

Економіка та управління національним господарством

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The behavioral imperative of technological development in the economy

R. N. Davymuka

Objective. To define the essence of the behavioral imperative as a key principle for stimulating technological development in Ukraine, with an emphasis on consumer behavior, digital interaction practices and effective marketing approaches.

Methodology. The article employs methods of retrospective and systemic analysis, statistical methods, methods of induction and deduction, logical generalization, content analysis, and comparative analysis.

Results. Based on an analysis of international ranking studies, it is demonstrated that in recent years Ukraine has established itself as a full-fledged participant in the global technological landscape, ranking among the top 10 countries worldwide for IT sector competitiveness (7th place) and among the top 5 for the level of professionalism of IT specialists. It has been established that the leading trend in technological development is the creation of new goods and products with more advanced properties, enabling people to solve new problems and meet ever-growing needs. Using classical theoretical principles of behavioral economics, the main aspects of the interaction between the behavioral imperative and technological development are explored through behavioral tools such as technology adoption, digital 'nudges'; the economics of human attention; the epistemic turn; and the behavioral dimension. It is demonstrated that the behavioral imperative in contemporary technological development acts as a link between human psychology and digital tools, enabling the creation of products that account for users' irrationality.

Originality. The paper substantiates and elaborates on the proposition that the behavioral imperative must be taken into account to a significant extent in the formulation and implementation of state technology policies through methods based on psychology and behavioral analysis to stimulate innovation, the adoption of new technologies and the enhancement of competitiveness.

Practical value. The research findings can be utilized in the formulation of state policy on technological development and digital transformation, the development of strategies to stimulate the adoption of innovations and cutting-edge technologies, and the refinement of marketing approaches to the promotion of digital products and services.

Keywords: behavioral economics, behavioral imperative, technologies, technological development, behavioral tools.

Introduction

In times of uncertainty and turbulence caused by numerous influencing factors, economic processes are evolving at a rapid pace, despite the heightened risks and challenges involved in decision-making. One of the key factors shaping the nature of these processes is technological change, which is regarded as the driving force behind investment and innovation, as well as the transformation of the manufacturing environment. For several decades now, the global economy has been undergoing the fourth, and subsequently the fifth, industrial revolutions, driven by automation, artificial intelligence and the deepening of digital economy processes, which are increasingly influencing not only people's lifestyles but also their subconscious, that is, they are altering the behavioral components of economic actors (households, companies, states). To identify these, researchers and experts are combining various theories and concepts that seek to explain the nature of changes in traditional approaches based on behavioral models. In this context, the behavioral imperative is increasingly recognized as a key principle for adapting to complex challenges, as it allows for a better understanding, anticipation and prediction of people's reactions to change, taking into account their preferences, motivations and concerns.

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Ukraine's ever-growing role in the global technology sector in recent years has attracted increasing interest from foreign partners and investors. Even before the war began, the Ukrainian IT industry had become a driving force behind the national economy, partly due to its role as a key player in the global information technology market, demonstrating resilience and significant growth potential even today. Ukrainian technology companies and start-ups are developing technological solutions that meet global demands, whilst international corporations are increasingly commissioning high-quality Ukrainian IT services, software development and cutting-edge technologies. In particular, the heightened focus on technological development amidst a large-scale war against the aggressor is characterized by MilTech (military technologies), AI, cybersecurity and the rapid digitalization of public services (notably, Diya), positioning Ukraine as a serious technological player on the global market. In this context, the successful implementation of digital transformation requires a comprehensive approach that takes into account technological, organizational, institutional and socio-psychological aspects, with a view to ensuring a balance between technological innovation and the productive development of the economic environment.

Thus, high hopes are pinned on technological development, yet the question arises as to the need to identify the influence of behavioral factors on the resolution of socio-economic problems during the development and implementation of cutting-edge technologies, taking into account the structural, functional and ergonomic characteristics of products and systems designed to meet the current and future needs of various consumer groups. These are primarily focused on identifying new opportunities to enhance well-being and address pressing social issues in the fields of healthcare, education and the environment, bearing in mind that economic decisions are made by ordinary people – with emotions, flaws and shortcomings – utilizing elements of various cognitive styles that reflect individual human characteristics. This is particularly relevant in the context of changing consumption patterns in the digital environment, as well as the need to formulate an effective technological policy aimed at supporting both the national economy and individual households under the new conditions. Thus, in connection with the new wave of intensified technological development, the problem of defining the behavioral imperative for the formation of a new model of technical and economic systems becomes pressing; this, in turn, broadens and deepens their nature and characteristics and necessitates the identification of interrelationships and mutual influences.

Literature review

Retrospective studies point to a sustained interest in the field of 'behavioral economics', which is gaining popularity and relevance as it enables the psychological characteristics and irrationality of economic agents to be taken into account during decision-making, thereby contributing to economic development. Indeed, renowned international authors such as D. Kahneman, M. Allais, G. Simon, R. Thaler, A. Tversky, J. Akerlof, G. Gintis and others have devoted their academic works to the study of these issues. In Ukraine, research into the methodological tools of behavioral economics began not so long ago, yet the theoretical aspects of this subject have now been sufficiently explored. In particular, the significance of behavioral economics in the context of the development of economic sciences and the potential for applying its theoretical principles in the process of creating information resources has been identified (Marchyshyn, 2023); the main stages in the development of behavioral economics as a promising conceptual and theoretical field have been summarized (Antoshchenkova and Deineha, 2024); trends in the paradigm shift of behavioral economics and ways to remove barriers hindering behavioral change have been identified (Balan, 2024), and so on. Among applied works, studies of behavioral finance (Sybirtsev and Zadorozhnyia, 2024) and an analysis of the specific features

of behavioral institutions, characteristic of the digital economy (Osetsyki et al., 2023), are worthy of attention. However, despite growing academic interest in this topic, the academic landscape still lacks comprehensive studies that would integrate interdisciplinary approaches to analyzing and identifying the characteristics of the mutual influence of the behavioral imperative and technological development on the formation of contemporary economic processes.

Purpose of the Study

The aim of this article is to define the essence of the behavioral imperative as a key principle for stimulating the technological development of Ukraine's economy, with a focus on consumer behavior, digital interaction practices and effective marketing approaches.

Methodology

To achieve the set objective, a range of general scientific and specialized research methods were employed, enabling the essence of the behavioral imperative of the economy's technological development to be revealed and its role in shaping contemporary economic processes to be determined. The information base for the study consisted of scientific works by domestic and foreign scholars on issues of behavioral economics, technological development, digital transformation and technology policy, as well as materials from international ranking studies, analytical reports and statistical sources on the development of Ukraine's innovative and digital economy.

The methodological approach is based on the sequential implementation of the following research stages: (1) an analysis of the theoretical principles of behavioral economics and concepts of technological development to establish the conceptual framework of the study; (2) an assessment of the current state of technological development in Ukraine based on international rankings and digital transformation indicators; (3) investigation of the interrelationship between behavioral factors and the processes of technological innovation implementation; (4) systematization of behavioral tools influencing technological decision-making, including digital nudges, the economics of attention, and epistemic and behavioral dimensions; (5) justifying approaches to incorporating behavioral imperatives into the formulation and implementation of the state's technological policy.

The research utilized methods of retrospective and systemic analysis to examine the evolution of scientific approaches to behavioral economics and technological development; statistical methods to analyze international rankings and indicators of digital development; methods of induction and deduction to formulate generalizations regarding the influence of behavioral factors on technological processes; content analysis – to examine scientific sources, analytical reports and regulatory and strategic documents; comparative analysis – to compare international experience in the use of behavioral tools in the field of digital transformation and technology policy. The application of these methods ensured the comprehensiveness of the study and made it possible to substantiate the behavioral imperative as an important factor in stimulating the technological development of the economy in the context of society's digital transformation.

Results and Discussion

According to the Global Innovation Index (the 2024 report entitled «Realizing the Potential of Social Entrepreneurship, «which ranks over 130 countries by their level of innovation performance) (Global Innovation Index, 2024), Ukraine significantly improved its position in the «knowledge and technological outcomes» sub-index compared to 2023, moving from 45th to 34th place. Among the strengths of this sub-index are «knowledge creation» (29th place), including the indicators: «ratio of patents by country of origin to GDP» (34), «ratio of utility models by

country of origin to GDP» (1); «knowledge impact» (60th place) – «expenditure on computer hardware and software as a percentage of GDP» (4), «knowledge diffusion» (35th place) – «exports of ICT services as a percentage of total foreign trade» (5).

According to international rankings and an analysis of data from *Digital State UA*, as of early 2025 Ukraine had established itself as a full-fledged participant in the global technology landscape, ranking among the world's top 10 countries for IT sector competitiveness (7th place) and the top 5 for the professionalism of its IT specialists. Among the key factors contributing to this situation are a developed modern technological ecosystem, military innovation and technological experience, and the transition from outsourcing to product-based companies. According to another well-known study conducted by the British agency Oxford Insights, Ukraine climbed 14 places in the global AI ranking and ranked 40th among 195 countries worldwide, as well as entering the top ten leaders in AI development in Eastern Europe and moving confidently towards global technological leadership: 99.63% – the rate of digitalization of public services; 92.25% – compliance of legislation with international standards.

2025 is considered a turning point for the development of AI in Ukraine: the WINWIN AI Centre of Excellence was established; Diya.AI – the world's first national AI assistant for public services – went live on the Diya portal; work began on a large Ukrainian language model and the AI Factory infrastructure; the Sandbox for developing AI and blockchain products began operations; AI is already being integrated into Mriya, Diya, the Ministry of Digital Transformation's ecosystem projects and government processes (Ministry of Digital Transformation, 2025). As a result, according to the GovTech Maturity Index (GTMI) 2025, Ukraine has achieved the status of a global leader in the digital transformation of the public sector across each of the key areas (core government systems: cloud solutions and registry interoperability; online service delivery: convenience and accessibility of services for citizens; digital citizen participation: e-democracy tools and public engagement in decision-making; drivers of development: institutional mechanisms, strategies and the innovation environment) (GovTech Maturity Index, 2025). Thus, modern technological development is demonstrating significant growth, despite the serious challenges posed by the war, which is offset, in particular, by corporate social responsibility towards citizens and the state's commitment to building the nation's social capital.

It is traditionally held that modern economic systems exist as a unity of technological (defined by the necessary number of technological stages through which resources are transformed into products), production (reflecting the degree of applicability, as well as the scale and intensity of technology use to meet societal needs) and institutional (manifesting organizational and legal forms and society's transactional perception of technologies) aspects. Thus, the very concept of *technology* in the broad sense should be interpreted as scientific and technical methods for achieving practical goals. On the one hand, technology is a means of influencing changes in the conditions of production and trade in goods produced with its aid; on the other hand, it is itself the subject of development and trade. In this regard, the most comprehensive definition, in our view, is offered by the World Intellectual Property Organization (WIPO), which regards *technology* as a body of systematic knowledge concerning the manufacture of a particular product, the application of a particular process, or the provision of a particular service, regardless of whether this knowledge is embodied in an invention, an industrial design, a utility model, or a new technological installation, or in technical information or know-how, or in services or assistance provided by specialists in the design, installation, operation and maintenance of industrial installations, or in the management of an industrial or commercial enterprise or its activities. Hence, technological development is not merely the introduction of individual technologies into production, but a dynamic,

systemic process based on the interaction of scientific, technological, innovative and investment activities.

To date, a significant body of scientific knowledge has been accumulated regarding the search for ways to substantiate the technological factor of economic growth, taking into account society's constant concern about the emergence of new technologies and their penetration into the lives of people and nature. In particular, alternatives regarding their role on the 'technological optimism – technological pessimism' spectrum are being discussed, which reinforces the desire to place it under public control. The leading trend in technological development is the creation of new goods and products with more advanced properties, enabling people to tackle new challenges and meet ever-growing needs. Hence, the psychological factors of technological development are important, including motivation for innovation, risk-taking readiness, staff creativity, the psychological climate within the team, and society's perception of change; ultimately, determine the economy's ability to adopt technologies, ensuring human self-fulfillment, a creative approach and the formation of an innovative culture, which enhances the country's competitiveness. From this perspective, we agree with the view of scholars who argue that the economic model of the individual within the framework of behavioral economics should be considered as a coherent whole in an institutional context: the institutional structure of this model's modification under the influence of various economic, social, psychological and other factors moves to a higher level through the use of more sophisticated analytical tools (Osetskyi et al., 2023). Undoubtedly, taking psychological characteristics and individual aspects into account when making decisions can help to more effectively translate discoveries into new technologies, thereby improving the quality of life for the population and ensuring the stability of economic development.

Consequently, from the perspective of the behavioral imperative principle, the key factors in technological development should be regarded as the presence of appropriate behavioral models and the existence of preconditions for their adaptation within the 'scientific knowledge – technological knowledge – technology transfer' system, the potential for technological development up to a certain stage, determined by the country's overall level of socio-economic and cultural development. A significant role in this process is played by the concentration of intellectual and financial resources on selected, strategically important scientific and technological priorities. Furthermore, technological development is also determined by so-called 'non-economic' factors (related, in particular, to the life and health, and the social environment of innovators); therefore, it is proposed that the conditions acting as its determinants be grouped into three categories (Fedulova, 2015): (1) the current state of human knowledge and of the individual (state of health), their ability to think, generate ideas, teach, learn, develop and utilize technologies, including the nation's propensity for invention; (2) institutional and organizational features of technological development, including the institution of private property rights, the shadow economy, forms of entrepreneurial activity, the use of financial instruments, etc.; (3) the state of the socio-economic infrastructure that meets the demand for new technologies, as well as functioning technical systems, the level of societal needs and development objectives, and, of course, the development of the global technological production base.

Specifically, in the technology sector, the behavioral imperative is used to study consumer behavior and understand the factors that influence purchasing decisions regarding goods and services based on the latest technology. Therefore, technological marketing is important, as it not only studies the ways in which consumers make decisions regarding the development and purchase of goods and services, but also significantly influences their consumer behavior (in particular, how factors such as price, advertising and brand are taken into account by consumers when making

purchasing decisions); examines how consumers' attitudes towards risk, uncertainty and imperfect information influence their decision-making. In technology policy, the behavioral imperative is used to develop more effective tools for regulating and stimulating socio-economic processes and the influence of cultural factors on people's behavior in economic situations. In the era of widespread implementation of artificial intelligence (AI), increasing attention is being paid to a human-centered approach when developing strategies, which could become a new paradigm for social policy, where digital tools, in conjunction with psychological tools, enhance social resilience, foster inclusion and build trust within society. In investment policy, the behavioral imperative takes on particular significance, as it is largely investors' cognitive biases, emotions and expectations that determine qualitative changes in the development of financial markets. Therefore, the growing role of digital platforms and mobile applications for investing requires a scientific justification for integrating behavioral factors into the system for assessing investment activity. Consequently, in today's rapidly advancing digital society, the behavioral imperative plays a key role in understanding and influencing financial habits, decision-making and consumer behavior in the online environment, as evidenced by the analysis of social, cognitive and emotional factors that drive irrational user behavior and help shape the digital trust and reputation of companies and states. Digital platforms use this knowledge to create effective tools that influence people's choices.

