

нагадування про майбутні зустрічі, сповіщати клієнтів про зміну статусу їхніх замовлень або автоматично надсилати повідомлення про заборгованість. Завдяки цьому компанії можуть підтримувати постійний зв'язок з клієнтами без додаткових зусиль з боку персоналу.

Контроль і моніторинг процесу відправлення є ще однією ключовою функцією такої системи. Вона дозволяє відстежувати статус доставки кожного повідомлення, перевіряти, чи було воно відкрито, і навіть аналізувати ефективність комунікації. Якщо повідомлення не доставлено, система може запропонувати альтернативний канал зв'язку або повторну відправку. Усі дані логуються, що дозволяє легко знайти проблеми та оптимізувати процеси.

Інформаційна управляюча система для автоматизації процесу зовнішніх нотифікацій також легко інтегрується з іншими програмними рішеннями, такими як CRM, ERP, білінгові платформи, що дає змогу автоматично отримувати необхідні дані для формування повідомлень. Це особливо корисно для великих компаній, які мають велику клієнтську базу і потребують швидкої та безперебійної комунікації.

**Висновки.** Автоматизована система нотифікацій допомагає компаніям покращити взаємодію з клієнтами, підвищити ефективність роботи та мінімізувати витрати на комунікацію. Вона дозволяє швидко та безпечно доставляти важливу інформацію, зменшуючи ризик людських помилок і підвищуючи рівень задоволеності користувачів. Результати дослідження будуть враховані при розробленні кваліфікаційної магістерської роботи «Інформаційна управляюча система для автоматизації процесу зовнішніх нотифікацій».

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## **ONLINE FREELANCE MARKET IN WAR-TIME UKRAINE**

This pilot study covers the main characteristics of the online freelancing market in Ukraine during the war. Particular attention is paid to the demographic profile of Ukrainian online freelancers and changes in the structure of demand for their services by industries during wartime. The analysis is based on recently published data from the Ukrainian freelancing platform Freelancehunt [1, 2], as well as on analytical reviews of the labor market [3, 4].

The majority of Ukrainian online freelancers belong to the younger generation. According to the data for 2024, the largest age group is 24-29 years old (23.5% of the total number of freelancers) [2], and more than half of the performers are under 35 years old. Generation Z is especially actively involved: more than half of young professionals 18-23 years old express their willingness to work in freelancing. Military events accelerated the influx of young people into this sphere: many students and recent graduates turned to remote work when internships and entry-level jobs disappeared. The share of students among Ukrainian freelancers increased to 12% in 2023 (from ~10% before the war) [2]. Ukrainian freelancers tend to be well-educated: over 70% of performers have higher education. There are many engineers, IT specialists, designers and other graduates of technical and creative specialties in the ranks of freelancers. The traditional career trajectories of young professionals were disrupted by the war, so a significant proportion of qualified young people had to look for online work opportunities.

The gender distribution in the Ukrainian freelance market is close to balanced. Men make up about 53% of remote specialists, women - about 47% [2]. During the war period, there was a relative increase in female participation in entrepreneurship and freelancing, as many men were mobilized. Specifically, women started 61% of new small businesses (FLPs) in 2023 (before the war, the figure was ~50%) [4]. A similar trend can be seen in freelancing: more and more women are realizing themselves in online work. In general, both men and women in Ukraine massively use remote income opportunities. Geographically, Ukrainian freelancers are scattered throughout the country and beyond. Traditional IT clusters (Kyiv, Lviv, Kharkiv) still provide a significant part of the workforce, but due to the hostilities, many specialists have moved to safer regions or abroad. Some continue to work remotely from abroad, completing projects through Ukrainian freelance platforms. This distributed talent network has become a kind of export advantage: Ukraine is consistently ranked among the leading countries in terms of the volume of freelance services on global platforms (e.g. Upwork).

Flexibility and security were the key motivations for switching to freelancing in war conditions. Remote work allows to save income in case of forced displacement and risks to life. According to the results of the Work.ua survey, for 31% of Ukrainian job seekers the most important thing is a flexible schedule and the opportunity to work remotely [3]. Freelancing satisfies this demand, giving professionals a chance to continue their careers even in case of relocation or military threats [3]. As a result of the war turmoil, online freelancing has become a haven for a significant portion of the working population. According to estimates, only on the platform Freelancehunt the number of registered Ukrainian freelancers is close to 1 million [1]. At the same time, their employment format is diverse: many of them use freelancing as a part-time job, but there are also those for whom it is the main source of income. Surveys show that about half of freelancers work on online platforms for additional income (combining it with other activities), while the other half rely on freelancing as their only form of employment. The gap in time commitment is illustrative: among freelancers with income  $\leq$  \$500 per month, more than 50% work less than 20 hours per week, and only a few are engaged in remote work full-time. On the contrary, among those who earn  $\geq$  \$1000 per month, there are significantly more professionals who dedicate 40 or more hours per week to freelancing. These figures indicate the formation of two segments: "casual" freelancers who work part-time and professionals who freelance full-time. About 34% of freelancers admit that they are ready to devote only limited time to learning new skills, which corresponds to the psychology of part-time work. At the same time, freelancers who have chosen this path as their main career treat their activity as a serious business, actively learning new tools and investing a lot of effort in improving their professional level and income. The main demographic characteristics of Ukrainian freelancers of the military period are summarized in Table 1.

