ISSN 3079-7780 (Print)
ISSN 3079-7799 (Online)

BUKETOV BUSINESS REVIEW

2025
Volume 30
Issue 2 (118)

Promoting Innovation

bbr.buketov.edu.kz

ISSN 3079-7780 (Print)
ISSN 3079-7799 (Online)

BUKETOV BUSINESS REVIEW

2025

Volume 30, No. 2 (118)

Founded in 1996

Published 4 times a year

Karaganda
2025

Publisher: **NLC "Karagandy Buketov University"**
Postal address: 28, Universitetskaya Str., Karaganda, 100024, Kazakhstan
E-mail: businessreview@buketov.edu.kz. Web-site: https://bbr.buketov.edu.kz

Buketov Business Review. — 2025. — Vol. 30, Iss. 2(118). — 65 p. — ISSN 3079-7780 (Print). ISSN 3079-7799 (Online).

Proprietary: NLC "Karagandy Buketov University"
Registered by the Ministry of Culture and Information of the Republic of Kazakhstan. Rediscount certificate No. KZ16VPY00108284 dated 19.12.2024.

Signed in print 30.06.2025. Format 60×84 1/8. Photocopier paper. Volume 8,1 p.sh. Circulation 200 copies. Price upon request. Order № 78.

Printed in the Publishing house of NLC "Karagandy Buketov University".
28, Universitetskaya Str., Karaganda, 100024, Kazakhstan. E-mail: izd_karu@buketov.edu.kz; izd_karu@mail.kz

CONTENTS

https://doi.org/10.31489/2025Ec2/4-16

JEL M31 Received: 28.12.2024. | Accepted: 03.04.2025.

ORIGINAL RESEARCH

Neuromarketing Insights: Using Eye-Tracking and Machine Learning to Understand Consumer Preferences for University Promotional Products

Gulsanat Bekenova[1], Elmaira Orazgaliyeva[2]

Abstract

This research applies neuromarketing approaches along with traditional marketing tool like self-report to study how design factors, such as visual appeal, quality and pricing, affect consumer engagement with promotional products at Almaty Management University. It explores how eye-tracking measures affect consumer preferences and how machine learning can be used to predict consumer behavior. 16 university students and young professionals participated in this quantitative study and interacted with a range of promotional items, including clothing, stationery and dishware. Gaze patterns and fixation durations were recorded using eye-tracker technology, and data including survey results were analyzed using machine learning model such as random forest classifiers to find patterns in consumer preferences. The results suggest that visually appealing designs increase consumer attraction and perceived attractiveness, especially in clothing. Eye-tracking metrics, such as size (cm^2) and dwell time, were strongly correlated with attractiveness ratings and were identified by machine learning models as key features in predicting. The study emphasizes the importance of visual appealing products in increasing consumer engagement and brand loyalty. This study offers insightful information about how eye-tracking and machine learning can be used to predict consumer behavior in the context of promotional products. The results highlight how important visual design is in attracting consumers, by offering practical implications for marketers to improve promotional products.

Keywords: Neuromarketing, Eye-tracking technology, Consumer behavior, Promotional products, Visual engagement, Machine learning

Introduction

Understanding consumer behavior has turned into a necessary element for more successful marketing strategies, most particularly in today's competitive marketplace, in which consumers are bombarded constantly with visual stimuli. Brands must seek methods to capture sufficient attention. Also, brands should sustain attention in an environment that is flooded with advertisements. Promotional products, for example stationery or clothing, are marketing tools which strongly connect with consumers and sway their decision-making. For higher education institutions such as Almaty Management University, effectively engaging many students and young professionals through various promotional products can greatly help increase such brand awareness and loyalty.

Neuromarketing, integrating certain principles of neuroscience with marketing strategies, offers definite tools for uncovering the specific drivers behind consumer behavior. Eye-tracking technology, in particular, allows data collection in real-time on how consumers interact visually with promotional products. It captures attention metrics such as where consumers look, how long they focus on specific visual elements, as well as how their gaze shifts during product interaction (Bulling & Wedel, 2019). This said ability for measurement of visual salience — the natural ability of certain design elements for attraction of attention — can give marketers actionable understandings into consumer preferences and decision-making processes.

The research on the use of eye-tracking technology for university promotional materials, especially in dynamic, real-world contexts, is still lacking, despite the growing interest in neuromarketing. Few studies have combined survey data with eye-tracking measures to analyze consumer involvement in dynamic situations, despite the fact that the majority of current research focuses on static areas of interest (AOIs) and screen-based devices (Xie et al., 2024). By integrating survey data, eye-tracking devices, and machine learning algorithms, this study aims to close that knowledge gap and provide a more thorough picture of how customers interact with Almaty Management University's promotional goods.

[1]Almaty Management University, Almaty, Kazakhstan, *gulsanat2017@yandex.kz*
[2]*Almaty Management University, Almaty, Kazakhstan, *2e.orazgaliyeva@almau.edu.kz* (corresponding author)

The study tackles the research problem of requiring a more profound understanding of how consumers interact with promotional products and the elements that affect their decision-making processes. Neuromarketing instruments, particularly eye-tracking technology, have demonstrated effectiveness in advertising and retail. Nonetheless, their application in the higher education field, particularly for university marketing items, has not been extensively explored. This research intends to fill this gap by integrating survey data with eye-tracking metrics and machine learning models to forecast consumer preferences and behavior.

The main objective of our research is to study how certain characteristics of promotional products affect consumer perception. To achieve this goal, the following objectives were set:

1. To assess consumer attitudes towards various categories of promotional products and product characteristics (e.g., price, quality, etc.) using a survey method;

2. To study gaze patterns obtained using an eye-tracker;

3. To identify the key features of the promotional products that have a high correlation with the perceived attractiveness of products and show statistical significance in predicting consumer behavior.

The results of our study revealed valuable insights for future researches, and also offered practically applicable insights for improving the marketing strategy of universities. Their implementation can help improve promotional products that can more effectively attract the target audience and increase the perceived attractiveness of goods. In a theoretical perspective, our work makes a modest contribution to the growing body of literature in the field of neuromarketing by expanding our vision and understanding of the unconscious processes occurring in the "black box" of consumers, that influence their decision-making process.

To achieve these objectives, our study used a quantitative approach that integrated survey results, machine learning models, and eye-tracking technology. Eye-tracker explored areas of interest (AOI) by assessing fixation-based metrics and saccade-based metrics, identifying design elements that aroused the greatest interest among respondents. Survey data, in turn, answer the question "why?", thereby complementing the eye-tracker results and providing context for the obtained metrics. The use of machine learning algorithms such as random forest and principal component analysis (PCA) make it possible to predict consumer behavior, in particular, the perceived attractiveness of promotional products.

Literature Review

In today's visually overwhelming market, understanding consumer behavior is critical for developing effective marketing strategies. Neuromarketing, which combine neuroscience with marketing practices, offers valuable tools to study subconscious consumer behavior. Among these tools, eye-tracking has become one of the essential methods, which is able to examine how visual stimuli impact consumer perception and decision-making. This literature review explores the integration of eye-tracking technology with machine learning models to better understand visual attention and its impact on consumer behavior. In particular, it aims to investigate the role of visual stimuli, such as size and layout, in consumer engagement with promotional products. The review will address key aspects, such as the role of neuromarketing, the application of eye-tracking technology, visual attention, and machine learning integration.