In general, the behavioral imperative within the digital innovation ecosystem analyses how digital technologies (AI, Big Data, UX/UI) influence decision-making by leveraging users' psychological characteristics, in particular by guiding consumption through 'nudges', personalization and gamification, ensuring a balance in stakeholder interactions within the digital economy. This triggers a significantly broad spectrum of behavioral changes not only among staff but also among company management, its customers, suppliers and other market participants. At the same time, the main threats arising in the digitalization process that are linked to the human factor generally include a decline in employment (due to staff reductions in companies caused by the automation of certain functions) and staff resistance to change (a classic reaction arising from existing habits and the lack of obvious benefits from changes in the nature of work). The impact of AI on work and careers is becoming particularly noticeable: it is predicted that by 2026, companies will be more actively formalizing the use of AI in the workplace, which may lead both to increased operational efficiency and to errors, biased decision-making or staff redundancies. Routine professions, such as cashiers, call center operators and translators, are at risk. At the same time, new roles and opportunities for retraining are emerging, and some employers will be able to use AI to improve productivity.

All the examples given above support the argument that there is a link between *behavioral imperatives* and *technological development* through influence: behavioral tools help to overcome the cognitive and social barriers that prevent people from accessing economic opportunities, explain resistance to innovation, by 'nudging' users and optimizing digital interfaces, thereby enhancing the effectiveness of human interaction with technology. From a systems perspective and taking into account the characteristics of 21st-century technological development, (Fedulova, 2011) we perceive the economic essence of the behavioral imperative and its interconnection with technological development as follows (Fig. 1). The *behavioral imperative* is an internal or external requirement, a mandatory attitude, acting as a moral framework that determines an individual's choice of actions, guiding their behavior. In a philosophical context, this concept is linked to principles that determine actions, in particular compelling one to act in a certain way, regardless of personal desires and circumstances, often based on morality, social responsibility or social norms. The methodology of the behavioral imperative is based on Immanuel Kant's concept of *the categorical imperative* as a fundamental principle of ethics

an urgent, unyielding, unconditional requirement

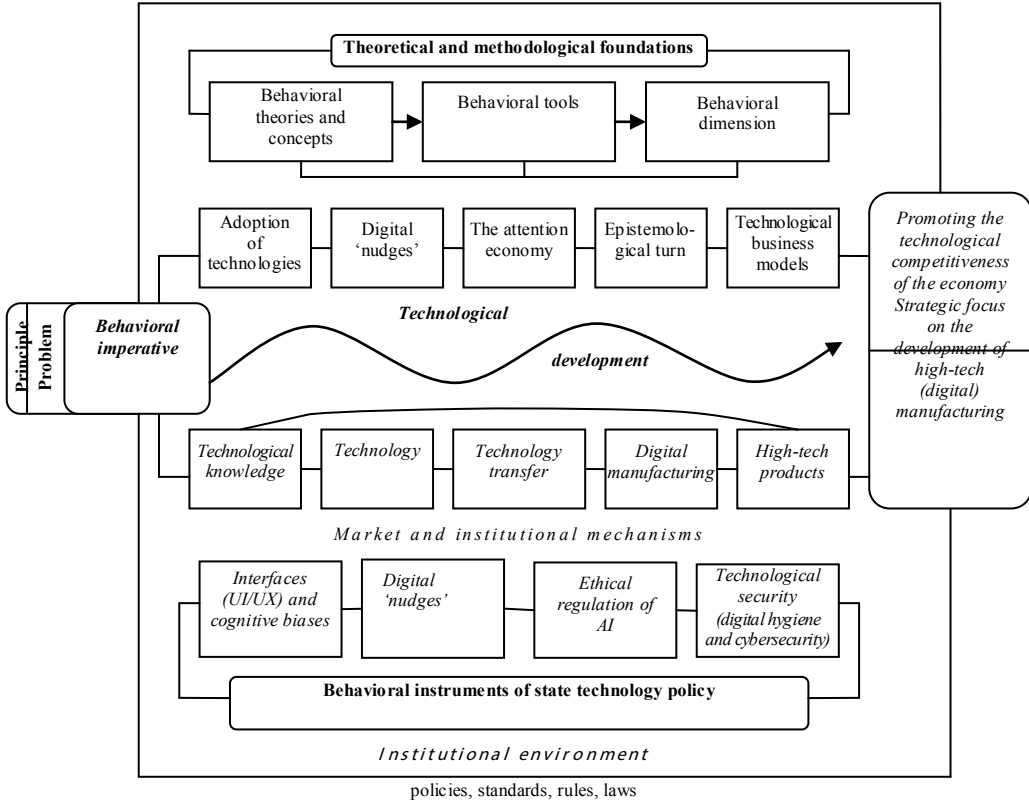


Fig. 1. Behavioral imperative of technological development of the economy

Source: proposed by the author

(as opposed to the hypothetical imperative, which depends on specific goals and operates under certain conditions).

