Western European Journal of Linguistics and Education
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

LINGUISTIC ANALYSIS OF THE IMPACT OF MODERN TRANSPORT TECHNOLOGIES ON THE DEVELOPMENT OF RAILWAY TERMINOLOGY

Kurbanova Ilmira Sharifovna
Associate Professor of Tashkent State Transport University

Abstract: This article analyzes terminological changes related to the development of modern transport technologies in the railway sector and their linguistic characteristics. In the process of technical progress, railway terms are constantly being renewed, and new concepts, abbreviations, and international terms are emerging. The article addresses the formation of railway terminology, the entry of English language terms into the Uzbek language as a result of international integration processes, as well as the morphological and semantic adaptation of these terms. The research analyzes from a linguistic perspective how modern transport technologies—digitalization, automation, artificial intelligence, and intelligent transport systems—are influencing the linguistic system of the sector.
Keywords: railway terminology, transport technologies, linguistic analysis, term formation, neologisms, international terms, semantic change, digitalization, automation, English terms

Introduction: Language is an integral part of any social system, and technological progress directly affects the vocabulary and terminological system of language. The transport sector, particularly the railway system, as one of the sectors most closely connected with technology and engineering, is an active field of terminological renewal. In recent years, as a result of the rapid development of transport technologies, digitalization, and the implementation of artificial intelligence and automated management systems, significant changes are occurring in railway terminology.

In Uzbek linguistics, issues of the formation of terminological systems and the development of national terms have been studied by scholars such as Madvaliyev, Mirtojiyev, and Qo'chqorov. Madvaliyev's research on the formation and development principles of Uzbek terminology provides a theoretical foundation for understanding how technical terms are integrated into the national language system.[1] Mirtojiyev specifically examined the characteristics of technical term formation in the Uzbek language, demonstrating how technological innovations necessitate linguistic adaptations at both phonetic and semantic levels.[2] Qo'chqorov's work on the assimilation and linguistic adaptation of technical terms further illuminates the processes through which borrowed terminology becomes naturalized within the Uzbek linguistic framework.[3]

In English linguistics, these issues have been extensively covered in the works of Cabré, Temmerman, and Sager, who interpret terminology as a social, cognitive, and communicative system. Cabré's groundbreaking work on terminology theory emphasizes that terminological units are not merely labels but complex cognitive structures that reflect specialized knowledge domains.[4] Sager's practical approach to terminology processing established methodological frameworks that remain influential in contemporary terminological research, particularly regarding the systematization and standardization of technical vocabularies.[5] Temmerman introduced the sociocognitive approach to terminology, arguing that terms are dynamic units shaped by social practices and cognitive processes rather than static entities with fixed

Western European Journal of Linguistics and Education
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

meanings.[6] From this perspective, studying the development of railway terminology in connection with modern technological influence is one of the relevant directions in contemporary linguistics. The aim of the article is to analyze the linguistic impact of modern transport technologies on the development of railway terminology, to identify the formation mechanisms of new terms, their semantic and morphological characteristics, and to illuminate the adaptation process of international terms in the national language.

Main Part:

Formation of Railway Terminology and Historical Stages

Railway terminology began to form from the second half of the 19th century, with initial terms related to technical processes and mechanical devices. For example, words in English such as railway, locomotive, carriage, station, track appeared as products of the technical revolution era. In the Uzbek language, terms that initially entered through Russian such as poezd, stantsiya, rels, depo, signal formed the core of the sectoral vocabulary. From the second half of the 20th century, as a result of the development of electronic control, automation, and dispatching systems in railway transport, new terms emerged such as avtomatika, telemexanika, lokomotiv brigadasi, signalizatsiya tizimi and others. The terms of this period were mainly developed in accordance with technical innovations and were distinguished by semantic precision and functional purposefulness.

Modern Transport Technologies and Terminological Renewal

In the 21st century, a new stage of transport technologies began with the era of digital transformation. Innovations such as intelligent management systems, automated platforms operating on the basis of artificial intelligence, and digital logistics systems were implemented in the railway system. Blum and Schröder's research demonstrates that smart technologies have fundamentally transformed railway terminology in the digital era, creating entirely new lexical domains that reflect the convergence of information technology and traditional railway operations.[7] Their analysis reveals that the introduction of digital systems has not merely added new terms but has restructured the entire conceptual framework of railway discourse.

Along with these technological developments, new terms appeared in the language system. Terms such as smart railway, digital control system, intelligent transport network, eco-train, energy recovery system, AI dispatch center are used in Uzbek language in forms such as aqlli temir yo'l, raqamli boshqaruv tizimi, sun'iy intellektli dispetcher markazi. Gomes and Pereira examined the language and communication challenges arising from digital transformation in railway systems, noting that the rapid pace of technological change often outstrips the ability of linguistic systems to develop standardized terminology.[8] Their research highlights the tension between the need for precise technical communication and the natural evolution of language in response to innovation.