Neuromarketing and Eye-Tracking Technology

Neuromarketing uses neuroscience approach to reveal consumer's physiological and cognitive responses to marketing stimuli. By using neuroimaging and biometric methods, neuromarketing captures real-time consumer reactions, offering insights into subconscious decision-making processes that traditional research methods often overlook. Aldayel et al. (2020) note that this approach provides a more precise understanding of consumer preferences. Using physiological metrics, neuromarketing identifies factors that capture consumer attention and drive decision-making, thereby helping to improve product positioning and marketing effectiveness.

Within this context, eye-tracking technology has become one of the main tools of neuromarketing, which measure physiological responses of consumers. It examines how consumers visually engage with marketing stimuli. By tracking eye movements, fixation durations, and gaze patterns, researchers can identify which elements of a product or advertisement draw consumer attention. These metrics offer valuable insights into consumer perception and decision-making (Martinovici et al., 2022).

Olarte (2021) highlights the importance of using eye-tracking beyond controlled laboratory settings, emphasizing its utility in real-world scenarios involving physical objects. The study also underscores how design features such as layout, background, and object size can significantly influence attention-related met-

rics like time to first fixation and dwell time. Similarly, Xie et al. (2024) demonstrate that such visual design elements have a measurable effect on consumer decision-making processes.

These findings support the present study's use of tangible promotional products in a naturalistic display and justify the inclusion of layout and size as key design variables. Furthermore, recent research suggests that neuromarketing techniques can also inform branding strategies in educational settings. For instance, student-oriented promotional design may benefit from identifying which visual features increase brand recall and engagement in high-stimulus environments like university campuses (Mashrur et al., 2023).

Visual Attention and Consumer Behavior

Visual attention is vital in consumer decision-making process. The way how consumers engage with visual elements — what they focus on and for how long — directly impacts their perceptions and purchasing decisions. Research by Kim and Kim (2024) and Pieters and Wedel (2004) shows that attention is shaped both by bottom-up factors (e.g., color, size) and top-down factors (e.g., expectations, goals). This dual influence is particularly important in marketing contexts, where design features must both stand out and align with consumer interests. Metrics such as fixation count, dwell time, and time to first fixation are considered reliable indicators of engagement. Gao and Kasneci (2022) show that higher fixation counts and longer dwell times often correlate with stronger consumer interest. These insights have practical implications for optimizing the design of promotional materials to better capture and sustain attention. Šola et al. (2025) reinforce the role of visual structure in shaping user attention. Their study on reader engagement with digital magazine content found that layout composition, spatial organization and content density significantly influence attention patterns and cognitive processing. Although the context differs, the principle — that design layout directly impacts attention — is relevant to optimizing the appeal and clarity of promotional products.

Machine Learning in Eye-Tracking Research

The combination of machine learning and eye-tracking technology significantly improves the prediction of consumer behavior. Gao and Kasneci (2022) note that machine learning algorithms can reveal patterns in eye-tracking data, which improves the accuracy of predictions regarding consumer preferences and purchasing intent. By analyzing factors such as fixation duration and areas of interest, machine learning models can refine predictions and optimize marketing approaches.

Juárez-Varón et al. (2020) applied Random Forest and clustering models to eye-tracking data in a product packaging study. Their results highlight the predictive value of AOIs, fixation counts, and revisit patterns in determining which design elements attract or lose consumer interest. These methodological parallels directly support this study's use of Random Forest Regressor and Hierarchical Clustering to analyze how consumers interact with university-branded promotional items. The focus on design elements such as layout and size further align with their findings, where visual characteristics were shown to significantly influence consumer preference. In addition, machine learning enables marketers to automate prediction of consumer engagement without manual feature engineering. Techniques like RETINA, a deep learning model described by Unger et al. (2023), suggest that attention trajectories — the order and time spent on different visual elements — can reveal decision-making intent with high predictive power. Though our study uses more interpretable models, these findings underscore the growing potential of combining physiological data with algorithmic interpretation to inform strategic marketing.

Gaps in the Literature

The design of promotional products can directly benefit from the insights gained from machine learning and neuromarketing. Optimizing the visual layout and positioning important information in high-attention zones can greatly boost product engagement, as previous study indicates (Goldberg et al., 2021). These high-impact locations are identified with the aid of eye-tracking study insights. Design elements like color, form, and testimonial usage can be adapted to create appeal and credibility in educational branding environments. Emotionally resonant colors and endorsements (such as alumni quotations) improve perceived credibility and connectedness, according to Mashrur et al. (2023). This literature confirms the significance of design detail in promotional efficacy, even if our study does not specifically evaluate emotional responses.

In spite of significant advancements in eye-tracking studies, there are still some gaps in the thorough understanding of consumer behavior. Numerous current studies center on individual eye-tracking metrics, like fixation duration, without examining how other eye-tracking metrics interplay to affect decision-making. Xie et al. (2024) emphasizes the need for a more cohesive method for eye-tracking that takes into account various data points. Additionally, much of the current research has concentrated on static areas of interest (AOIs) or screen-oriented devices in controlled laboratory settings, which might not entirely represent actual

consumer behavior in the real world. In this context, portable eye-trackers provide more natural and flexible measurements along with promising avenues for future research.

This current gap emphasizes the need for studies that examine the application of eye-tracking tools in practical settings, such as mobile devices or retail spaces. The current body of research reveals a complicated connection between visual attention and consumer behavior, with eye-tracking technology offering crucial insights into consumer interactions with products. Essential metrics, including fixation time and gaze frequency, are linked to heightened consumer interaction and can act as signs of buying intentions. Combining eye-tracking data with machine learning models can improve the ability to forecast consumer behaviors and refine marketing approaches.

This literature review has explored the function of eye-tracking technology in neuromarketing, emphasizing its capability to monitor consumer attention and foresee behavior. By combining eye-tracking with machine learning techniques, marketers can obtain enhanced understanding of consumer decision-making processes. The review emphasizes the significance of visual cues in shaping consumer perceptions and choices, establishing a solid basis for this research.

Methods

This research investigates consumer behavior in the context of promotional products at Almaty Management University, using a neuromarketing framework that combines eye-tracking technology with machine learning techniques. By analyzing consumer engagement through visual attention metrics, the study aims to identify the key factors which impact consumers' decision-making. The study aims to receive practically useful results and address important questions related to consumer preferences, eye-tracking metrics and design features of the promotional products such as layout and size.

Research Questions:

– How do design attributes (such as size and layout) impact consumer engagement with promotional products at Almaty Management University?

– How do eye-tracking metrics correlate with consumers' perceived attractiveness towards promotional products?

– How well machine learning models can predict consumer engagement and perceived attractiveness based on eye-tracking metrics?

Hypothesis:

It is hypothesized that visually appealing design elements, like size and layout, will have a positive impact on consumer engagement and perceived attraction of promotional products of Almaty Management University. Specially, products which have larger visual features and more visually appealing designs will attract more attention of consumers, which will lead to higher levels of engagement, and more likely to be rated as more attractive.