Next, using classical theoretical principles of behavioral economics and, in particular, the proposals in (Bezgin, Ushkalov, 2019; Chornobaiev, 2025), we will outline the main directions of interaction between *the behavioral imperative* and *technological development*:

(1) *Technology adoption* is the process of integrating new tools, systems or solutions into business or everyday activities; it is driven by motivation, perceptions of usefulness and convenience, where behavioral factors (such as fear of loss or habit) often outweigh technical characteristics in users' decision-making. Typically, these include cognitive biases (effects that distort perception – anchoring as a method of rapid self-regulation, confirmation bias), emotional state (fear of the unknown or overconfidence, which can lead to irrational decisions), risk perception, social influence (conformity – following the majority and groupthink, which often determine choices) and the manager's personal assessment and experience (personal biases, level of competence and risk assessment by the manager or user), the state of the social environment (information constraints, social and ideological relationships within which a person operates) is also seen as important, as it shapes technological (currently digital) habits, leading to irrational decisions and depending on the institutional environment, thereby determining the success of technological innovation implementation. It is important to take these factors into account, as in most cases they increasingly override the classical rational model of decision-making.

(2) *Digital ‘nudges’*: technological platforms use behavioral tools to guide users towards selecting certain options (e.g., automatic updates, subscriptions) and, in this way, shape a ‘choice pattern’ through personalization (e.g. Amazon, Netflix), reminders and interface design, helping people make better choices, for example, through suggested recommendations, time constraints or convenient default settings, etc. However, it should be noted that whilst digital ‘nudges’ make choices more convenient, they are sometimes used to manipulate consumer behavior.

(3) *The ‘attention economy’* – the competition to capture and retain people’s attention (social media, algorithms) – is a concept that shapes the battle for attention in an information-saturated environment, leading to the emergence of new strategies, behavioral patterns and business models that shape the way information resources are produced, consumed and managed. After all, with the proliferation of various gadgets, social media, streaming services and other digital platforms, people are faced with a huge flood of content, each competing for their limited attention. Key aspects of this interconnection include: the technological foundation, the value of the resource, business models, and the impact on the user, all of which contribute to the transition towards a ‘conscious attention economy’ that is used not only to generate profit but also, as practice shows, to support sustainable social development as a whole. The attention economy is rightly considered a key driver of the digital economy, significantly transforming business processes and user behavior with a focus on their consumer value, which is formed in the consumer’s mind based on their experience, expectations and comparisons with alternatives.

(4) *The epistemic turn* – a behavioral approach that redefines rationality and helps adapt technologies to real, rather than theoretical, consumer needs (i.e. how we carry out the process of knowledge creation and transfer using modern tools, in particular artificial intelligence (AI) and digital platforms). *Key aspects of the approach*: technology, as an active agent of cognition, transforms the process of knowledge acquisition, shifting from the role of a tool to that of a partner (generating data, modelling complex systems, automating experiments and interpreting results) and thus shapes our understanding of the world, altering the very structure of scientific inquiry. In particular, modern technologies (AI, Big Data) not only help to collect data but are also capable of independently identifying patterns in processes; instrumental devices (telescopes, microscopes, sensors) define the boundaries and methods of cognition, determining the structure of the object; technologies enable the creation of virtual models of objects for experiments, replacing direct interaction with the object of cognition. Thus, technology acts as an active mediator between the subject and the object, transforming the process of cognition into an interaction between humans and technical systems.

In this context, it is important to note *the transformation of scientific methods* for researching and forecasting technological development, which in today’s environment signifies a shift from empirical experimentation to automated modelling, artificial intelligence and big data, ultimately accelerating technology transfer by combining fundamental research with commercialization: scientific discoveries are more quickly transformed into patents, licenses and commercial products. In practice, this transition facilitates the move towards a high-tech, automated (digital) level of production. In particular, the emergence and spread of virtual laboratories, 3D printing, biotechnology and quantum computing have radically changed the process of creating new technologies and equipment: the use of virtual and augmented reality allows to simulate processes, reducing the need for physical experiments; artificial intelligence and Big Data analyse vast amounts of data, identifying patterns that cannot be detected by traditional methods, and accelerate the development of new materials and technologies, etc. At the same time, one should not overlook such an important aspect as the development of interdisciplinarity: modern technologies (nanotechnology, robotics) require a combination of physics, chemistry, biology,

psychology, etc. Key aspects of these processes: AI is transitioning from the status of a 'tool' to the role of a 'cognitive partner' capable of identifying patterns inaccessible to the human mind due to vast volumes of data (however, this raises a trust issue, as algorithms often produce results without explaining the logical path to their derivation); in science, AI accelerates the formulation and testing of hypotheses, making the process of knowledge acquisition iterative and algorithmic.

At the same time, today's complex digital technological systems force us to abandon the illusion of complete control and perfectly logical decisions, by applying *the principle of bounded rationality*: there is no such thing as infinite time, memory or brain processing power; we never possess absolutely all the facts about the future or the market; we choose the first option that meets our minimum criteria ('good enough'), rather than searching endlessly for the ideal (Satisficing). Among other things, *epistemic rights and equality* deserve attention: the issue of access to truthful information is becoming increasingly relevant; in particular, society must ensure that every person possesses the skills to utilize the knowledge generated by digital institutions. *Key aspects* include: epistemic justice (ensuring that the knowledge and experience of different social groups are taken into account in AI training and technology development to avoid algorithmic bias; technological equality entails users' right to receive reliable information and protection against 'epistemic manipulation' (deepfakes – a portmanteau of 'deep learning' and 'fake' – bots, disinformation); epistemic exploitation (for example: large technology corporations extract data (knowledge) from users without giving them control over how this knowledge is used to shape their reality; cognitive self-determination: the human right to reject algorithmic recommendations and retain one's own system of judgement, without submitting to the 'authority' of computational systems. In other words, a process is taking place whereby humans become aware of their role, identity and the limits of their intellect in the context of the active implementation of artificial intelligence (AI) and cognitive technologies; that is, they have the right to clearly define which cognitive functions remain exclusively human (empathy, strategic intuition, ethics), and which are delegated to algorithms (data analysis, computation), whilst retaining critical thinking and autonomy in decision-making, despite the influence of recommendation algorithms and information 'bubbles'. Furthermore, from the perspective of the behavioral imperative, humans must perceive technologies not as competitors, but as enhancers and deepeners of their own cognitive capabilities, whilst realising that it is the human being who remains the agent setting the goals and value guidelines for the technological development of the technosphere and the economy, and understanding that excessive reliance on electronic devices can lead to the degradation of independent thinking skills.

The behavioral dimension plays a key role (the practical aspect of activity, which encompasses decision-making, emotional expressions and social interaction, and is most frequently used for analysis and subsequent adjustment or for understanding motivation). Thus, in economics and the social sciences, the shift from the 'rational man' model to taking cognitive characteristics and emotions into account can now be measured using digital tools; describing how innovations are changing our habits, ways of thinking and social interaction: technology influences how we perceive information (for example, 'clip thinking' – a mosaic-like perception of fragmented images that replaces a holistic picture, characteristic of social media use and receiving breaking news, which protects against information overload but reduces concentration and analytical abilities); the shift from face-to-face communication to digital communication (messengers, social media), which affects changes in empathy levels and social norms. For example, recommendation systems (TikTok, YouTube) shape our tastes, views and even political preferences, sometimes creating serious 'information bubbles'; the speed of access to services (Uber, Glovo) fosters expectations of 'instant gratification'; a shift in attitudes towards one's own data –

from caution to a voluntary public life, and so on. This and other factors require a rethinking of developers' responsibility regarding consumer trust in modern technologies; in particular, algorithms must not discriminate against people on the basis of race, gender or social status; the final decision in critical areas (medicine, justice, weapons) must remain with the individual; developers must explain how the technology reaches a particular conclusion, avoiding the 'black box' effect; users must know what data is being collected and how it is used; implementation of *Privacy by Design* principles; ensuring that technology is not used as a tool for manipulation or surveillance; assessing how technologies impact the environment and energy consumption; ensuring equal access to technology for different sections of the population (digital inclusion), etc. Thus, taking behavioral tools into account helps to develop interfaces that match cognitive capabilities, reducing cognitive load (the amount of mental effort required to process information and perform tasks in a person's working memory) and simplifying the process of human adaptation to technological change.

Thus, the behavioral imperative in modern technological development acts as a link between human psychology and digital tools, enabling the creation of products that take into account users' irrationality. Key areas of application: AI is used to identify behavioral variables and overcome people's cognitive limitations; algorithms (for example, in Spotify – the world's leading audio streaming service, providing access to millions of tracks, podcasts and audiobooks) help overcome choice overload by narrowing down millions of options to personalized recommendations; technology platforms use 'nudge' techniques to guide users towards desired actions: financial apps (Zerodha, Betterment) integrate behavioral finance principles to deter users from financially unrealistic decisions; eco-friendly interfaces set 'default' settings in favor of eco-friendly solutions (for example, in smart grids); wearable devices (smartwatches), combined with behavioral principles, encourage long-term changes such as increased physical activity or adherence to medication schedules, thereby promoting lifestyle changes and health promotion, etc. Among the trends for 2026 is hyper-personalization: the creation of ecosystems that adapt the digital experience to individual emotional states and behavioral patterns (design templates linked to algorithms and the distribution of responsibilities among objects) in real time; companies are using big data and analytical tools to create unique offerings that perfectly match the needs and preferences of each customer; ethical regulation: legislation is expected to be tightened to protect consumers from manipulative 'dark patterns' in interface design; democratization of support: the use of AI to provide psychological support and expand access to behavioral health services (the interconnection between habits, human actions and physical and mental well-being) for remote regions.

We shall now turn our attention to such an important institution of technological development as *technology policy*. For Ukraine, the issue of formulating an effective technology policy at the state level is currently of great relevance, particularly in terms of creating conditions to stimulate the comprehensive development of an individual's intellectual potential, which entails active state intervention at all stages of human capital formation and the refinement of the system of indirect state influence on the development of the high-tech manufacturing sector, as well as the application, in the early stages, of the necessary mechanism of protectionist measures to support it in the foreign market. Another important aspect is the creation of integrated, adaptive and transparent mechanisms for supporting the population, based on the principles of accessibility, ethics and trust in the context of the digital intellectualisation of the social security system. This will facilitate a productive transition to a proactive model of social policy, where decisions are made on the basis of data and predictive algorithms, thereby contributing to more efficient use of resources and improved quality of public services (Sagaidak, 2025).

Consequently, behavioral imperatives must be given due consideration in the formulation and implementation of national technology policies, through methods based on psychology and behavioral analysis, in order to stimulate innovation, foster the adoption of new technologies and enhance competitiveness, and thereby expand and deepen the country's technological development, transforming the 'human factor' into a catalyst for technological innovation. Behavioral tools include 'nudges' towards digitalization (infrastructure design that encourages citizens and businesses to choose digital or high-tech solutions without coercion); behavioral insights (from the English 'insight' – understanding, realization) in public administration: using data on human behavior to rationally streamline government digital services and encourage the use of AI or blockchain; gamification of technological processes: the use of game elements to train staff and increase engagement with technological change; simplifying access to services (for example, automatic registration in online accounts or digital document management as the preferred method of interaction, which accelerates the development of IT infrastructure). The use of digital services that implement the principle of easy choice architecture deserves special attention, for example in the EAST model developed by the UK Behavioral Insights Team, which sets out four key conditions for effective behavioral intervention: simplicity, attractiveness, sociality and timeliness. The practical application of such a model demonstrates how complex policy decisions are transformed into accessible, understandable and behaviorally effective actions on the part of citizens, which contributes to increasing societal resilience, particularly in the face of prolonged challenges and threats. Specifically in Ukraine, the EAST model for the implementation of digital services demonstrates high potential as a digital governance tool, in particular through the use of services such as 'Diya', specialized chatbots and online platforms (Semykras, 2025).

Gamification is seen as an important tool (particularly in the corporate sector of the economy), involving the use of gaming techniques to steer employee behavior in the desired direction (increasing productivity, meeting deadlines, training), often through repetitive cycles of action and corresponding incentives. The best-known *model* in this context is *the Hook model* – the so-called 'Hooked Model' – which describes a four-phase habit-forming cycle: (1) trigger (internal/external trigger) – an event or stimulus that prompts action; (2) action – a simplified target action by the user; (3) variable reward – an unpredictable or partially unpredictable reward for the action, which reinforces the desire to repeat it; (4) investment – a user's contribution (e.g. completing a profile or creating content), which increases their commitment to the action system (Ivanov, Timinsky, 2025).

Given that the foundation of modern technological development lies in the creation of *digital ecosystems for R&D*, a key component of the state's technology policy should be to support these ecosystems *through behavioral incentives*, such as tax breaks and grants, in order to shift companies' attitudes towards high-risk, but promising R&D projects, which help attract skilled professionals and investment. In general, behavioral tools enable the state to effectively manage technological transformation, minimizing resistance to change and facilitating the faster implementation of innovations; and the simplification of bureaucratic procedures through behavioral design makes the country more attractive to tech start-ups and venture capital investment. Of course, technological development is impossible without security, which is why an important role is assigned to technological security, namely *cybersecurity and digital hygiene*. For example, regular reminders to change passwords or game-based simulations of online fraud foster a culture of safe technology use at the national level; *the ethical regulation of AI and algorithms* using behavioral tools allows states to gently regulate the development of artificial intelligence by implementing the principles of 'ethics by design', which encourages the development of transparent and accountable technologies without strict bans that could hinder the digitalisation process as a whole.

Estonia is rightly cited as a successful example of the digitalization of the economy and society, taking into account the behavioral imperative, where this process is underpinned by a nationwide e-ID system (used by over 90% of users), blockchain technologies for public services and convenient digital solutions covering both the public and private sectors (Batke, 2025). In particular, behavioral insights to improve the efficiency of digital services are applied in the following areas: *the 'once-only' principle*: the system is configured so that the state never requests data that is already in the registers, which reduces the cognitive load on the user and encourages the completion of digital transactions; *proactive services*: the state itself offers services based on life events (for example, automatic calculation of childbirth benefits without the need to submit an application); *Personal State*: as part of the 'Estonia 2035' strategy, interfaces are being developed that adapt to the needs of the individual, making the use of services as seamless as possible; *Digital Defaults*: most processes (filing tax returns, prescriptions for medicines) are digital by default, fostering a lasting habit of using e-services; *data control*: users can see who has viewed their data and when, which creates a sense of security and increases willingness to share information; simplification campaigns: for example, the '100% Digital & 0% Bureaucrazy' initiative uses gamification elements (tests to measure 'bureaucracy levels') to engage citizens in digital transformation, etc. This approach has made Estonia the most user-centric digital state in the world, where technology adapts to human behavior rather than operating through bureaucratic control.

In conclusion, it should be noted that the methodological foundations of the behavioral imperative's influence on technological development are based on an analysis of people's cognitive limitations that affect decision-making in the digital age and are used to manage technological competitiveness, adapt technologies to consumers' psychological characteristics, and assess the impact of technological innovations on choice. The main components of this relationship include: technologies change the ways in which information is processed, whilst behavioral tools help to understand how these changes influence deviations from rational decisions; the use of digital interfaces and algorithms to influence user behavior with the aim of improving their choices; an experimental approach: behavioral economics methods (A/B testing) are used to assess the effectiveness of new technological products and interfaces; the psychological foundations of competitiveness: technological development is aimed at satisfying behavioral needs (convenience, emotional experience), which increases the value of the product. This interconnection enables the creation of technologies that are not only functional but also psychologically compatible with the user, minimizing cognitive overload.

