated the possibility of adapting traditional service quality criteria to the digital environment when assessing the quality of e-services.

This scientific approach is even more relevant for today's transport systems. Because before using the transport service, the passenger can receive the route, the arrival time of the vehicle, traffic congestion, ticket price and other information through digital platforms. During the service, he has

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the opportunity to track the location of the vehicle via GPS, make electronic payments and express his opinion on the quality of the service. Thus, digital technologies are changing not only the process of providing transport services, but also the mechanism for assessing their quality.

A study conducted in 2025 by Nilsson, Jansson, Nicholas and Zhao with the participation of 4,200 public transport users in Sweden more clearly demonstrated the connection between digitalization and the quality of transport services. The study found that digital competence, that is, the ability of a passenger to use mobile applications and other digital tools, affects the perceived quality and satisfaction of the transport service.

Also, in 2025, a special scale was developed to assess technology-enabled service quality in public transport. The study, based on data from 446 passengers, assessed service quality based on six key components: tangibles, reliability, speed, assurance, empathy, and technology-enabled service quality. This result suggests the need to consider digital technologies as an independent factor in assessing the quality of transport services.

Digital technologies are also expanding the possibilities for monitoring the quality of transport services in real time. GPS and telematics systems can automatically record indicators such as vehicle movement, delays, waiting times at stops, and route load levels. As a result, it becomes possible to assess service quality based on real operational data, rather than just periodic questionnaires. Within the framework of Intelligent Transport Systems (ITS), digital infrastructure is considered an important means of integrating transport services and ensuring information exchange between various participants. The ISO/TR 7872:2022 standard defines the functional model of digital infrastructure for urban ITS services and approaches to information exchange between transport service participants.

In addition, the publication of the TPEG2-PTS technology specification for public transport information services in 2025 indicates the technical development of real-time transport information delivery to users. This system is aimed at effectively delivering alerts and public transport information from the service provider to the end user.

At the same time, an analysis of existing research shows that although the traditional SERVQUAL, satisfaction and passenger experience indicators have been sufficiently studied in the scientific literature on assessing the quality of transport services, the issue of a comprehensive assessment of the relationship between digital technologies and these indicators has not yet been fully resolved. In particular, the issue of integrating GPS monitoring, mobile applications, electronic payment, real-time information, digital appeals and data analytics within a single transport service quality index requires separate scientific research.

The analysis has shown that GPS monitoring, electronic ticketing systems, mobile applications, geolocation services, electronic payment platforms and online appeal systems significantly increase the efficiency of assessing the quality of transport services. These technologies allow for quick information on vehicle compliance with the schedule, waiting times at stops, regularity of service, load levels of routes and passenger satisfaction. As a result, the process of making management decisions is improved based on a data-driven approach.

Digital technologies also further strengthen the connection between the quality of transport services and consumer satisfaction. The openness of information, the ability to obtain information about the movement of vehicles in real time, the convenience of electronic payments and the ability to express opinions on the quality of service through mobile applications increase the trust of passengers in the transport system. This is one of the important factors in strengthening the competitiveness of transport enterprises and improving the efficiency of services.

The acceleration of the process of digitalization of transport systems in the conditions of Uzbekistan requires the introduction of modern mechanisms for assessing the quality of transport services. In this regard, it is advisable to create a unified monitoring system based on digital indicators for assessing the quality of transport services, regularly collect passenger feedback through mobile applications, and form a service quality index using GPS and telematics data.

In general, digital technologies are an important organizational and economic tool that, while making the transport service quality assessment system more transparent, efficient and effective,

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serves to improve the quality of service, rational use of resources, and the development of transport infrastructure.

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