

“Freelance economy in the context of Industry 5.0: Challenges and prospects”

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FREELANCE ECONOMY IN THE CONTEXT OF INDUSTRY 5.0: CHALLENGES AND PROSPECTS

Abstract

The freelance economy opens new ways for direct interaction between freelancers and customers without intermediaries. This study aims to systematize the forms of the freelance economy in the context of Industry 5.0. A structured review methodology focusing on technological progress and human-centric solutions of the freelance economy is used. Freelancing and Industry 5.0 are closely intertwined and complement each other, forming new economic models and work processes. Their relationship lies in the combination of technological development and human creativity, which allows for the formation of efficient and flexible economic structures. Personalization and customization of consumption within Industry 5.0 promote the freelancing (individualization) of the production sphere, building a win-win strategy both for consumers and producers. Freelancing economy focuses on information processing of work, enables remote communications, promotes creativity of work, provides opportunities for the synergistic combination of human cognitive abilities with AI, ensures the development of personalization and customization of consumption, and contributes to the social development of workers. The structure of the forms of the freelance economy is characterized by the integration of decentralized financial systems, the use of artificial intelligence and blockchain, and the transition to new forms of labor organization based on global digital platforms and self-regulated organizations. One of the key barriers to the freelance economy is the lack of legal regulation of cryptocurrencies and decentralized autonomous organizations (DAOs), as well as the associated cybersecurity risks. To summarize, the significance lies in creating a more adaptive, flexible, and decentralized labor market that meets the challenges of today's digital world.

Keywords

freelancing, competitiveness, human-centricity, digital platforms, barriers to freelancing, individualization, personalization, cognition, flexibility, risks

JEL Classification

J21, L29

INTRODUCTION

Industry 5.0 presents a new vision of economic development that aims to combine advanced technologies with human values harmoniously and return the human factor to the center of technological innovation. Personalization and customization of consumption meet the freelancing of the production sphere. In this paradigm, technologies act not as competitors but as partners of humans, enhancing their capabilities in creativity, critical thinking, and decision-making. The main goal of this concept is to create not only efficient and productive production systems, but also those that take into account social, ethical, and environmental aspects of development (EC, 2024). This ensures the transition from standard automated processes to more personalized, adaptive production focused on the individual needs of end consumers. Industry 5.0 provides close interaction between man and machine due to artificial intelligence (AI), language models, smart sensors, col-

laborative robots (cobots), big data, and the Internet of Things (IoT). The peculiarity of this stage is the personalization not only of products but also of processes: systems adapt to human needs, not vice versa. For example, collaborative robots can work side by side with humans, performing dangerous or routine tasks, leaving the human with room for creativity and strategic thinking (Directorate-General for Research and Innovation, 2021; EU, 2022). Modern information tools enable the performance of a significant number of tasks at freelanced (individualized) workplaces through remote communication with economic counterparties (customers and resource suppliers). The Internet of Things, cloud technologies, and other means of production automation create the prerequisites for free labor of performers. Freelancing creates conditions for the individualization of labor, which enables the synergistic combination of human cognitive abilities and artificial intelligence. The freelancing form of production also ensures the development of personalization and customization of consumption.

The purpose of the study is to systematize the forms of the freelance economy in the context of Industry 5.0.

1. THEORETICAL BASIS

Modern industrial development is accompanied by significant transformations in employment, driven by advances in digital technologies. Industry 5.0 takes into account not only economic efficiency, but also social responsibility and environmental sustainability, where enterprises not only produce products with a smaller environmental footprint, but also create value for society, including improving the quality of life and preserving natural resources.

Considering the achievements of Industry 5.0, freelancing as a new form of labor organization is gaining particular importance. Freelancers serve as key agents of change, adapting to the rapid implementation of innovations and providing the flexibility necessary for an individualized approach to the development of innovative technologies. Due to their specialization and ability to engage in interdisciplinary interaction, freelancers become an integral part of technological innovations, complementing traditional employment models. Their flexibility and access to global markets enable them to integrate the best global practices into local contexts, which is critical for enterprises to adopt Industry 5.0 principles. Thus, Industry 5.0 is a new stage of industrial evolution that combines technology, ecology, and human potential (Melnik et al., 2021). It is not only a technological transformation, but also an ethical shift aimed at harmonizing the interests of business, society, and the environment. In this context, freelancing is a leading force driving enterprises'

adaptation to modern requirements, ensuring flexibility, innovation, and sustainable development. An analysis of previous publications helps us understand how these processes affect the organization of work and what Industry 5.0 offers freelancers. Margherita and Sulbout (2021) focus on the role of freelancers in implementing innovative technologies, where freelancers act as intermediaries in digital transformation, facilitating the adoption of new technologies across industries. Developments in IT devices, functionalities, and technological capabilities have a positive effect on service performance, business processes, and productivity levels in service companies (Avecillas et al., 2025; Kemrichard et al., 2026; Oualid et al., 2024). Avogaro (2019) analyzes how digitalization is changing the requirements for a group of skilled workers, such as freelancers. The gig economy is increasingly interpreted within the context of Industry 4.0 as a new form of work organization that responds to the evolving requirements of a digital society (Deepak, 2020; Ziane et al., 2025). The gig economy has become a central feature of the new economic reality, generating new opportunities for workers while simultaneously creating substantial challenges for employment policy and labor market regulation (Dirik, 2022; Alemu, 2025). Digital platforms play an increasingly important role in connecting highly skilled workers with the evolving needs of modern organizations, thereby facilitating more flexible and demand-driven labor market interactions (Rani & Dhir, 2020; Parajuli et al., 2024). A conceptual business model, such as Skill Hub, demonstrates how digital freelancing platforms can be designed to meet

the needs of freelancers and socially vulnerable groups. In this context, such platforms can help address employment challenges by expanding access to work opportunities for diverse population groups, including low-income individuals (Amran et al., 2022; Ly & Mujtaba, 2025).

Freelancing in marketing and communications is characterized by specific professional competencies, identity formation processes, and a distinct set of market-related challenges and opportunities in the contemporary labor environment (Keso, 2024; Msosa et al., 2025). The impact of Industry 4.0 technologies on employment and competence development is increasingly understood through systematic assessments that account for human-machine interaction and the organizational transformations emerging under new working conditions. In this context, competence development is also recognized as a critical factor enabling adaptation to technological and structural change (Simões et al., 2020; Glos & Karwot, 2025). The literature review demonstrates that freelancing plays an important role in transforming workplaces for Industry 5.0 and contributing to the integration of technologies, adaptation to new working conditions, and the formation of flexible business models. At the same time, these processes create new challenges that require appropriate political and economic adaptation.