Also, it is expected that the integration of machine learning models **(**such as Random Forest and Hierarchical Clustering) with eye-tracking data will be able to improve the prediction of consumer preferences. By analyzing eye-tracking metrics such as fixation duration and gaze frequency, machine learning techniques will provide deeper insights into the relationship between visual stimuli and consumer behavior, which can offer more accurate and deeper understanding of consumer decision-making processes.

Participant Recruitment

The study uses a quantitative research method, using eye-tracking technology to collect data on participants' visual interactions with Almaty Management University's promotional products. The sample consisted of 16 participants (8 female, 8 male), aged 18–31. They were senior undergraduate students and early-career university employees, collectively defined as young professionals. This demographic was selected based on its strong alignment with the target audience of university promotional materials and its active engagement in both the university's social and physical environments. Recent literature supports the relevance of young professionals in branding research. Macalik (2023) emphasizes that young professionals, such as final-year students and early-stage employees, are increasingly attuned to branding as part of their personal and professional development. They demonstrate high sensitivity to visual identity, design cues, and messaging due to their active roles in social media, peer influence, and institutional representation. These individuals act as informal brand ambassadors, sharing experiences both online and offline, and are therefore highly relevant for testing responses to branded content in naturalistic settings. Their entrepreneurial mindset and openness to innovation further justify their inclusion in neuromarketing studies, where emotional and cognitive responses to design are key evaluation points. Moreover, this group's routine exposure to university-

branded materials — through events, onboarding processes, campus environments, and digital platforms — ensures high ecological validity. According to ESOMAR guidelines, researchers are expected to ensure that their sample sources are appropriate for the research purpose and representative of the relevant population. This implies that selecting participants who reflect the natural target audience of a product or brand enhances the relevance and interpretability of the results (ESOMAR, n.d.). While the sample size is below standard statistical thresholds, this sample aligns with neuromarketing research practices where smaller, targeted samples are common due to the consistency of physiological responses (Kazybayeva, 2022). Vozzi et al. (2021) found that even with as few as 16 participants, meaningful and interpretable results could be obtained, particularly when analyzing physiological metrics like EEG, eye movements, or skin conductance. In their neuromarketing case study, they demonstrated that although data variability increases as sample size decreases, subgroups of 16 participants still produced moderately strong correlations with the full-sample results. However, it is recommended for future researches to include more participants in order to improve representativeness of the study.

Equipment and Materials

Eye-tracking data was collected using the Tobii Glasses 2 device, a highly accurate portable neuromarketing tool, which is often used in neuromarketing researches. This device tracks eye movements, providing metrics such as fixation duration, saccades' counts, and areas of interest (AOIs) and etc. These metrics are important for understanding how visual elements of promotional products capture consumer's attention (Pieters & Wedel, 2004).

The promotional products which were used in this study were categorized into three main groups**:** Clothing (T-shirts, Sweatshirts), Stationery (Notebooks, Diaries), and Dishware (Mugs, Bottles, Thermoses). Hierarchical Clustering analysis later confirmed that this categorization was effective for comparing eye-tracking metrics across different groups.

Procedure

The experiment was conducted in a quiet study room at the university. A section of the room was partitioned off by a curtain to conceal the stimuli until participants were ready. The product display was designed to replicate a real-life campus environment, mimicking the university's entrance hall where such items are commonly exhibited. Branded products, such as T-shirts, mugs, thermoses, stickers, diaries, and notebooks and etc., were arranged on a large table in natural positions to create a familiar, ecologically valid context. After participants were informed about the study's aims, each of them went through calibration process to ensure that eye-tracking process will be highly-precise. Then, participants entered the space one at a time, with sufficient time intervals to prevent influence from prior sessions, especially since a few participants verbally commented during their interaction despite not being prompted to do so. Once inside, participants were left completely alone to interact with the items. This was done deliberately to minimize the observer effect and allow for a more authentic, self-paced experience. Instructions were minimal; participants were told to interact with the items as they would naturally. They were free to touch, pick up, or simply look at the products, with no imposed time limits. On average, they spent about 1,5 minutes exploring the display, though some remained longer and others less, depending on personal interest. The naturalistic, unmonitored setting was key to maintaining ecological validity and reducing artificial behavioral cues.

After interacting with promotional products, participants were asked to complete a survey in order to have a deeper understanding of their preferences for the promotional products and the importance of attributes like Quality**,** Design Appeal**,** Price**,** and Functionality. This combination of subjective responses and objective eye-tracking data regarding respondents' physiological responses provided a broader understanding of consumer engagement.

Data Collection and Analysis

Key eye-tracking metrics were analyzed to define consumer engagement:

- AOI Metrics: Duration of gaze on certain areas of interest.
- Fixation-based Metrics: Number of fixations and their duration.
- Saccade-based Metrics: Number and amplitude of quick eye movements between fixations.

Survey responses were combined with eye-tracking data to have a broader understanding of consumer preferences and define consumer behavior patterns. The data analysis was proceeded using machine learning models such as non-linear regression (Random Forest Regressor) and cluster analysis **(**Hierarchical Clustering**)** to define patterns and correlations between physiological responses and self-report results.

Machine Learning Models

1. Random Forest:

The Random Forest Regressor was designed to define the key features which impact consumer attraction. The model focused on eye-tracking metrics like size (cm²) and dwell time. The quality of the model's performance was evaluated using Mean Squared Error (MSE) and R^2 to ensure its accuracy in predicting.

2. Hierarchical Clustering:

This model divided promotional products into certain categories according to the engagement metrics which were obtained from eye-tracker. The clustering algorithm used Ward's method to minimize variance and identify patterns in consumers' attraction across different product categories. This helped to define the product groups which captured the most attention.

The methodology combines self-report and eye-tracking technology with machine learning to create a comprehensive model for understanding consumer engagement and behavior.

Results

Survey Results

Key findings of survey show strong preferences for clothing products and price sensitivity.

1. Attractiveness of Promotional Products

The survey analyzed consumers' preference of 3 promotional product categories, revealing following results:

– Clothing: 81 % of respondents showed a preference for clothing items, highlighting their importance as promotional products.

– Stationery: 9.5 % of respondents expressed attraction towards stationery, showing a lower level of attraction in this category.

– Dishware: 9.5 % of respondents also preferred dishware, with the same level of perceived attraction as in stationery.

2. Importance of Product Characteristics

Respondents rated the importance of various product characteristics on a scale from 1 to 5:

Table 1. Importance of Product Characteristics as Rated by Respondents

Characteristic	Average Rating
Quality	3.57
Attractiveness of Design	4.33
Price	4.43
Functionality/Practicality	3.86
Overall Average	**4.05**
Note: Compiled by the authors based on research.	

These findings show that while quality (3,57) is valued, the attractiveness of design (4,33) is more important for respondents. Additionally, the affordability of price was rated as the most important characteristic (4,43) for the respondents in decision-making process (see Table 1).

Eye-Tracking Metrics

Eye-tracking tool provided results which consist of several metrics, which can be divided into three main categories: AOI-based metrics, fixation-based metrics and saccade-based metrics.

AOI-Based Metrics

– AOI Duration (%): This metric shows the percentage of respondents' total viewing time spent on certain areas of interest (AOI). Higher values mean that the visual features within the AOI attract more attention.

– Size (%): This metric represents the relative size of the AOI as a percentage, showing how much of the screen area occupied by the object. Larger size (%) may attract more attention because of its visual prominence.