**Table 1. Demographic characteristics of Ukrainian wartime freelancers**

Indicator	Data
Age composition	The largest group is 24-29 years old (23.5% of freelancers) [2]; > 50% of performers are under 35 years old; high youth engagement (Generation Z: > 50% of 18-23 olds are willing to freelance); the share of student freelancers has increased to 12% in 2023 (about 10% before the war) [2].
Level of education	Over 70% of freelancers have a college degree (bachelor's degree or higher).
Gender	Men ~53%, women ~47% [2]; growth in female entrepreneurship: women 61% of new FLPs in 2023 (pre-war ~50%) [4].
Number of freelancers	~1,000,000 registered Ukrainian freelancers on the Freelancehunt platform [1].
Employment Format	≈ 50% of performers combine freelancing with other work (part-time work); ≈ 50% are completely dependent on freelance income (main job).
Mode of operation and income	For incomes ≤ \$500/month, most freelancers work < 20 h/week (few full-time); for incomes ≥ \$1000/month, performers are more likely to work ≥ 40 h/week.
Skills training	~34% of freelancers are willing to devote only a limited amount of time to learning new tools.

The war and related technological shifts also had a significant impact on the distribution of projects by industry in the freelance market. Some areas of activity experienced an increase in demand, while others faced a decline [1]. **Table 2** shows the structure of projects on Ukrainian freelance platforms by main categories in 2024 and dynamics of changes compared to the previous year, as well as differences in the income level of freelancers by industry.

**Table 2. Dynamics of industries and incomes in the Ukrainian freelance market**

Category / Indicator	Value (2024 and change to 2023)
Programming (IT)	30.2% of all projects; -9.1% of projects (2024 vs 2023).
Design and art	24.5% of all projects; +0.8% of projects.
Audio/video content	+41.1% of projects (increase in the number of projects).
AI and machine learning	+49% of projects; +160% of budgets (growth in the AI subcategory within IT).
Photography and videography	+56% of projects; +69% of budgets.
3D modeling	+74% of projects.
Copywriting and texts	-14.8% of projects.
Translations	-28.2% of projects.
Outsourcing and consulting	~4.4% of all projects; -8.9% of projects.
Marketing (SMM)	+3.1% of projects.
Architecture and engineering	+21.6% of projects.
Design (number of freelancers)	+10% of performers (growth in the number of specialists in the category).
Income by industry	IT areas: ~22-27% of freelancers earn > \$500/month; text services (copywriting, translations): > 70% of freelancers earn < \$500/month (only few earn > \$1000).

*Compiled from source [1].*

As can be seen from Table 2 (compiled from [1]), the IT sphere retains its leading position in the Ukrainian freelance market. In 2024, programming projects accounted for about 30% of all orders, which makes this category the largest, although the number of such projects was 9.1% lower than in 2023. The second place in terms of volume is occupied by design and art (24.5% of projects), and the demand for design services remained almost stable (+0.8% over the year). At the same time, the greatest growth was

demonstrated by the areas related to multimedia and new technologies. The number of audio and video content creation projects grew by more than 40% over the year - this is explained by the high demand during the war for digital content for online communications and marketing. Businesses actively moved to the online environment, which increased demand for video editors, animators and other multimedia specialists. In IT, artificial intelligence has become a particular driver: the number of AI and machine learning projects has increased by 49%, and the total budgets for these projects have grown by 160% in 2024. This shows the rapid development of AI trends in freelancing. Similarly, photography and videography projects increased by 56%, with corresponding budgets growing by 69%, indicating serious investment in visual content. Even orders for 3D modeling increased by 74% - probably due to demand in game projects, marketing and VR applications, which persists despite the war conditions.

