UDC 659.1:004.8
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INTEGRATION OF NEUROMARKETING AND ARTIFICIAL INTELLIGENCE FOR THE DEVELOPMENT OF E-BUSINESS STRATEGIES

The dynamic development of digital technologies and the ongoing socio-economic transformation necessitate the search for new tools to support decision-making processes in organizations operating in a digital environment. One of the key challenges of e-business today is not only capturing consumer attention but also gaining a deep understanding of the mechanisms that determine their purchasing decisions. In this context, neuromarketing and artificial intelligence (AI) are gaining increasing importance, and their integration makes it possible to create more effective and personalized management strategies in the digital economy [1; 2].

Neuromarketing, which combines knowledge from neuroscience, cognitive psychology, and marketing, enables the analysis of consumers' unconscious reactions to marketing stimuli, significantly expanding traditional market research methods [3]. Neurobiological data such as brain activity, emotional responses, and eye-tracking provide insight into decision-making processes that are often inaccessible through classical declarative methods. Artificial intelligence, in turn, allows the processing of vast behavioral datasets, identifying behavioral patterns, and predicting future consumer decisions with high precision [4; 5].

The integration of neuromarketing and AI creates a new quality in designing e-business strategies. Combining neurobehavioral data with advanced machine learning algorithms enables the creation of dynamic customer segmentation models, the automation of content personalization processes, and the optimization of marketing communication in real time [1, 4]. As a result, companies can not only increase the effectiveness of their activities but also build long-term relationships with customers in a digital environment characterized by growing competitiveness and rapidly changing consumer preferences [2;5].

From a theoretical perspective, the integration of neuromarketing and artificial intelligence can be viewed as part of a broader trend toward the intellectualization of economic processes, in which business decisions increasingly rely on data, knowledge, and advanced analytics. Contemporary management models are shifting away from intuition-based decision-making toward approaches grounded in the in-depth analysis of neurobehavioral data, enabling a deeper

understanding of consumer motivations and their responses to marketing stimuli [1]. The integration of these elements supports the development of next-generation decision-making systems, in which data collected through neuromarketing methods are processed and interpreted by AI algorithms, providing managers with deeper and often non-obvious insights into market dynamics [5].

This model aligns with the concept of Society 5.0, in which digital technologies, artificial intelligence, and knowledge of human behavior jointly form the foundation for sustainable development, intelligent management, and innovation. Such an economy is built upon the synergy between humans and technology, where neurophysiological and behavioral data are used not only for marketing purposes but also to optimize product design, manage customer relationships, and build long-term business value [1; 5].

Findings from recent research confirm that integrating neuromarketing and AI fosters the development of more flexible, adaptive, and proactive management models that are better suited to the dynamics of the digital environment [2, 4]. Combining the analysis of emotions, attention, and decision-making processes with machine learning capabilities enables the creation of strategies that not only address current consumer needs but also anticipate future market trends. As a result, organizations can adapt more rapidly to changing preferences, allocate resources more efficiently, and increase the effectiveness of marketing and sales activities.

Further research in this field may contribute to the development of new analytical methods and decision-support tools that integrate neurophysiological and behavioral data in a more automated and scalable manner. Such advances may serve as the foundation for developing sustainable and responsible e-business strategies in the next stages of the digital economy's evolution.

In addition to its strategic and analytical implications, the integration of neuromarketing and artificial intelligence also transforms the very nature of consumer interaction within digital ecosystems. Intelligent platforms equipped with emotion-recognition technologies and real-time behavioral analytics can adjust not only the content but also the tone and timing of communication, creating a more immersive and empathetic user experience. This human-centric approach, powered by data-driven insights, promotes higher engagement levels and enhances brand loyalty [2, 4].

Moreover, the practical application of neuromarketing-AI integration extends beyond marketing and sales to encompass broader business functions such as innovation management, product development, and customer service optimization. AI-driven interpretation of neurophysiological data allows organizations to evaluate user experience and product usability more precisely [1; 3].

As companies increasingly adopt hybrid analytical models that combine biological and computational intelligence, the boundaries between technological innovation and behavioral science become blurred. This interdisciplinary synergy may lead to the emergence of new business paradigms, where value creation is driven not only by technological capability but also by a deep, scientifically grounded understanding of human behavior [1; 5].

Ultimately, the ongoing integration of neuromarketing and artificial intelligence represents a transformative step toward intelligent, adaptive, and ethically grounded e-business ecosystems. In doing so, businesses can ensure that the technological progress underpinning the digital economy serves not only profit maximization but also the broader goals of human-centered innovation and sustainable development.

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