Freelancing is a form of self-employment in which an individual provides professional services or works on projects for various clients without long-term contractual obligations to any specific employer. Freelancers work for themselves, having the freedom to choose their working hours, location, and type of work, which allows them to adapt their work to their personal needs and market demands (Kim et al., 2024). Analysis of annual growth in freelancers' income by country reveals significant dynamics, especially in economically developed countries. For example, in the United States, which leads this indicator, annual growth is 78%, indicating a deep integration of the freelance model into the domestic labor market. The United Kingdom, with a growth of 59%, shows a similar trend, confirming the strategic importance of this sector in economies with a high level of digitalization. In developing countries, such as Pakistan, Ukraine, India, and the Philippines, the

growth rates (from 27% to 47%) reflect their role in the global provision of services based on digital technologies. In less developed economies such as Bangladesh and Serbia, freelancing is becoming a tool for integration into global markets, despite lower growth rates. At the same time, relatively low indicators, such as in Russia (20%) and Serbia (19%), illustrate the lack of sufficient prerequisites for this form of work and the potential for further development (Genius, 2024).

In most cases, freelancers work in fields such as information technology (programming, web design, graphic design), consulting, copywriting, marketing, translation, photography, journalism, and many other professions that do not require permanent residence in a fixed workplace. They can be involved in short- or long-term projects implemented through digital platforms, agencies, or direct client contracts.

Freelancing allows individuals to maintain a high degree of autonomy and control over their careers (Melnik et al., 2026), but also places responsibility on them to manage their time and finances, market their services, and build ongoing relationships with clients. One of the main advantages of freelancing is the opportunity to work on diverse projects and with companies around the world, using modern technology to communicate and complete tasks remotely.

Modern economic systems are undergoing a profound transformation driven by the transition to Industry 5.0, which integrates technological innovation with the growing importance of human intelligence and creativity. The freelance economy is part of this transformation, enabling the development of a cognitive economy based on intellectual resources, creativity, and flexible thinking, which makes it critically important for the future stability of global economic systems in a world facing constant socio-economic challenges (J. Kaur & S. Kaur, 2022; Quisenberry & Burrell, 2026). The freelance economy is taking on a new dimension amid the development of decentralized financial technologies and the crypto-economy. The introduction of these tools creates new challenges for traditional economic structures, contributing to the development of decentralized organizations and institutional innovations.

Freelancing is becoming increasingly popular worldwide, reflecting changing work practices and greater employment flexibility. Every year, more and more people choose the freelance model, which allows them to combine their career with their personal life, providing independence and the ability to choose projects. At the same time, companies are actively recruiting freelancers to perform specific tasks, enabling them to optimize costs and access a global talent pool. This trend is clearly visible in the financial performance of leading freelance platforms such as Upwork. According to the data provided, Upwork's revenue increased by more than 4.9 times from USD 164 million to USD 806 million from 2016 to 2024. Such dynamics indicate rapid growth in the global freelance services market and rising demand for these services. In 2016, the platform's revenue totaled only USD 164 million. However, by 2021, they exceeded USD 500 million. The most significant jump occurred during the COVID-19 pandemic, when, in 2020–2021, freelancers' income increased by 34% - from USD 374 million to USD 503 million. The gradual growth in income continued, and in 2023, the platform received almost USD 700 million. This jump indicates the global acceptance of the freelance employment model. Given the above trend and expert assessments, the paper predicts that by 2028, Upwork's revenues will reach new heights, driven by sustained growth rates, as shown in Figure 1.

However, the most important characteristic of the freelance economy in the context of Industry

5.0 is its antifragility, that is, the ability not only to withstand crises but also to strengthen in conditions of instability, thereby improving their market positions. Freelancers, due to their flexibility and independence, demonstrate high resistance to market shocks and can quickly adapt to new conditions. Freelancers, particularly in technology industries, are quick to adapt to new market demands, as their self-learning and self-development potential means they need less time to retrain and acquire new skills than traditional workers. In the digital era, organizations increasingly implement remote work arrangements and use artificial intelligence in recruitment, training, and other human resource management operations (Panasiuk & Kravchuk, 2025; Sarwar et al., 2026). This is especially important in the context of Industry 5.0, where demand for specialized skills (such as managing artificial intelligence or developing innovative products) is growing, and freelancers can fill these niches.

To summarize the theoretical basis, it is necessary to underline the necessity of a wider description of all possible forms of the freelance economy in the context of Industry 5.0. Continuing the study of freelancing as the basis of Industry 5.0 will make it possible to study the dynamics of changes in the labor market, systematize the forms of this type of activity, and develop recommendations for the formation of policies and strategies that would contribute to the harmonious integration of innovative technological approaches to the organization of labor in the society of the future.