At the same time, traditional non-tech categories are struggling. The volume of writing (copywriting) projects has decreased by 14.8% and text translation by 28.2% in 2024 [1]. The likely reason is the widespread adoption of automation: many clients have started using machine translation and AI-based text generation systems for rough work, thus reducing the demand for human copywriters and translators. In addition to the technological factor, the decline in text services may have been influenced by the general reduction in international information activity due to war. As a result, more than 70% of Ukrainian freelancers employed in translation and copywriting earn less than \$500 per month, and only a few specialists in these fields manage to exceed \$1000 monthly income (Table 2). On the contrary, in high-tech fields, incomes are much higher: about a quarter of freelancers engaged in, for example, software and mobile development, earn more than \$500 per month. This income gap between industries reflects both differences in the market value of skills and the effect of automation - routine tasks are paid less well and are gradually being replaced by algorithms, while skilled technical or creative labor is still highly valued in the market.

It should also be noted that not all areas promising for wartime are reflected in freelance exchanges. Some new niche needs arising from the war are being met outside of public platforms. For example, the demand for specialists in cybersecurity, geographic information systems and military technological developments has increased significantly, but such projects are often carried out under closed contracts rather than through open online platforms. On the platforms themselves, the most rapid growth is concentrated in digital content production (IT, design, media) rather than business consulting or administrative services. The outsourcing and consulting category remains relatively small (about 4.4% of projects) and has even shrunk by 8.9% in terms of assignments in 2024 [1]. This confirms that during the war companies were more likely to look for freelance performers for specific production tasks (development, creative, marketing) than for business consulting.

There is a certain distinction between local and foreign sources of demand in the Ukrainian freelance market. Small and medium-sized businesses in the country, experiencing budgetary constraints, increased their involvement of freelancers for marketing, SMM and design in order to support their operations and find new clients. At the same time, international clients continued to provide Ukrainians with IT projects, taking advantage of Ukraine's high reputation in software development outsourcing. These factors were reflected in a moderate growth of marketing projects (+3.1% in 2024) [1] and a significant replenishment of freelance designers (the number of design specialists increased by more than 10% over 2024 year). Even in architecture and engineering, despite the war, there was an increase in orders (+21.6%), which can be attributed to the beginning of planning for the reconstruction of infrastructure [1]. Interestingly, the total budget of projects on freelance platforms increased in 2024, despite a slight decrease in the total number of projects [1]. This means that the average size (cost) per project has increased. Probably the most qualified freelancers started to get larger and long-term contracts (e.g. remote IT projects with long-term employment). This trend can be seen as a sign of gradual maturity of the market: freelancing in Ukraine is already used not only for one-off small tasks, but also for complex and large-scale projects.

Thus, the Ukrainian online freelancing market in wartime has demonstrated high flexibility and sustainability. It relies on mostly young, educated personnel, and the gender distribution of specialists is

close to equal. Many professionals were forced into freelancing due to the war turmoil, but managed to turn remote work into a source of income; some of them continue to use it as an additional income, and some of them use it as a main career. In terms of industry, the freelance economy has undergone tangible shifts: technological and creative areas (software development, design, multimedia, AI) have retained their leadership or shown growth, while routine services (writing, translation) have shrunk under the pressure of automation. Although a significant share of freelancers still have modest earnings, there is a trend towards higher incomes as they gain experience and connect with foreign clients. Overall, freelancing during the war was an important mechanism to support employment and income. As the economy stabilizes, some temporary freelancers are likely to return to traditional work, but the already established core of online professionals is likely to continue freelancing and contribute to the further development of Ukraine's digital economy.

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## **INVITING STUDENTS TO PARTICIPATE IN THE PROJECT “DIGITAL AVATARS OF OUTSTANDING UKRAINIANS”**

**Introduction.** In the digital age, artificial intelligence (AI) becomes a valuable tool for preserving national heritage and developing cultural practices amidst contemporary social challenges. Personalized chat avatars, developed by AI programmers for educational institutions, universities, museums, and memorial foundations, can assist society in preserving national memory and visualizing and popularizing the archival heritage of prominent Ukrainians. For instance, digital avatars of Volodymyr Vernadskyi, Vadym Hetman, Viktor Glushkov, and other notable compatriots of the 20th century—those who have passed into eternity but left behind creative works in the form of archival texts, articles, textbooks, and other academic or literary works—can become valuable multimedia exhibits in university welcome centers and on the websites of universities that proudly bear their names [1]. Academically gifted undergraduate and graduate students who have acquired the necessary competencies in applied informatics and programming, as well as students in the humanities who explore the creative legacy of outstanding scientists, philosophers, writers, and thinkers, can become co-executors of this innovative scientific and practical project.

**Main Part.** In one archival video interview, the founder of domestic cybernetics, Academician Viktor Mykhailovych Glushkov, voiced an idea that at the time seemed fantastical to his contemporaries: