

Review of the article «MODERN DIGITAL TECHNOLOGIES IN THEIR INTERACTION WITH TRIZ»

The article explores the intersection of modern digital technologies (including AI and artificial neural networks) with TRIZ and ARIZ methodologies. The author examines how the rapid evolution of information technologies, the shortening of innovation cycles, and the increasing complexity of technical systems necessitate a fundamentally new approach to creating inventive solutions. Special attention is paid to psychological barriers, technical stereotypes, and the subjective nature of evaluating the “non-obviousness” of inventions, particularly in the context of the fourth patentability criterion used in the United States.

The relevance of the study is driven by the current challenges of digital transformation: the need to accelerate the transition from an inventive idea to a market-ready product, the rising cost of prototyping, and the integration of multidisciplinary technologies (electronics, materials science, laser technology, etc.). The author rightly notes that traditional methods of innovation analysis often fail to account for emerging psychological and technological stereotypes, which can block the commercialization of potentially breakthrough ideas. This makes the article valuable for inventors, engineers, and innovation managers.

The author employs methods of theoretical analysis, patent review, and case-based reasoning. The article systematically presents several key concepts, including:

The impact of digital technologies on innovation speed – the drastic reduction of the time cycle from idea to product, which raises the stakes for correct initial technical solutions.

Psychological and technological stereotypes – how entrenched “obvious” solutions from past industrial eras hinder the adoption of truly novel, cross-disciplinary ideas;

The subjective nature of the “non-obviousness” criterion – particularly the fourth U.S. patent criterion, which introduces psychological bias into the evaluation of inventions;

Paradoxes of dynamic fuel component mixing – a detailed description (with figures) of seven physical paradoxes observed in a device for mixing liquid and gaseous fuels, including the formation of a vacuum zone, changes in fluid compressibility, and the creation of millions of fuel microcapsules.

A particularly valuable part of the article is the detailed illustrative material (Figs. 1–11) that shows modern, innovative design, the simulation of structural materials, and the application of AI systems during qualification testing. The description of the seven paradoxes of fuel mixture mixing demonstrates a deep understanding of physical processes and has direct practical application for thermodynamic systems. Additionally, the extensive list of patent references (Appendices 1–17) provides a solid foundation for further research.

The work systematizes the challenges facing modern inventors, who must be not only engineers but also multidisciplinary experts attuned to market demands and psychological barriers. The practical significance lies in highlighting the need to overcome stereotypes and reconsider the evaluation of obviousness/non-obviousness in the context of integrated technologies (electronics, optics, new materials).

Conclusions. The article «MODERN DIGITAL TECHNOLOGIES IN THEIR INTERACTION WITH TRIZ» is a thought-provoking and original study that bridges the gap between classical invention theory (TRIZ/ARIZ) and the realities of modern digital engineering. The work is notable for its depth of insight into psychological factors, its detailed technical case study, and its relevance for practitioners in innovation, patent analysis, and R&D.

I recommend the article for publication in the journal Science Online.

Reviewer:

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Expert in the field of information technology