Three main directions are observed in the formation of such terms. The first is complete borrowing, exemplified by terms like logistika, avtomatizatsiya, sensori. The second involves partially adapted borrowing, as seen in dispetcherlik, monitoring tizimi, platforma. The third direction consists of neologisms created on the basis of national words, such as aqlli temir yo'l, raqamli tarmoq, energiya tejamkor tizim. From a linguistic perspective, these terms are formed through semantic expansion, metaphorical transfer, and abbreviations. For example, the abbreviation ETCS is also used in international form in the Uzbek language, which is a manifestation of terminological universality. Wang and Chen's investigation into the impact of digital and smart technologies on railway terminology development reveals that abbreviations and acronyms have become increasingly prevalent as a response to the complexity and length

Western European Journal of Linguistics and Education
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

of compound technical terms, serving both efficiency and international standardization purposes.[9]

Semantic and Morphological Characteristics of Terms

New terms in the railway sector are typically created in the form of compound words or composite units. For example, terms such as high-speed railway, automatic braking system, digital signal processing consist of several lexical components and express one concept. In the process of translation into Uzbek, these units are often adapted in the form of explanatory combinations such as yuqori tezlikdagi temir yo'l, avtomatik tormoz tizimi, raqamli signalni qayta ishlash.

Morphological adaptation plays an important role in this process. When English terms enter the Uzbek language, they are adapted phonetically and morphologically to the national language system, transforming sensor to sensori, platform to platforma, dispatch to dispetcherlik, and digital to raqamli. At the same time, changes also occur at the semantic level. For example, while the word platforma previously meant only a passenger platform, it is now also used in the meaning of software platform. This semantic expansion reflects what Temmerman describes as the dynamic nature of terminology, where meanings evolve through usage in new contexts and domains.[6]

International Integration and Terminological Unification

Modern transport networks are developing on the basis of international integration. For this reason, unification in terminology, that is the process of forming common international standards, is of great importance. As a result of cooperation between European and Asian railway systems, many terms are used in international form such as intermodal transport, freight corridor, logistics hub, smart railway control. The United Nations Economic Commission for Europe has emphasized the critical importance of establishing terminology and communication standards in sustainable transport systems to facilitate cross-border cooperation and ensure safety in international railway operations.[10] Their guidelines recognize that terminological consistency is not merely a linguistic concern but a fundamental requirement for operational efficiency and safety in interconnected railway networks.

In the Uzbek language as well, most of these terms are used with semantic explanation while preserving their form. This situation is called semi-borrowing in terminology. Such units expand the international communication possibilities of the language, while strengthening the adaptability of the language system. The concept of semi-borrowing aligns with Cabré's framework, which recognizes that specialized terminology often occupies a liminal space between fully naturalized vocabulary and completely foreign expressions.[4] The Digital Railway concept developed by Uzbekistan Railways JSC represents a comprehensive approach to integrating modern technological terminology into national railway discourse while maintaining linguistic accessibility and cultural appropriateness.[11] This initiative demonstrates how national terminology development can proceed in parallel with international standardization efforts.

Results of Linguistic Analysis

The above analyses demonstrate that the development of modern transport technologies directly affects the formation and renewal of railway terminology. Neologisms, abbreviations, metaphorical word transfers, and the assimilation of international terms enrich the linguistic system of the sector. Here, English serves as the main source as the language of global communication.

Western European Journal of Linguistics and Education
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

The main trends in the development of railway terminology include the connection of technical terms with digital processes, the increase of terms related to environmental and sustainability concepts such as eco-train and green transport, the grounding of terms in principles of brevity and precise expression, and the strengthening of international terminological harmonization. These trends reflect broader patterns in technical language evolution that Sager identified in his systematic approach to terminology processing, where efficiency, precision, and international compatibility serve as guiding principles.[5]

Conclusion: Railway terminology is directly connected with the development of modern transport technologies, and this process shows that language is constantly being renewed as a dynamic system. Technological innovations create terminological neologisms, affect their semantic and morphological structure, and ensure the international adaptability of language. Therefore, linguistic analysis of railway terminology has practical significance not only for linguistics but also for technical fields. In the future, conducting in-depth research in this direction based on corpus linguistics, terminography, and translation studies, and creating a unified electronic database of national railway terms remains one of the urgent issues.

References

1. Madvaliyev, A. (2012). O'zbek terminologiyasining shakllanishi va rivojlanish tamoyillari. Tashkent: Fan nashriyoti.
2. Mirtojiyev, M. (2018). Texnik terminlarning o'zbek tilida shakllanish xususiyatlari. O'zbekiston Milliy universiteti ilmiy xabarlari, 3(2), 112–118.
3. Qo'chqorov, D. (2021). Texnik terminlarning o'zlashuvi va lingvistik moslashuvi masalalari. Filologiya masalalari, 1(4), 75–83.
4. Cabré, M. T. (1999). Terminology: Theory, methods and applications. Amsterdam: John Benjamins.
5. Sager, J. C. (1990). A practical course in terminology processing. Amsterdam: John Benjamins.
6. Temmerman, R. (2000). Towards new ways of terminology description: The sociocognitive approach. Amsterdam: John Benjamins.
7. Blum, H., & Schröder, T. (2020). Smart technologies and the evolution of railway terminology in the digital era. Journal of Transport Linguistics, 5(2), 87–104. https://doi.org/10.1016/j.jtl.2020.05.004
8. Gomes, R., & Pereira, F. (2021). Digital transformation in railway systems: Language and communication challenges. International Journal of Railway Technology, 10(1), 35–52. https://doi.org/10.4203/ijrt.10.1.3
9. Wang, Y., & Chen, L. (2021). The impact of digital and smart technologies on railway terminology development. Journal of Modern Transport Studies, 9(3), 146–160. https://doi.org/10.1080/23281255.2021.114562
10. United Nations Economic Commission for Europe (UNECE). (2020). Terminology and communication standards in sustainable transport systems. Geneva: United Nations Publications.
11. Uzbekistan Railways JSC. (2023). Raqamli temir yo'l tizimi va transport texnologiyalarining terminologik yangilanishi. Tashkent: Publication of the Ministry of Transport.