– Fixation-Based Metrics

– Fixation Count: This metric shows the number of times when the respondent's gaze was fixed on a certain AOI. More fixations typically mean stronger interest or need for closer inspection.

– TTFF AOI (ms): The Time To First Fixation (TTFF) measures how quickly the viewer's gaze is attracted to a specific AOI. Shorter times usually indicate quicker attraction.

– Dwell Time (ms): This represents the total time spent looking at an AOI. Longer dwell times suggest increased interest or difficulty in processing information.

– First Fixation Duration (ms): This metric measures the time spent on the first fixation. Longer first fixations typically reflect stronger initial attraction or interest.

– Saccade-Based Metrics

– Saccade Count: This metric refers to the number of quick eye movements (saccades) made between different AOIs. Higher saccade counts generally suggest active exploration of the visual content.

– Amplitude (deg): This refers to the angular distance the eyes move between fixations. Larger amplitudes indicate a more active exploration of the content.

As shown in Table 2, clothing consistently outperformed both dishware and stationery in terms of attention metrics, indicating that clothing is the most visually appealing category in Almaty Management University's promotional products. This supports the idea that aesthetically pleasing products, particularly those with larger visual features, are more likely to engage consumers (Janiszewski, 1998). Dishware and stationery, though still attracting some attention, did not capture consumer interest as strongly as the clothing items.

Table 2. Eye-Tracking Metrics by Category

Metric	Clothing	Dishware	Stationery
AOI Duration (%)	100	100	100
Size (%)	4.65	1.80	2.47
Fixation Count	2.525	1.4	1.77
TTFF AOI (ms)	958.45	2965.6	2669.77
Dwell Time (ms)	355.85	268	221.67
First Fixation Duration (ms)	166.25	128	133.33
Saccade Count	4.23	1.7	2.43
Amplitude (deg)	4.07	3.90	3.37
Note: Compiled by the authors based on research.			

These findings align with survey results, which also highlighted clothing as the most attractive promotional product category.

Machine Learning Model Results

1. Principal Component Analysis (PCA)

Principal Component Analysis (PCA) is a technique used to simplify complex data while keeping only key information. In this study, this method was applied to the eye-tracking data to replace the traditional heatmap, offering a more accurate measure of consumer engagement (see Fig. 1). By analyzing eye-tracking metrics like AOI duration (%), size (%), dwell time (ms), and saccade count, PCA reduced the data and provided Overall Intensity score for each product, which reflects consumer attraction levels.

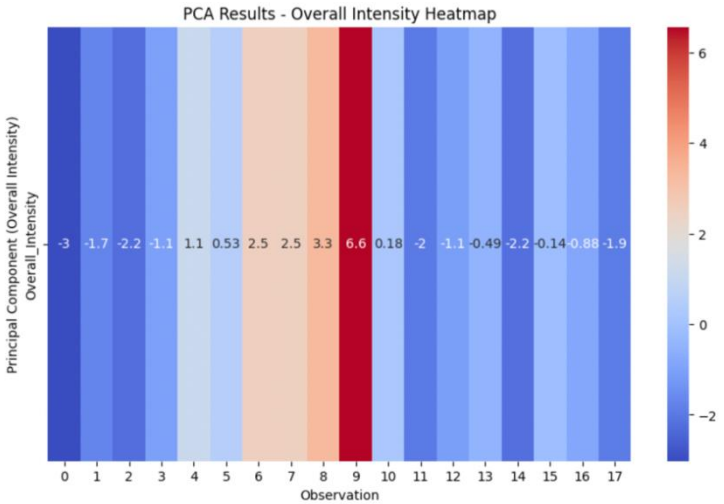

Figure 1: Heatmap of PCA Results for Overall Intensity of Promotional Products

Note: The results were obtained using Python, with data processed through a PCA (Principal Component Analysis) algorithm, and visualized accordingly.

The Overall Intensity scores were categorized as low, medium, or high based on their value. Scores below –1.5 were identified as low, between –1.5 and 2.5 medium, and above 2.5 high. This categorization

helped to define which products attract more attention. Table 3 shows the Overall Intensity scores and their categorization based on PCA results.

Table 3. Overall Intensity and Categorization of Promotional Products Based on PCA Results

Number	Object Name	Object Color	Object Category	Overall Intensity	Intensity Category
0	Thermocup	White	Dishware	–3.02	Low
1	Thermos	Dark Blue	Dishware	–1.72	Low
2	Thermal Bottle	Gray	Dishware	–2.24	Low
3	Mug	Dark Blue	Dishware	–1.07	Medium
4	T-shirt	Dark Blue	Clothing	1.14	High
5	T-shirt	White	Clothing	0.53	High
6	T-shirt	Black	Clothing	2.54	High
7	Bomber	Red	Clothing	2.51	High
8	Sweatshirt	Dark Blue	Clothing	3.33	High
9	Sweatshirt	Black	Clothing	6.57	High
10	Sticker	Light Blue	Stationery	0.18	Medium
11	Sticker	Dark Blue	Stationery	–1.98	Low
12	Sticker Mini	White	Stationery	–1.10	Medium
13	Diary	Gray	Stationery	–0.49	Medium
14	Diary	Dark Blue	Stationery	–2.20	Low
15	Diary	Red	Stationery	–0.14	Medium
16	Copybook	White	Stationery	–0.88	Medium
17	Copybook	Gray	Stationery	–1.94	Low

Note: Compiled by the authors based on research.

The PCA results showed that clothing products, such as the T-shirt (Black) and Sweatshirt (Dark Blue), had higher Overall Intensity scores, showing higher consumer engagement. These items also had larger size (%) metric, suggesting that products with larger visual features are more likely to attract consumers' attention. On the contrary, dishware and stationery category products with smaller size percentages received low or medium intensity scores.

2. Hierarchical Clustering Analysis

Hierarchical Clustering was used to categorize promotional products based on their eye-tracking metrics, in order to confirm the initial categorization of Clothing, Dishware, and Stationery product groups. This analysis aimed to identify distinct engagement patterns within these product categories. The ML model was applied using the fcluster() function from scipy.cluster.hierarchy, which clustered the products into three groups based on the similarities in their engagement metrics obtained from eye-tracker.

Interestingly, the application of the Machine Learning model showed the same classification of products into three clusters, as in the original categories of Clothing, Dishware, and Stationery (see Fig. 2). This alignment not only validates the initial product categorization but also highlights the effectiveness of the eye-tracking metrics. These metrics show that visually engaging products, especially in the clothing category, attract more consumer attention. The fact that these eye-tracking results align with the logical categorization of products confirms that products within the same category provoke similar physiological responses, highlighting the consistency of consumer engagement across different product types.

Objects in Cluster 1:

	Color	Category	AOI duration (msAOI duration (ms)	Size (%)
4	dark-blue	clothes	4488.7	9.9
5	white	clothes	4488.7	11.5
6	black	clothes	4488.7	14.4
7	red	clothes	11407.9	8.6
8	dark-blue	clothes	11407.9	11.5
9	black	clothes	11407.9	19.7

Objects in Cluster 2:

	Color	Category	AOI duration (msAOI duration (ms)	Size (%)
0	white	dishware	16698.5	1.2
1	dark-blue	dishware	16698.5	1.4
2	gray	dishware	16698.5	1.3
3	dark-blue	dishware	16698.5	1.0

Objects in Cluster 3:

	Color	Category	AOI duration (msAOI duration (ms)	Size (%)
10	light-blue	office supplies	4410.0	4.2
11	dark-blue	office supplies	4410.0	4.3
12	white	office supplies	4410.0	2.5
13	gray	office supplies	8410.1	3.3
14	dark-blue	office supplies	8410.1	3.3
15	red	office supplies	8410.1	3.7
16	white	office supplies	4343.1	6.6
17	gray	office supplies	4343.1	2.9

Figure 2. Hierarchical Clustering Results for Promotional Products

Note: The clustering results were obtained using Python and visualized with the help of a hierarchical clustering algorithm.

Using key eye-tracking metrics such as AOI duration, Fixation count, and Dwell time, the products were grouped into three clusters:

Cluster 1: This cluster, consisting of clothing items, was characterized by high engagement. Products like t-shirts, sweatshirts, and bombers with larger visual features attracted higher levels of consumer attention. These products also showed high Fixation counts and Dwell time, indicating that clothing items not only captured attention but held it for longer time.

Cluster 2: Consisting of dishware items, this cluster showed medium level of engagement. While Amplitude (deg) and Saccade counts were not as high as in Cluster 1, products like thermocup and thermal bottles still drew notable level of attention. The TTFF AOI (Time to First Fixation) and Fixation counts in this cluster showed a reasonable level of engagement, although lower compared to clothing items.

Cluster 3: This cluster encompassed stationery, which attracted the least attention from respondents. Dwell time and Fixation count were noticeably lower, with items like diaries and copybooks receiving less engagement. Interestingly, despite the overall lower attention metrics, some stationery like copybooks showed moderate engagement in specific metric such as Saccade count, suggesting that they were occasionally revisited for closer inspection.

This analysis not only confirmed the initial categorization but also provided deeper insights into the engagement levels across these groups. The precise alignment of the ML clustering results with the original categories underscores the effectiveness of both the experiment's design and the application of Machine Learning in deriving meaningful insights.

3. Random Forest Regressor for Attractiveness Prediction

A Random Forest Regressor model was employed to predict the attractiveness ratings of promotional products based on a range of eye-tracking and product-related features. As an ensemble learning method, Random Forest constructs multiple decision trees to enhance prediction accuracy and mitigate overfitting, making it particularly suitable for this analysis. The model was trained using features such as AOI duration, product size, dwell time, and additional metrics to predict attractiveness ratings, which were derived from survey responses. The dataset was divided into 70 % for training and 30 % for testing. The model's performance was then assessed through the Mean Absolute Error (MAE), Mean Squared Error (MSE), and the R^2 Score.

Model Evaluation Metrics

– Mean Absolute Error (MAE): 2.47, showing that, the model's predictions differ from the actual ratings, on average, by 2.47 points.

– Mean Squared Error (MSE): 7.28, it measures the average of the squared differences between the predicted and actual values, showing the differences between them.

– R^2 Score: 0.57, suggesting that the model accounts for approximately 57 % of the variance in attractiveness ratings. While not perfect, this result signifies that the model captures a substantial portion of the relationship between eye-tracking features and perceived product attractiveness.

The Random Forest model's evaluation metrics provide a further understanding of how well these visual and engagement features predict consumer preferences.

Feature Importance

Feature importance in machine learning indicates which factors are most influential in predicting a target variable — in this case, the attractiveness ratings. In the Random Forest model, each feature is assigned an importance score, showing how much it contributes to the model's predictions. A higher score means a feature plays a bigger role in determining attractiveness. Feature importance analysis revealed the following key drivers:

1. Size (cm²): 23.47 %, indicating that larger products are perceived as more attractive.
2. Dwell time (ms): 16.33 %, highlighting the influence of longer consumer attention on the perceived attractiveness of a product.

Additional important features included Revisit count (8.1 %), Amplitude (deg) (8.1 %), and Fixation count (7.1 %), demonstrating that metrics of consumer engagement, such as the frequency of revisits and number of fixations, also contribute to the perception of attractiveness.

Predictive Ability

The model's ability to explain 57 % of the variance in attractiveness indicates a moderate correlation between visual metrics and consumer preferences (Fig. 3).

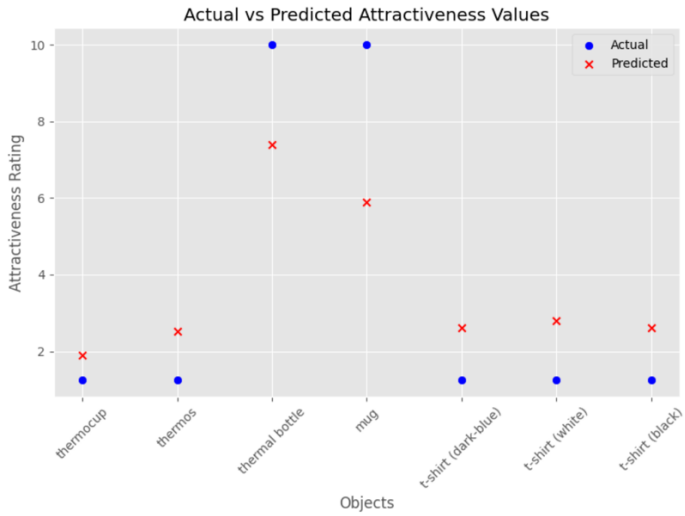

Figure 3: Actual vs Predicted Attractiveness Ratings for Promotional Objects

Note: The predictions for attractiveness ratings were obtained using Python and visualized with the help of a Random Forest Regressor model.

Discussions

The findings from this study highlight the importance of design attributes, especially visual appeal, which proved to drive consumer engagement the most. Eye-tracking metrics such as dwell time and size (cm^2), had a reliable correlation value with consumers' perceived attraction. Based on these findings, it can be suggested that larger promotional products are much more likely to be viewed as attractive. Therefore, universities should give priority to products with more surface area, like clothing or tote bags, in order to improve visual appeal. Products that promote longer visual attention — whether through functional features, symbolic imagery, or layered design elements — are also better at drawing in customers. Designing visually appealing items that encourage repeated focus, for example, by employing strategic color contrasts or balanced logo placement, is further highlighted by metrics like revisit and fixation counts. These results lend credence to a data-driven strategy for product design optimization that matches visual attributes with trends in customer engagement and attention.

These results also can suggest that consumer behavior is influenced by a blend of bottom-up factors, driven by the inherent characteristics of a product, and top-down factors, shaped by consumers' prior knowledge or expectations. As Pieters and Wedel (2004) argue, bottom-up attention is automatic and heavily guided by visual cues such as size, layout, and color, which naturally capture consumer attention. Our study's findings, where clothing items received higher engagement, align with these insights, as clothing of-

ten stands out visually and is strongly associated with consumer identity or needs. In contrast, items like stationery, which lack this emotional resonance, generated less engagement.

The significant preference for clothing (81 %) indicated by the survey responses reinforces the idea that products with higher aesthetic appeal tend to capture more attention and are more likely to be remembered by consumers (Alsharif et al., 2023) and consistent with the findings of eye-tracking results. This aligns with previous researches (Kahneman, 2011; Ariely & Berns, 2010), which discuss how neuromarketing can uncover hidden preferences in consumers behavior and preferences.

Additionally, the pattern of higher engagement with clothing items can be understood through the lens of Hedonic Versus Utilitarian Purchases (Li et. al, 2020). Hedonic purchases, such as clothing, are driven by emotional gratification and personal identity, leading to stronger consumer engagement. Clothing items often evoke a sense of self-expression and are linked to social status, making them more emotionally resonant compared to utilitarian products like stationery. The emotional appeal of clothing naturally generates greater attention and sustained engagement, reinforcing the idea that hedonic products are more likely to engage consumers.

The results of this study are consistent with earlier research that emphasizes the significance of visual cues in influencing consumers' choices. Alsharif et al. (2023) found that visually appealing products attract more attention and increase engagement. Our study supported the important role that visual attention plays in influencing consumer preferences, which is in line with the findings of Kim et al. (2024) and Xie et al. (2024). According to the findings, clothing and other items with higher visual salience are more likely to draw in customers.

However, this research takes a more thorough approach by using machine learning models like Random Forest Regressor to predict consumer behavior, in contrast to traditional studies that frequently rely on descriptive metrics. By providing deeper insights, applying machine learning models to eye-tracking data greatly enhances the capacity to predict consumer preferences, as Unger et al. (2023) point out. Our study offers a new framework for comprehending hidden patterns in consumer behavior, especially in the way that design elements affect how attractive products are perceived, by combining these predictive models.

The study's conclusions offer helpful suggestions for enhancing Almaty Management University's approach to product promotion:

- Focus on Clothing

Almaty Management University ought to think about growing its clothing line in light of the high demand for apparel. Highlighting bold, eye-catching designs could enhance the visual appeal of these products, increasing consumer engagement.

- Improve Visual Appeal

Since design attractiveness was highly rated by respondents (4.33/5), Almaty Management University should invest in high-quality graphics and designs, ensuring they are unique and more visually appealing to the target audience.

It is critical to acknowledge this study's limitations. First of all, the reliability of these results might be enhanced by a larger sample size. Additionally, customer perceptions and decisions may also have been impacted by variables like socioeconomic status and individual preferences. Belch & Belch (2009) emphasize how crucial a customer's personal objectives and feelings are to their ability to focus and make decisions.

Future studies could investigate a number of approaches to improve the results and address present limitations in light of this study:

- Increase sample size

Including a larger range of demographics in the sample may yield more in-depth information about how different customer preferences impact engagement. This would support cross-market validation of the results.

- Incorporate personal preferences and psychographic profiling

Future studies should take individual differences in motivation, lifestyle, and identity expression into consideration, given the symbolic and emotional value frequently associated with promotional items. Techniques like personality-based segmentation or brief surveys may be able to reveal trends in the use and appeal of products.

In summary, the discussion section highlights the importance of certain characteristics of promotional products. In particular, visual appeal emerged as the second most important product attribute after price, according to the survey results. Combining this data with metrics obtained from eye-tracker, the study shows that consumers are subconsciously drawn to visually appealing products, in particular to clothing. In our

study, we used these metrics in machine learning models to predict consumer behavior — namely, how attractive promotional products are perceived to be. The results highlight the effectiveness of implementing neuromarketing tools in studying consumer behavior. It can reveal hidden patterns in physiological responses that traditional methods may miss. And based on these findings, universities should further prioritize larger products with more surface area, as they are more likely to be perceived as attractive, and include visually appealing elements that stimulate prolonged and repeated attention.

Conclusions

This study, conducted at the Almaty Management University, shows how certain design elements affect consumer interactions with promotional products. The survey revealed that clothing items were consistently rated as the most attractive products. The eye-tracker results also undermined this pattern, as these items also scored high in the AOI-metrics. The combination of survey data and neuromarketing tools provides important insights into how design attributes, such as size and layout, influences consumer decision-making and the perceived attractiveness of promotional products. Further analysis through machine learning models, such as Random Forest, brought important insight into the key parameters that could influence the perception of the attractiveness of items.

The results show that, particularly with respect to the apparel market, consumers tend to be attracted more to highly dressed aspects rather than things that are less designed. This aligns with the findings of Janiszewski (1998), which suggest that larger and more visually prominent stimuli tend to garner more interest. The study also confirms that eye-tracking metrics like dwell time and size (cm2) are reliable indicators of consumer interest. Our study revealed a clear correlation between these metrics and attractiveness ratings. For marketers, this means that improving the visual design of promotional products can significantly increase consumer engagement.

Although the study offers valuable information, it should be noted that it has several limitations. The results' representativeness may be limited by the 16-person sample size. The findings would be more applicable with a larger sample. Furthermore, to conduct a longitudinal research would offer an understanding of how engagement and appeal are changed in relation to the dynamic trends of the ever-changing market, culture, and economic conditions.

This research highlights that integrating advanced technology such as eye tracking, machine learning, etc., is important in marketing strategies. It gives marketers a deeper understanding of consumer behavior, from which improved and efficient promotional materials can be developed. The results showed that the visual appeal usually had a considerable effect on customer engagement. In conclusion, institutions like Almaty Management University can enhance their promotional strategies by focusing on the visual elements that most effectively capture consumer attention.

References

Aldayel, M., Ykhlef, M., & Al-Nafjan, A. (2020). Deep learning for EEG-based preference classification in neuromarketing. *Applied Sciences (Switzerland), 10*(4), Article 1525. https://doi.org/10.3390/app10041525

Alsharif, A.H., Md Salleh, N.Z., Abdullah, M., Khraiwish, A., & Ashaari, A. (2023). Neuromarketing tools used in the marketing mix: A systematic literature and future research agenda. *SAGE Open, 13*(1), Article 21582440231156563. https://doi.org/10.1177/21582440231156563

Ariely, D., & Berns, G.S. (2010). Neuromarketing: The hope and hype of neuroimaging in business. *Nature Reviews Neuroscience, 11*(4), 284–292. https://doi.org/10.1038/nrn2795

Belch, G.E., & Belch, M.A. (2009). *Advertising and promotion: An integrated marketing communication perspective* (9th ed.). Irwin/McGraw-Hill.

Bulling, A., & Wedel, M. (2019). Pervasive eye tracking for real-world consumer behavior analysis. In M. Schulte-Mecklenbeck & A. Kühberger (Eds.), *A handbook of process tracing methods for decision research: A critical review and user's guide* (pp. 27–44). Taylor & Francis. https://collaborative-ai.org/publications/bulling19_tf/

ESOMAR. (n.d.). *Guideline for researchers and clients involved in primary data collection.* https://esomar.org/code-and-guidelines/guideline-for-researchers-and-clients-involved-in-primary-data-collection

Gao, H., & Kasneci, E. (2022). Eye-tracking-based prediction of user experience in VR locomotion using machine learning. *Computer Graphics Forum, 41*(7), 589–599. https://doi.org/10.1111/cgf.14703

Goldberg, P., Sümer, Ö., Stürmer, K., Wagner, W., Göllner, R., Gerjets, P., Kasneci, E., & Trautwein, U. (2021). Attentive or Not? Toward a Machine Learning Approach to Assessing Students' Visible Engagement in Classroom Instruction. *Educational Psychology Review, 33*(1), 27–49. https://doi.org/10.1007/S10648-019-09514-Z

Janiszewski, C. (1998). The influence of display characteristics on visual exploratory search behavior. *Journal of Consumer Research, 25*(3), 290–301. https://doi.org/10.1086/209540

Juárez-Varón, D., Tur-Viñes, V., Rabasa-Dolado, A., & Polotskaya, K. (2020). An Adaptive Machine Learning Methodology Applied to Neuromarketing Analysis: Prediction of Consumer Behaviour Regarding the Key Elements of the Packaging Design of an Educational Toy. *Social Sciences*, *9*(9), 162. https://doi.org/10.3390/socsci9090162

Kahneman, D. (2011). *Thinking, fast and slow.* Penguin Books.

Kazybayeva, A.M. (2022). *Neuromarketing.* Balausa.

Kim, J.Y., & Kim, M.J. (2024). Identifying customer preferences through eye-tracking in travel websites focusing on neuromarketing. *Journal of Asian Architecture and Building Engineering*, *23*(2), 515–527. https://doi.org/10.1080/13467581.2023.2244566

Li, J., Abbasi, A., Cheema, A., & Abraham, L.B. (2020). Path to purpose? How online customer journeys differ for hedonic versus utilitarian purchases. *Journal of Marketing*, *84*(4), 127–146. https://doi.org/10.1177/0022242920911628

Macalik, J. (2023). Personal Brand—Instructions of Use. Do Young Professionals Want and Need to be Taught Personal Branding? *Marketing of Scientific and Research Organizations*, *48*(2), 41–60. https://doi.org/10.2478/minib-2023-0009

Martinovici, A., Pieters, R., & Erdem, T. (2022). Attention Trajectories Capture Utility Accumulation and Predict Brand Choice. *Journal of Marketing Research*, *60*, 625–645. https://doi.org/10.1177/00222437221141052

Mashrur, F.R., Rahman, K.M., Miya, M., Vaidyanathan, R., Anwar, S.F., Sarker, F., & Al Mamun, K.A. (2023). Intelligent neuromarketing framework for consumers' preference prediction from electroencephalography signals and eye tracking. *Journal of Consumer Behaviour*. https://doi.org/10.1002/cb.2253

Pieters, R., & Wedel, M. (2004). Attention capture and transfer in advertising: Brand, pictorial, and text-size effects. *Journal of Marketing*, *68*(2), 36–50. https://doi.org/10.1509/jmkg.68.2.36.27794

Salazar Olarte, C.A. (2021). Pupilometría y el eye tracking como herramientas del neuromarketing. *Vivat Academia*, 227–243. https://doi.org/10.15178/va.2021.154.e1345

Šola, H.M., Qureshi, F.H., & Khawaja, S. (2025). AI and Eye Tracking Reveal Design Elements' Impact on E-Magazine Reader Engagement. *Education Sciences*, *15*(2), 203. https://doi.org/10.3390/educsci15020203

Unger, M., Wedel, M., & Tuzhilin, A. (2023). Predicting consumer choice from raw eye-movement data using the RETINA deep learning architecture. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4341410

Vozzi, A., Ronca, V., Aricò, P., Borghini, G., Sciaraffa, N., Cherubino, P., Trettel, A., Babiloni, F., & Di Flumeri, G. (2021). The Sample Size Matters: To What Extent the Participant Reduction Affects the Outcomes of a Neuroscientific Research. A Case-Study in Neuromarketing Field. *Sensors*, *21*(18), 6088. https://doi.org/10.3390/s21186088

Xie, W., Lee, M.H., Chen, M., & Han, Z. (2024). Understanding consumers' visual attention in mobile advertisements: An ambulatory eye-tracking study with machine learning techniques. *Journal of Advertising*, *53*(3), 397–415. https://doi.org/10.1080/00913367.2023.2258388

https://doi.org/10.31489/2025Ec2/17-30

JEL: D91, L83, M37. Received: 22.01.2025 | Accepted: 03.04.2025

ORIGINAL RESEARCH

The Impact of Gambling Advertising Perception on the Development of Gambling Addiction: Mediating and Moderating Effects

Yermek Buribayev[1], Aigerim Lambekova[2*], Yessengali Oskenbayev[3] Beibut Mukanov[4]

Abstract

This study aims to identify the influence of gambling advertising perceptions on the development of gambling addiction, focusing on the mediating role of behavioral impulse and the moderating function of risk awareness. With the growing digitalization of gambling services and increasing advertising pressure, especially among youth audiences, there is a growing need for a comprehensive analysis of the mechanisms of marketing content exposure. The methodological model includes four hypotheses: the influence of advertising on impulsivity (H1), the influence of impulsivity on addiction (H2), the mediating effect of impulsivity (H3) and the moderating role of risk awareness (H4). Data were collected in 20 regions of Kazakhstan among 530 respondents with signs of addiction. PLS-SEM model was applied. The results indicate a significant mediation of impulse and mitigating effect of risk awareness. The findings are important for regulation and prevention of gambling addiction.

Keywords: gambling advertising, addiction, impulsivity, risk awareness, PLS-SEM, Kazakhstan

Acknowledgment: This research for this article is funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan. Project title — Integrative Study of Gambling Addiction in Kazakhstan and Multidisciplinary Strategies for Its Minimization (BR24992927)

Introduction

In recent decades, participation in gambling has become a widespread phenomenon in many countries, including the Republic of Kazakhstan. One of the driving forces behind this spread is the aggressive marketing policy of gambling operators, which is particularly active in the digital space — through social networks, push notifications, messengers and online broadcasts. Such advertising positions gambling not as a risk, but as part of socially approved leisure activities, forming a positive perception in users and reducing awareness of the consequences.

In parallel with the global spread of online gambling, concerns about its consequences are growing. The situation is particularly alarming among young people and working-age men, for whom betting and gambling become part of the everyday digital experience. Kazakhstan is of particular interest in this context: on the one hand, legalization and economic growth stimulate the development of the gambling sector; on the other hand, there is a lack of comprehensive regulation of online advertising and preventive support systems for people with gambling addiction. Despite the growing academic interest in the topic, most of the existing studies are based on data from Western countries and do not take into account the cultural, behavioral and economic characteristics of post-Soviet societies. Current research highlights that advertising can reinforce risky behavioural patterns and act as a factor in the engagement of individuals with no previous interest in gambling (Hing et al., 2018; Russell et al., 2023). Moreover, exposure to advertising messages can activate a behavioural impulse that leads to uncontrolled betting. Behavioural impulse, in turn, is considered as an intermediate link in the formation of gambling addiction, and critical perception and risk awareness as possible buffering factors.

[1] Department of Law, Zhetysu University named after I. Zhansugurov, Ilyas Zhansugurov, *yermek-a@mail.ru*
[2] *Faculty of Economics, Karaganda Buketov University, Karaganda, Kazakhstan, *lambekova_aigerim@buketov.edu.kz* (corresponding author)
[3] School of Economics and Management, Narxoz University, Almaty, Kazakhstan, *Yessengali.oskenbayev@narxoz.kz*
[4] Faculty of Economics, Karaganda Buketov University, Karaganda, Kazakhstan, *mukanovbo@mail.ru*

Thus, the present study attempts to fill two gaps: (1) to test empirically a mediated model that explains how advertising perception influences addiction through behavioural impulse, and (2) to identify the moderating effect of risk awareness in these relationships. The analysis was conducted on a representative sample of 530 players from different regions of Kazakhstan, using PLS-SEM, one of the most advanced structural modelling tools.