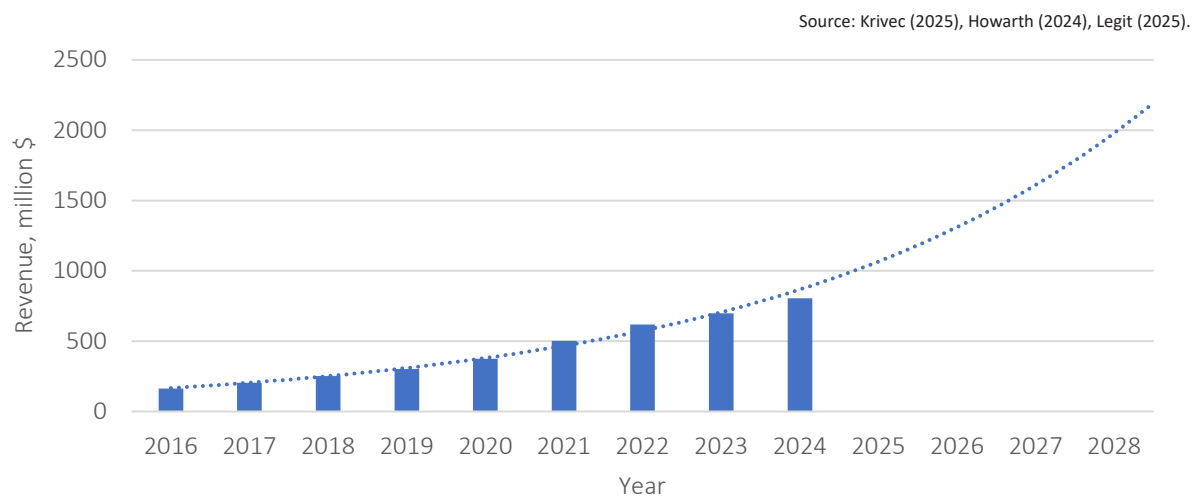


Figure 1. Dynamics of freelancer income growth on the global platform Upwork

2. RESULTS AND DISCUSSION

The freelance economy is a form of economic activity based on short-term or project-based employment relationships, primarily facilitated by digital platforms. This model of economic organization provides freelancers with access to global markets, promotes the creation of new mechanisms of economic cooperation, and optimizes the development of innovative potential, adapting professional opportunities to the dynamic requirements of the modern economy. The freelance economy naturally aligns with Industry 5.0 due to its flexibility, adaptability to the cognitive economy's requirements, and emphasis on creativity and innovation.

A special place in the Industry 5.0 concept is occupied by “smart manufacturing” and “collaborative robots”. These areas demonstrate how intelligent systems and robotics are shaping the future of manufacturing. Freelancers in areas such as robot programming, AI algorithm development, and robotic system integration are becoming critical agents of change and play an important role in developing intuitive interfaces that enable effective human-machine interaction. The integration of artificial intelligence technologies optimizes this process, but success also requires the participation of specialists who can correctly interpret the data. Freelance analysts who have expertise in the field of big data and business intelligence create added value by helping companies make strategic decisions. Their contribution enables companies to remain competitive, reducing costs and improv-

ing process efficiency. All this indicates that freelancing is not just adapting to the requirements of Industry 5.0, but is also becoming a driving force that determines its development.

The structure of the forms of the freelance economy is characterized by the integration of decentralized financial systems, the use of artificial intelligence and blockchain, as well as the transition to new forms of labor organization based on global digital platforms and self-regulated organizations. Determining the role of freelancers in these processes allows us to understand how flexible employment contributes to the integration of human-centric technologies and the development of innovations in the context of the new economic reality.

Table 1 provides a structured description of the primary forms of the freelance economy and their role in implementing Industry 5.0. It identifies key categories of freelancers, platforms, technologies, and financial instruments that interact within this economic system.

The possibility of individual choice of work schedules and terms of cooperation promotes economic inclusion, allowing people with different levels of access to the traditional labor market to participate in the global economy. At the same time, this creates challenges related to income stability, which emphasizes the importance of state support through social insurance and adaptive tax regulation.

Table 1. Key forms of the freelance economy and their role in the development of Industry 5.0

Source: GO-Globe (2024), Aragon (2021), Taylor and Sharif (2020), Mottola (2023), Waheed et al. (2022), Bellavitis (2023).

Component structure	Description	Examples	Economic value in Industry 5.0
Global digital platforms	Platforms that connect freelancers with employers	Upwork, Freelancer, Fiverr	Promoting the globalization of the labor market
Decentralized Organizations (DAOs)	Organizations without centralized management based on blockchain	MakerDAO, Aragon	Allow freelancers to interact without intermediaries
Cryptocurrency ecosystems	Using cryptocurrencies for transactions	Bitcoin, Ethereum	Reducing transaction costs, simplifying international agreements
Smart contracts	Programmable contracts on the blockchain that execute automatically	Ethereum, Solana	Ensuring the transparency and security of transactions
Marketplaces for digital products	Trade in digital products and services	Envato, Gumroad	Supporting freelance activities in creative industries
Distributed labor management systems	Tools for managing work in distributed teams	Trello, Asana, Slack	Optimization of work and project coordination in the freelance environment

The main factors behind this rapid development are digitalization, the spread of remote work, and the introduction of modern technologies that make collaboration easier. Freelancing is experiencing significant global growth, driven by structural economic changes and the growing influence of Industry 5.0. This trend correlates with the changes inherent in Industry 5.0, which emphasizes personalization, innovation, and the effective use of human potential. The synergy between freelancing and Industry 5.0 becomes evident amid the growing demand for creative, analytical, and engineering services. The spread of remote platforms helps optimize the interaction between employers and performers, while simplifying access to international markets. Thus, economies at different levels of development find opportunities in freelancing to increase competitiveness amid technological transformation.

The graphs presented below systematize the key characteristics of international freelancing (Figure 2).

To overcome the challenges of freelancing, such as high competition and the need for continuous education, developing unique competencies, using educational platforms, creating a personal brand, and actively participating in professional communities are key. This approach not only increases work efficiency but also promotes long-term career development in the changing digital economy.

The experience of leading countries in strengthening social guarantees for freelancers requires developing basic health insurance packages for freelancers, with the option to expand coverage for an additional fee, thereby providing greater flexibility and adaptability of the system to the needs of self-

Source: Kumar (2025), Liedke (2025), Guda (2024), Duarte (2024), Haileyesus (2024), Petrov (2025).