Conclusions and Directions for Further Research

In general, the application of the behavioral imperative of technological development in the economy entails changes in consumption patterns, adaptation to the digital environment, an increase in educational and cultural standards, and a transformation of media values, which stimulate demand for new technologies, shape new financial habits, facilitate digital decision-making, and determine the speed of innovation adoption in business processes, increased demand for information and digital services, and active use of social platforms and networks, thereby changing the ways in which economic entities communicate and interact. Acting in conjunction with the technological imperative and economic factors, the behavioral imperative stimulates the transition to a digital society and influences the effectiveness of technological ecosystems. In this regard, the issue of technological development is of a practical nature, as it is linked to a fundamental restructuring of social morality, ethical knowledge and education, and to the creation of a new system of values appropriate to the new conditions and prospects for the development of society, where every action is dictated by an understanding of responsibility as a behavioral imperative.

Consequently, against the backdrop of Ukraine's growing aspirations for European integration, the formulation of a modern technology policy has become a strategic priority in terms of establishing a flexible system of foreign economic regulation that stimulates the development of the scientific and educational sectors and high-tech industries, taking into account behavioral tools, and must be an indispensable component of ensuring the country's effective participation in the functioning of the global scientific and technological space, which will enable it to take its rightful place in the global market for intellectual goods and services as a full-fledged partner. In conclusion, we note that: 1. By applying the fundamental principles of behavioral economics, economists and researchers gain the opportunity to refine models and forecasts based on more realistic assumptions about human behavior. 2. There are high hopes for Ukraine's technological development, yet the question arises regarding the need to identify the influence of behavioral factors on the resolution of socio-economic problems during the development and implementation of cutting-edge technologies, taking into account the structural and functional characteristics of products and systems designed to meet the current and future needs of various consumer groups. 3. The behavioral imperative, as a conceptual principle of technological development, helps to understand how the characteristics of the human cognitive-psychological system influence technical and economic decisions, and explains economic, social, environmental and other motives; it enables the formulation of general principles for the state's technological policy regarding the stimulation of technological competitiveness. 4. Achieving successful technological development, taking into account the behavioral imperative, should be the result of implementing a technological policy in which the state acts as a platform for technologies, and partnership between the government, the digital sector and the public is a key institutional principle.

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Давимука Р. Н. Поведінковий імператив технологічного розвитку економіки

Мета. Визначити сутність поведінкового імперативу як важливого принципу для стимулювання технологічного розвитку України з акцентом на споживчу поведінку, цифрові практики взаємодії та ефективні маркетингові підходи.

Методологія. У статті використано методи ретроспективного та системного аналізу, статистичні методи, методи індукції і дедукції, логічного узагальнення, контент-аналіз, порівняльний аналіз.

Результати. На основі аналізу міжнародних рейтингових досліджень обґрунтовано, що Україна останніми роками презентує себе в ролі повноправного учасника глобального технологічного простору, входячи до десяти країн світу за конкурентоспроможністю IT-сфери (7 місце) та п'яти за рівнем професіоналізму IT-спеціалістів. Визначено, що провідною тенденцією технологічного розвитку є створення нових виробів і продуктів з більш досконалими властивостями, що дозволяє людині розв'язувати нові завдання і задовольняти щораз більші потреби. Використовуючи класичні теоретичні положення поведінкової економіки, розкрито основні складові взаємодії поведінкового імперативу та технологічного розвитку через такі поведінкові інструменти, як прийняття технологій, цифрові «підтиховування» (Nudges); економіка уваги людей; епістемічний поворот, поведінковий вимір. Доведено, що поведінковий імператив у сучасному технологічному розвитку є ланкою, що пов'язує між собою людську психологію та цифрові інструменти, дозволяючи створювати продукти, які враховують ірраціональність користувачів.

Оригінальність. Обґрунтовано та розкрито положення, що поведінковий імператив повинен суттєво враховуватись під час формування та реалізації технологічної політики держав через методи, що базуються на психології та поведінковому аналізі для стимулювання інновацій, прийняття нових технологій і підвищення конкурентоспроможності.

Практична цінність. Результати дослідження можуть бути використані під час формування державної політики технологічного розвитку та цифрової трансформації, розробленні стратегій стимулювання впровадження інновацій і новітніх технологій, удосконаленні маркетингових підходів до просування цифрових продуктів і послуг.

Ключові слова: поведінкова економіка, поведінковий імператив, технології, технологічний розвиток, поведінкові інструменти.

Давимука Роман Назарович – аспірант кафедри економічної теорії економічного факультету Львівського національного університету імені Івана Франка (e-mail: r.davymuka95@gmail.com, ORCID ID: <https://orcid.org/0009-0002-9288-014X>).

Davymuka Roman Nazarovych – Postgraduate of the Department of economic theory of the Economic Faculty of the Ivan Franko National University of Lviv.

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