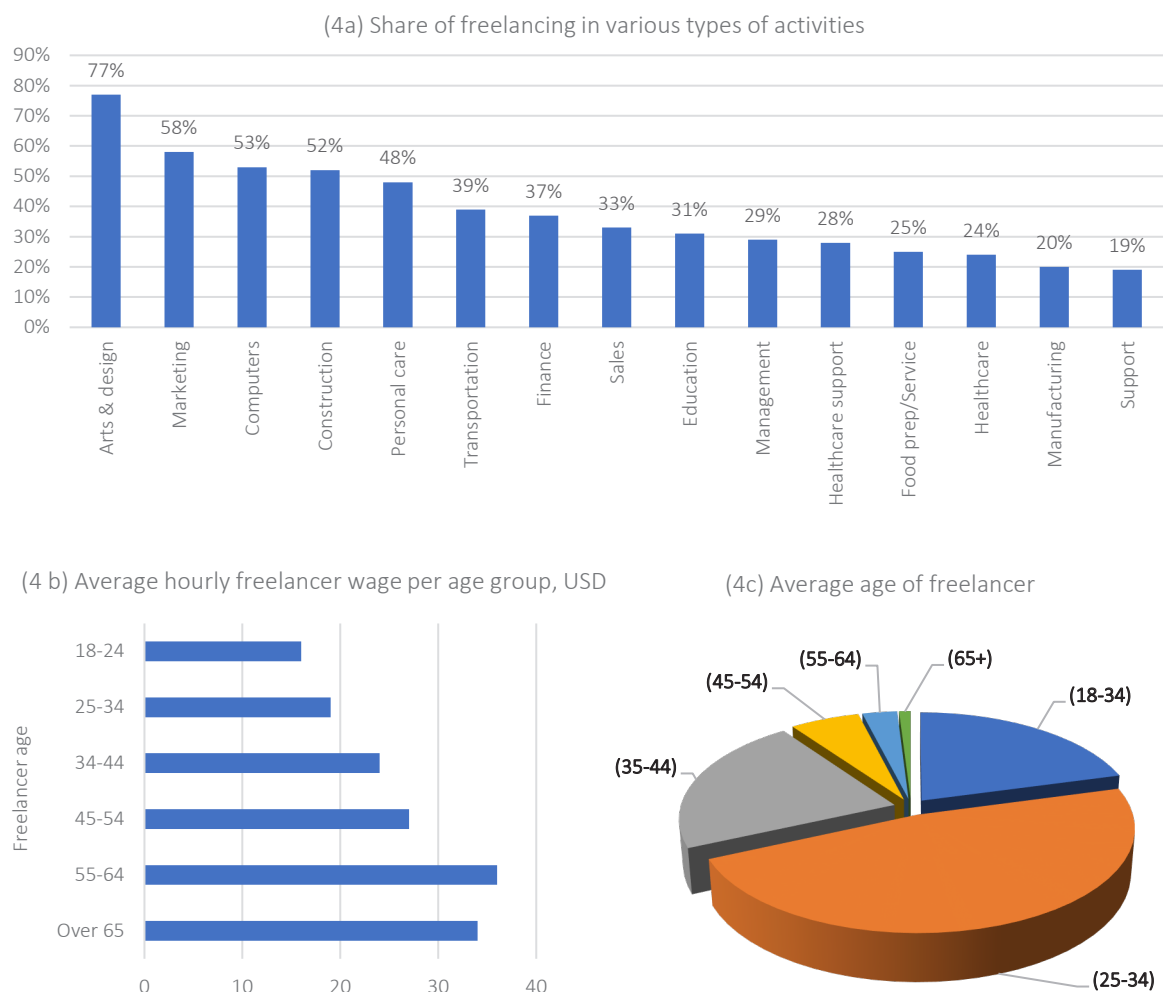


Figure 2. Key characteristics of the international freelance market (averaged portrait)

employed individuals. Thus, such programs help reduce the financial burden on freelancers, ensure access to medical services, and account for the specifics of irregular employment. States can create digital platforms that automate contributions and access to social services, such as Estonia's e-Residency platform, which enables freelancers to register businesses, file taxes, and obtain insurance online (Government of Estonia, 2025). The EU's experience in creating international insurance programs that operate across multiple countries and enable freelancers to work globally is interesting. EU: The Social Security Coordination Regulation allows freelancers to transfer social security rights between EU countries (EP, 2024).

One of the key barriers to the freelance economy is the lack of legal regulation of cryptocurrencies and decentralized autonomous organizations (DAOs), as well as the associated cybersecurity risks. The use of cryptocurrencies and smart contracts based

on blockchain technology is becoming increasingly common in the global freelance economy. However, the imperfect legal framework creates significant challenges for freelancers and their clients. On a practical level, it is important to raise awareness among freelancers about cybersecurity risks and methods to avoid them. For example, participating in training programs and webinars organized by platforms like Binance Academy can help freelancers develop skills in the safe use of cryptocurrencies and an understanding of blockchain technologies (Binance, n.d.). Thus, overcoming barriers associated with insufficient legal regulation of cryptocurrencies and DAOs, as well as cybersecurity risks, is possible provided that a comprehensive approach is implemented that combines improving the legislative framework, implementing educational initiatives, and actively using innovative technologies. Summarizing the above, identify the main barriers to the development of the freelance economy and suggest ways to overcome them in Table 2.

Table 2. Barriers to the development of the freelance economy and ways to overcome them

Development barriers	Directions for overcoming
Lack of social guarantees, unstable income, and tax difficulties	Introduction of state insurance programs for freelancers (medical, pension insurance). Modernizing tax legislation to take into account the specifics of the freelance market, such as flexible rates or preferential conditions. Development of platforms for financial consulting and income planning.
High level of competition for projects, difficulty in ensuring continuing education	Organization of online courses and certification programs for freelancers on preferential terms. Development of specialized programs in Industry 5.0 to improve skills. Formation of transparent ratings and evaluation mechanisms on platforms for customers.
Insufficient legal regulation of cryptocurrencies and DAOs, and cybersecurity risks	Developing a clear legislative framework for regulating cryptocurrencies and blockchain technologies. Applying cybersecurity protocols and creating insurance mechanisms on freelance platforms. Conducting information campaigns on data protection and the risks of using digital assets.
Risk of market instability for individual freelancers, lack of guarantees of long-term income	Introduction of state incentive programs for long-term contracts in the freelance sector. Creation of professional unions or associations to ensure the stability of project proposals. Using algorithms to forecast demand for freelance services.
Dependence on digital platforms and technological infrastructures, the problem of the digital divide	Investments in expanding high-speed Internet access, especially in regions. Developing independent platforms for freelancers that minimize dependence on international corporations. Supporting digital literacy initiatives
Unequal access to global markets due to different economic and technological conditions	Implementation of programs for the international exchange of experience and support for cooperation between countries. Development of state mechanisms to support the export of digital services. Organization of international platforms for freelancers, taking into account the specifics of regional markets.
The complexity of adapting tax systems to the rapidly changing freelance market, and the risks of tax evasion	Introduction of unified electronic registers to simplify tax accounting. Providing tax benefits and simplifying tax administration for freelancers. Integration of automated reporting platforms into the operation of digital platforms.
High levels of stress due to workload uncertainty and income instability	Development of training programs on time and stress management. Implementation of mechanisms for stable payment for services (prepayment, contract insurance). Creating psychological support platforms for freelancers.
Heterogeneity in the implementation of environmental practices among freelancers and companies	Dissemination of information about environmental standards and the benefits of sustainable practices. Creating public and private programs to encourage environmentally responsible freelancing. Implementing green standards on freelance platforms.

To overcome the lack of social guarantees, unstable income, and tax difficulties, the special organization's trade union could increase worker productivity by fostering a healthy work environment. Industry 5.0 and freelancing are two modern trends that interact and influence each other. Industry 5.0 enhances the creative component of the human factor in production processes, combining technology with human cognitive potential and emotionally developed artificial intelligence. Figure 3 presents a comprehensive approach to assessing freelancing in the context of Industry 5.0 through the prism of technology, economics, and social change. It summarizes a set of parameters arising at the intersection of technological, economic, and social factors. The inclusion of parameters such as decentralization, cognitive capital, and technological development enables a deeper analysis of the impacts on the economy's structure. In particular, the studies take into account both the positive aspects of productivity growth and innovation, and the risks associated with income instability and insufficient legal regulation.

both cases, market participants must be able to respond quickly to changes in the environment, master new skills, and adapt to new technologies. Industry 5.0 demands that businesses personalize products and services, which in turn requires flexible, adaptive workflows. Freelancers are often pioneers in developing new technologies, as their success in the market depends on their ability to deliver high-quality services quickly with the latest tools. They also often work in a changing project economy, where they must quickly switch between tasks and clients (Webb, 2024). In the context of Industry 5.0, the flexibility of freelancers becomes even more important, as they become part of teams working on solutions in areas such as robotics, artificial intelligence, and big data analysis.

The focus on the human is another key point of intersection between freelancing and Industry 5.0. Despite the technological emphasis of both concepts, the focus remains on the human. Industry 5.0 emphasizes that technology should be aimed at improving people's lives, increasing their productivity, and ensuring better working conditions. Freelancers, thanks to their creativity, ability to

Flexibility and adaptability are important characteristics for both freelancing and Industry 5.0. In

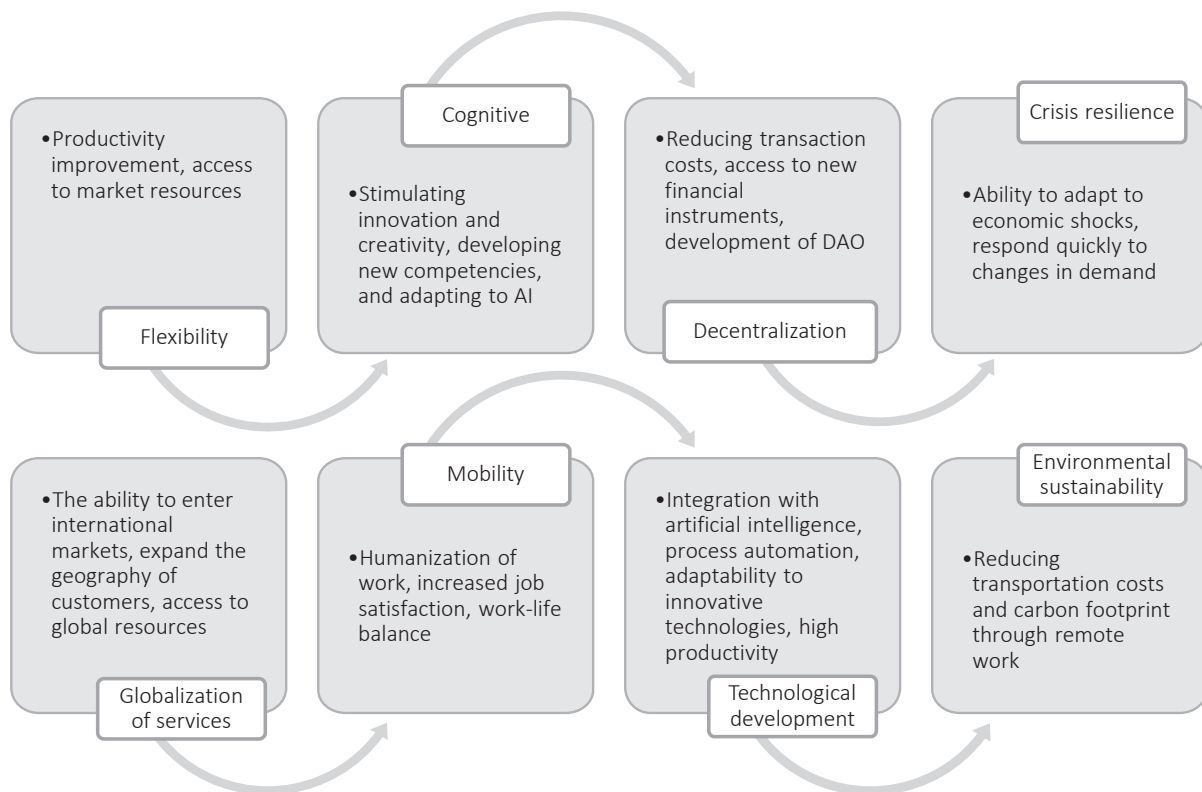


Figure 3. System of parameters for the analysis of prospects of freelancing in Industry 5.0 conditions

innovate, and flexible approach to work, are key players in such processes. They bring the human factor to technological solutions, integrating their knowledge and experience into processes that require an individual approach, creativity, and empathy.

It is worth emphasizing individual responsibility, another common feature for freelancers and employees in Industry 5.0. In the context of freelancing, each market participant is independently responsible for the results of their work, from meeting deadlines to the quality of the services provided (Castrillon, 2024). People are responsible for configuring systems, developing new solutions, and integrating technologies into real business processes. In such an environment, personal responsibility is a decisive factor in project success. The prospects for the development of freelancing are primarily related to the ability to address emerging challenges and overcome barriers to the growth of the freelance economy. The main problem of freelancing is the irregularity of income, which makes it difficult to plan for the financial future and creates risks of uneven taxation (Ievsieieva et al., 2021). To address this problem, it is advisable to introduce specialized social insurance programs. An example is the French Autonomous Organization for the Insurance of Ageing for the Liberal Professions, which offers a basic pension scheme specifically targeted at people with irregular incomes. This scheme provides for social insurance contributions proportional to income, and the amount of benefits depends on the amount of contributions paid. At the same time, the return on pension points is determined by earnings levels. The program is part of the French pay-as-you-go pension system, which is based on the principle of intergenerational solidarity and aims to provide resources for all members after the end of their professional activities (CNAVPL, 2025).

Technologies such as personalization, artificial intelligence (AI), robotics, blockchain, and the Internet of Things (IoT) contribute to strengthening networked models of interaction, where freelancers become not just task performers but part of global interdisciplinary teams (Margherita & Sulbout, 2021).

Thanks to technologies that combine the expertise of specialists with artificial intelligence, companies can quickly attract freelancers from around the world to tackle tasks that require high levels of flexibility and creativity. In such conditions, freelancers often become key executors of innovative projects, thanks to their ability to adapt to new technologies and work with large amounts of data in real time (Robinson, 2024).

Industry 5.0 technologies, including artificial intelligence, automate routine tasks, allowing freelancers to focus on the strategic and creative aspects of projects. For example, in software development, AI can automate testing and tuning, while a freelance programmer works on creating innovative features or improving the user experience (Freelancing Union, 2024). Thus, global teams that include freelancers and machines can create highly effective solutions focused on customer and market needs.

Networks and platforms are the foundation of both freelancing and Industry 5.0 (Wallenstein et al., 2019). In today's digital economy, platforms that bring together professionals from different parts of the world can significantly reduce transaction costs, optimize talent search, and provide access to specialists with unique skills who can work regardless of geographical location. Online freelance platforms such as Upwork, Toptal, or Freelancer have become virtual marketplaces where companies can find the right performers for their projects, and freelancers can access global projects. Industry 5.0, for its part, expands the capabilities of such networks by integrating artificial intelligence (AI), blockchain, and the Internet of Things (IoT). These technologies enable automated search, optimized project management processes, increased freelancer productivity, and more efficient collaboration models.

Industry 5.0 promotes the close integration of human and machine intelligence, particularly by creating global teams in which specialists from different countries collaborate to solve complex tasks. In these conditions, freelancers play an important role because they can adapt and integrate quickly into such teams. They can work in different time zones, using online platforms to coordinate actions and share knowledge. The technologies used in Industry 5.0 (in

particular, cloud computing and collaboration tools) enable freelancers to collaborate with companies and organizations remotely, providing them with the specialized skills and expertise needed to implement innovative projects. For example, freelancers working in fields related to programming, design, or data analysis

can become an integral part of interdisciplinary teams, where each team member performs their unique function, ensuring the integrity of the process, creating new opportunities for global cooperation, where knowledge and experience are distributed among different participants in the process.

CONCLUSION

The purpose of the study is to systematize the forms of the freelance economy in the context of Industry 5.0. Freelancing and Industry 5.0 are closely intertwined and complement each other, forming new economic models and work processes. Their relationship lies in the combination of technological development and human creativity, which allows for the formation of efficient and flexible economic structures. In the Industry 5.0 environment, characterized by the integration of people and technology, freelancing plays a key role in transforming economic relationships and shaping new collaboration structures. Freelancers act not only as performers of specific tasks, but also as important agents of change who adapt modern technologies to the needs of the future economy. On the other hand, Industry 5.0, focusing on people, ecology, and cooperation with machines, takes freelancing to a new level, making it a fundamental component of this innovative model. The freelance economy, as part of this new paradigm, provides flexibility, the ability to adapt to rapidly changing conditions, and promotes the development of new mechanisms for cooperation. It not only enables effective use of cognitive resources but also expands the potential for innovations that meet the needs of digital transformation.

However, as the transition to Industry 5.0 progresses, freelancing faces several challenges that require further analysis and adaptation. In particular, income instability, limited legal regulation, and the need to continually update skills and adapt to global digital platforms are serious problems. These issues require a comprehensive approach to developing the freelance economy, including improving the legal framework and providing institutional support for freelancers, which is especially relevant in extreme socio-economic conditions (epidemics, hostilities, military conflicts) that complicate traditional forms of labor organization.

The synergy between freelancing and Industry 5.0 creates new opportunities to increase economic efficiency by combining the strengths of both. Thus, freelancers, as active participants in digital markets, become an integral part of this ecosystem, helping companies integrate advanced technologies and achieve new levels of productivity. Industry 5.0, in turn, provides freelancers with access to the most modern tools and platforms, allowing them to constantly improve their skills and participate in global innovation projects.

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REFERENCES

1. Alemu, B. A. (2025). Leveraging Knowledge Management for Sustainable Innovation: Advancing Public Health Leadership Interventions. *Health Economics and Management Review*, 6(1), 23-39. <https://doi.org/10.61093/hem.2025.1-02>
2. Amran, M. A. Z., Khairul Akmal, S. N. A., Sapee-e, N., & Ahmad Dahlan, A. R. (2022). Skill HUB: a conceptual business model that gives job opportunities for freelancers and B40 community. *Journal of Information Systems and Digital Technologies*, 4(2). <https://doi.org/10.31436/jisd.v4i2.293>
3. Aragon. (2021). *What is a DAO?* Aragon’s Blog. Retrieved from <https://blog.aragon.org/what-is-a-dao/>
4. Avecillas, D. X. A., Alipio, R. A. L., Montoya, M. E. R., Valenzuela, P. V., & Jaramillo, V. H. G. (2025). Effects of the implementation of information technologies on the productivity of service companies in Ecuador. *Problems and Perspectives in Management*, 23(1), 23-37. [https://doi.org/10.21511/ppm.23\(1\).2025.02](https://doi.org/10.21511/ppm.23(1).2025.02)
5. Avogaro, M. (2019). The highest skilled workers of industry 4.0: New forms of work organization for new professions. A comparative study. *E-Journal of International and Comparative Labour Studies*, 8(1), 29-50. Retrieved from https://air.unimi.it/retrieve/dfa8b99d-a90d-748b-e053-3a05f-e0a3a96/ejicls_2019_1_MA.pdf
6. Bellavitis, C. (2023). In the News and Trending: Decentralised Autonomous Organizations (DAOs): What Are They and Why Are They Potentially Changing the Way Businesses Are Governed? *Default*. Retrieved from [https://whitman.syracuse.edu/about/newsroom/whitman-news/news-detail/2023/02/03/in-the-news-and-trending-decentralized-autonomous-organizations-\(daos\)-what-are-they-and-why-are-they-potentially-changing-the-way-businesses-are-governed](https://whitman.syracuse.edu/about/newsroom/whitman-news/news-detail/2023/02/03/in-the-news-and-trending-decentralized-autonomous-organizations-(daos)-what-are-they-and-why-are-they-potentially-changing-the-way-businesses-are-governed)
7. Binance. (n.d.). *Binance academy blockchain & crypto education*. Retrieved from <https://academy.binance.com/en/>
8. Castrillon, C. (2024). *Why Freelancing Is an Attractive Option for Highly Skilled Workers*. Forbes. Retrieved from <https://www.forbes.com/sites/carolinecastrillon/2024/04/14/why-freelancing-is-an-attractive-option-for-highly-skilled-workers>
9. CNAVPL. (2025). *Les professionnels libéraux et leurs retraites [Self-employed professionals and their pensions]*. (In French). Retrieved from <https://www.cnavpl.fr/les-professionnels-liberaux-et-leurs-retraites/>
10. Deepak, S. (2020). *Future of Work in Industrial Revolution 4.0 – The Gig Economy Trends, Potential, and Challenges*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3748217
11. Directorate-General for Research and Innovation. (2021). *Industry 5.0: Towards more sustainable, resilient and human-centric industry*. Research and innovation. Retrieved from https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/industry-50-towards-more-sustainable-resilient-and-human-centric-industry-2021-01-07_en
12. Dirik, D. (2022). Industry 4.0 and the New World of Work. In E. Yakut (Ed.), *Industry 4.0 and Global Businesses* (pp. 1-17). Leeds: Emerald Publishing Limited. <https://doi.org/10.1108/978-1-80117-326-120211001>
13. Duarte, F. (2024). Number of Freelancers (2024). *Exploding Topics*. Retrieved from <https://explodingtopics.com/blog/number-of-freelancers>
14. European Commission (EC). (2024). *Research and innovation. Industry 5.0*. Retrieved from https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/industry-50_en
15. European Commission (EU). (2022). *Industry 5.0, a transformative vision for Europe: governing systemic transformations towards a sustainable industry*. Luxembourg: Directorate-General for Research and Innovation Publications, Office of the European Union. <https://doi.org/10.2777/17322>

16. European Parliament (EP). (2025). *Social security cover in other EU Member States*. Retrieved from <https://www.europarl.europa.eu/factsheets/en/sheet/55/social-security-cover-in-other-eu-member-states>
17. Freelancing Union. (2024). *Freelancing and the A.I. Revolution*. *Freelancers Union Blog*. Retrieved from <https://blog.freelancersunion.org/2024/07/23/freelancing-and-the-a-i-revolution/>
18. Genius. (2024). *41+ Freelance Statistics, Trends and Insights (2025-2030)*. Retrieved from <https://joiningenius.com/statistics/freelance-statistics/>
19. Glos, J., & Karwot, J. (2025). Study of Customer Attitudes Toward AI-Driven Solutions in Customer Support Services. *Knowledge Economy and Lifelong Learning*, 1(2), 24-49. [https://doi.org/10.61093/kell.1\(2\).24-49.2025](https://doi.org/10.61093/kell.1(2).24-49.2025)
20. GO-Globe. (2024). *Rise of the Freelancer Economy: How Online Platforms Are Changing the Way We Work*. Retrieved from <https://www.go-globe.com/the-rise-of-the-freelancer-economy/>
21. Government of Estonia. (2025). *Your digital id your company your freedom*. Retrieved from <https://www.e-resident.gov.ee/>
22. Guda, M. (2024). *Freelancer Statistics 2024 (Latest Data)*. Medium. Retrieved 2025 from <https://medium.com/@melisaguda/20-freelancer-statistics-2024-latest-data-dc380cb7e467>
23. Haileyesus, S. (2024). *The Future of Work: 60 Freelance Statistics*. SBT. Retrieved from <https://smallbiztrends.com/freelance-statistics/>
24. Howarth, J. (2024). *57+ Freelance Statistics, Trends and Insights (2024)*. Exploding Topics. Retrieved from <https://explodingtopics.com/blog/freelance-stats>
25. Ievsieieva, O., Kalinichenko, L., Pidoprygora, I., Pakulina, H., Ievsieieva, A., & Ilichev, K. (2021). Evaluation of the performance of motor transport 192 enterprises of urban agglomerations in the region. *Transport Means – Proceedings of the International Conference* (pp. 188-192). Retrieved from <https://www.elibrary.ru/item.asp?id=48129117>
26. Kaur, J., & Kaur, S. (2022). Study on managing work from home and freelancing employees during covid-19 pandemic. *International Journal of Creative Research Thoughts (IJCRT)*, 10(2), 402-414. Retrieved from <https://ijcrt.org/papers/IJCRT2202172.pdf>
27. Kemrichard, P., Ribiere, V., Boehnlein, N., Hjørnered, J., & Vongsurakrai, S. (2026). A Strategic Competitive Advantage Driven by Knowledge and Evolving AI Innovation: An Empirical Case Study of Ethical Enterprise Leadership in Automobile Manufacturing Management and Supply Chain Intelligence in China. *Business Ethics and Leadership*, 10(1), 384-415. [https://doi.org/10.61093/bel.10\(1\).384-415.2026](https://doi.org/10.61093/bel.10(1).384-415.2026)
28. Keso, S. (2024). *Developing marketing and communication freelancer business – opportunities and challenges* (Master's Thesis). Haaga-Helia University of Applied Sciences Leading Business Transformation Communication and Marketing Management. Retrieved from https://www.theseus.fi/bitstream/handle/10024/861381/Keso_Sebastian.pdf
29. Kim, P., Cheon, E., & Sawyer, S. (2023). Online Freelancing on Digital Labor Platforms: A Scoping Review. In *Computer Supported Cooperative Work and Social Computing (CSCW '23 Companion)*. Minneapolis, MN, USA. <https://doi.org/10.1145/3584931.3607011>
30. Krivec, R. (2025). *Freelance Statistics (How Many Freelancers Are There?)*. Colorlib. Retrieved from <https://colorlib.com/wp/freelance-statistics/>
31. Kumar, N. (2025). *Freelance Statistics. Number of Freelancers & Industry Size*. DemandSage. Retrieved from <https://www.demandsage.com/freelance-statistics/>
32. Legit. (2025). *40 Latest Freelance Statistics and Trends You Need to Know*. Retrieved from <https://legiit.com/blog/freelance-statistics/>
33. Liedke, L. (2025). *50+ Freelance Statistics for 2025: Stats, Facts & Trends*. *Startup Bonsai*. Retrieved from <https://startupbonsai.com/freelance-statistics/>
34. Ly, H. Q., & Mujtaba, B. G. (2025). From Sustainable HR Policies to Sustainable Development: Building a Culture of Inclusion and Meritocracy. *Green Transition and Sustainable Development*, 1(1), 24-36. [https://doi.org/10.61093/gtsd.1\(1\).24-36.2025](https://doi.org/10.61093/gtsd.1(1).24-36.2025)
35. Margherita, E., & Sulbout, J. (2021). Freelancers 4.0: the impacts of freelancers on the adoption of Industry 4.0 under a socio-technical perspective. *Proceedings of the 7th International Workshop on Socio-Technical Perspective in IS Development (STPIS 2021)*. Retrieved from <https://ceur-ws.org/Vol-3016/paper6.pdf>
36. Melnyk, L., Kalinichenko, L., Kubatko, O., Rozhgon, Y., & Zavdovieva, Y. (2026). Employee autonomy as a global trend and resource in the Industry 5.0 paradigm. *Geopolitics under Globalization*, 7(1), 27-43. [https://doi.org/10.21511/gg.07\(1\).2026.03](https://doi.org/10.21511/gg.07(1).2026.03)
37. Melnyk, L., Kubatko, O., Matsenko, O., Balatskyi, Y., & Serdyukov, K. (2021). Transformation of the human capital reproduction in line with Industries 4.0 and 5.0. *Problems and Perspectives in Management*, 19(2), 480-494. [https://doi.org/10.21511/ppm.19\(2\).2021.38](https://doi.org/10.21511/ppm.19(2).2021.38)
38. Mottola, M. (2023). *Freelance Economy 2.0: How The Freelance Economy Is Transitioning from A Gig Economy to A Strategic Sourcing Channel*. Forbes. Retrieved from <https://www.forbes.com/sites/matthewmottola/2023/07/24/freelance-economy-20-how-the-freelance-economy-is-transitioning-from-a-gig-economy-to-a-strategic-sourcing-channel>
39. Msosa, S. K., Martin, L., Mkhonza, P. N., & Govender, G. (2025). Consumer Perceptions of Influencer Marketing: Business Insights and Leadership from the Retail Sector. *Business Ethics and Leadership*, 9(3), 96-108. [https://doi.org/10.61093/bel.9\(3\).96-108.2025](https://doi.org/10.61093/bel.9(3).96-108.2025)

40. Oualid, C., Selma, D., & Soufyane, B. (2024). The Impact of Content Personalization on Customer Engagement and Market Risks of E-Stores. *Financial Markets, Institutions and Risks*, 8(3), 37-56. [https://doi.org/10.61093/fmir.8\(3\).37-56.2024](https://doi.org/10.61093/fmir.8(3).37-56.2024)
41. Panasiuk, O., & Kravchuk, O. (2025). The impact of digitalization on strategic human resource management: global and national context. *Social and Labour Relations: Theory and Practice*, 15(1), 30-44. [https://doi.org/10.21511/slrrp.15\(1\).2025.03](https://doi.org/10.21511/slrrp.15(1).2025.03)
42. Parajuli, D., Adhikari, G. M., & Bhattarai, G. (2024). Drivers of Intention to Adopt Fintech: A Study in the Urban Sector. *Financial Markets, Institutions and Risks*, 8(3), 80-97. [https://doi.org/10.61093/fmir.8\(3\).80-97.2024](https://doi.org/10.61093/fmir.8(3).80-97.2024)
43. Petrov, C. (2025). *Freelance Statistics*. Spendmenot. Retrieved from <https://spendmenot.com/freelance-statistics/>
44. Quisenberry, W., & Burrell, D. N. (2026). Virtual Teamwork Through the Lens of Sustainable Development: Implications for Environmental Footprint, Social Resilience, and Organizational Agility. *Green Transition and Sustainable Development*, 2(1), 18-39. [https://doi.org/10.61093/gtsd.2\(1\).18-39.2026](https://doi.org/10.61093/gtsd.2(1).18-39.2026)
45. Rani, U., & Dhir, R. K. (2020). Platform Work and the COVID-19 Pandemic. *The Indian Journal of Labour Economics*, 63, 163-171. <https://doi.org/10.1007/s41027-020-00273-y>
46. Robinson, C. (2024). *Future of Freelancers in the Workplace. Companies Shift Hiring Model*. Forbes. Retrieved from <https://www.forbes.com/sites/cheryl-robinson/2024/04/27/future-of-freelancers-in-the-workplace-companies-shift-hiring-model/>
47. Sarwar, S., Gowindasamy, M., Ashraf, S., & Kashif, I. (2026). Remote Work Challenges in the Knowledge Economy: The Mediating Role of Family Motivation in Well-Being and Leadership Trust Dynamics. *Knowledge Economy and Lifelong Learning*, 2(1), 34-47. [https://doi.org/10.61093/kell.2\(1\).34-47.2026](https://doi.org/10.61093/kell.2(1).34-47.2026)
48. Simões, A. C., Rodrigues, J. C., & Neto, P. (2020, June). The impact of Industry 4.0 on work: A synthesis of the literature and reflection about the future. In *2020 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)* (pp. 1-7). Cardiff, UK. <https://doi.org/10.1109/ICE/ITMC49519.2020.9198443>
49. Taylor, J. M., & Sharif, H. R. (2020). Leveraging Digital Twins to Enhance Performance of IoT in Disadvantaged Networks. *2020 International Wireless Communications and Mobile Computing (IWCMC)* (pp. 1303-1308). Limassol, Cyprus. Retrieved from <https://ieeexplore.ieee.org/document/9148070>
50. Waheed, A., Alharthi, M., Khan, S. Z., & Usman, M. (2022). *Role of Industry 5.0 in leveraging the Business Performance: Investigating Impact of Shared-Economy on Firms' Performance with Intervening Role of i5.0 Technologies*. SAGE Open. <https://doi.org/10.1177/21582440221094608>
51. Wallenstein, J., Chalendar, A., Reeves, M., & Bailey, A. (2019). *The New Freelancers: Tapping Talent in the Gig Economy*. Boston Consulting Group (BCG). Retrieved from <https://www.bcg.com/publications/2019/new-freelancers-tapping-talent-gig-economy>
52. Webb, R. (2024). *Adapting to Industry Changes: How Freelancers Can Stay Relevant*. Medium. Retrieved from <https://medium.com/@r0sanna.freelancer/adapting-to-industry-changes-how-freelancers-can-stay-relevant-888e54f6eb6d>
53. Ziane, A., Bouziani, A., & Moumni, S. (2025). Entrepreneurship and Innovation: Driving Economic Growth. *SocioEconomic Challenges*, 9(1), 219-232. [https://doi.org/10.61093/sec.9\(1\).219-232.2025](https://doi.org/10.61093/sec.9(1).219-232.2025)