However, the question remains insufficiently explored: through what mechanisms does advertising influence the formation of addiction? The role of awareness as a possible buffer is also neglected.

Theoretical background and literature review

Gambling advertising affects cognitive distortions and normalizes risk-taking behaviour. Hing et al. (2018) showed that advertising stimuli, especially in digital form (SMS, push notifications, bonuses), elicit immediate impulsive betting. Russell et al. (2023) confirmed that perceptions of advertising messages are associated with increased frequency of betting participation, especially among young people.

Behavioural impulse acting as a mediator is a key predictor of the development of gambling addiction. This is consistent with the stimulus-organism-response (S-O-R) model, in which advertising stimuli (S) activate internal psychophysiological responses (O), leading to gambling behaviour (R).

Pitt et al. (2017) found that children's exposure to gambling advertisements was significantly associated with more favorable attitudes toward gambling and increased consumption intentions. Impulsivity in adolescents and young adults is considered a consistent predictor of gambling involvement (Ioannidis et al., 2019).

Risk awareness acts as a potential moderator in this relationship. As shown in Gainsbury et al. (2020), participants with high levels of critical awareness of advertising displayed a lower propensity for impulsive betting. This suggests a buffering role for mindfulness and media literacy in advertising exposure conditions. Young people (18–24 years old) are considered the most vulnerable: they are often exposed to massive advertising of sports betting and online casinos through television, internet and social media (Rossi et al., 2021). Gambling advertisements often present gambling as an exciting and safe pastime, thereby normalising risk-taking behaviour and shaping positive attitudes towards gambling among audiences. However, the exact contribution of advertising to the promotion of gambling behaviour and the development of addictive patterns remains a subject of active research.

One of the putative psychological mechanisms of advertising influence is the enhancement of the behavioural impulse to gamble by the spontaneous urge to bet money without thinking about the consequences. Behavioural impulsivity has long been recognized as a significant risk factor for addictive behaviour and its role has been extensively studied in the context of pathological gambling (Mestre-Bach et al., 2020; Ioannidis et al., 2019). Meanwhile, gambling addiction (gambling addiction) — a clinical disorder characterized by compulsive gambling participation, loss of control and escalating negative consequences — is often associated with increased impulsivity and reduced risk sensitivity (Spurrier & Blaszczynski, 2014). In turn, risk awareness — an individual's understanding of the realistic probabilities of losing and the potential harms of gambling — can play a protective role by moderating impulsive decisions. This literature review aims to analyze current research on four interrelated aspects: (1) the influence of gambling advertising on players' behavioural impulses; (2) the influence of impulsivity on the formation of gambling addiction; (3) the indirect nature of advertising influence (through impulsive behaviour); and (4) the role of risk awareness. Based on the results of the critical analysis of the literature, the relevant hypotheses of the study are formulated for further empirical testing.

Theoretical background

Gambling advertising refers to any marketing promotion of gambling products and services, from television spots and internet banners to sponsorship of sporting events. Studies have documented the explosive growth of such advertising: in one country, for example, gambling companies' advertising expenditure grew by almost 50 per cent in a year. Adverts full of enticing messages (e.g., free bets, high odds) create an illusion of easy winnings and reduce risk perception (Deans et al., 2017).

In psychology, impulsivity is defined as the tendency to act in haste, without due consideration of the consequences. Impulsive individuals are characterized by difficulty in restraining immediate impulses and a preference for instant gratification, even if it involves great risk. Impulsivity is considered a key personality factor that increases vulnerability to gambling problems (Chamberlain et al., 2019). Theoretical models partition impulsivity into components (cognitive hurry, inhibition deficits, preference for immediate rewards, etc.), and on all of these dimensions, individuals with gambling addiction show higher scores than control

groups. Thus, impulsive behaviour serves as an important basis for the emergence and perpetuation of gambling habits.

Pathological gambling is recognized as a form of behavioural addiction comparable in its manifestations to chemical addictions. The DSM-5 and ICD-11 classify it as "gambling disorder," a disorder in which a person loses control over gambling, continues to gamble despite severe consequences, and experiences psychological dependence and withdrawal-like symptoms. Gambling addiction is associated with serious personal, family and socio-economic problems: it causes deterioration of mental health, conflicts in relationships, debts, up to bankruptcy. Current estimates of the prevalence of problem gambling range from 1–3 % of the adult population, with young males at highest risk (Calado et al., 2017). A significant feature of ludomaniacs is the presence of associated impulsive-cognitive dysfunction — increased impulsivity, deficits in self-control, and cognitive distortions about winning and chance (Spurrier & Blaszczynski, 2014). These characteristics both predispose to the development of addiction and worsen as addiction progresses.

Gambling risk awareness refers to the level of awareness and realism of a person's perception of the probabilistic and negative aspects of gambling. This includes an understanding that the mathematical expectation of winning is usually negative, awareness of the possibility of large monetary losses, and knowledge of the signs and consequences of gambling addiction. For example, Spurrier and Blaszczynski (2014) noted that heavy gamblers tend to overestimate the likelihood of winning and underestimate the possibility of losing and harm, whereas non-pathological gamblers have more sober risk perceptions. A growing body of research confirms that gambling advertisements can provoke immediate urges to gamble in audiences. Two recent systematic literature reviews have concluded that advertising exposure acts as a "catalyst" for gambling behaviour — it increases the desire to gamble (craving), induces impulsive and risky betting, and generally increases engagement with the game (Bouguettaya et al., 2020; Newall et al., 2019).

There is a dose-dependent effect: an increase in advertising exposure is accompanied by an increase in positive attitudes towards betting, intentions to bet and actual acts of gambling. According to a meta-analysis, the effect of advertising on behaviour is statistically significant and increases with the number of ads seen (Livingstone et al., 2014).

In a study involving Australian bettors, it was shown that certain types of promotions — such as offering bonus bets — provoke spontaneous bets during a sports game, which the players themselves identified as being made "impulsively" under the influence of the adverts (Hing et al., 2018). These results illustrate the mechanism by which marketing incentives (colourful appeals, time-limited offers, live odds) trigger an immediate impulse to try their luck in the gambler's mind, bypassing the stage of deliberate decision-making.

At the same time, empirical data indicate the complexity and heterogeneity of this effect. Not all forms and conditions of advertising exposure induce impulsive gambling in the same way. For example, the aforementioned study by Hing et al. (2018) found that the overall level of exposure to betting adverts did not have a direct positive relationship with the frequency of impulsive betting during a match.

There is strong evidence that individuals that already have high risk or problem gambling levels are the most susceptible to impulsive reactions to advertising. In a longitudinal study in Spain among sports bettors, advertising exposure was significantly associated with an increase in problem gambling only in the group with high scores on the PGSI scale, whereas no such association was observed in low-risk players (Lopez-Gonzalez et al., 2022). Literature data in this area is generally consistent, indicating the existence of a direct behavioural relationship between exposure to gambling advertising and impulsive actions of players. Based on this, it can be hypothesized that increased exposure to gambling advertisements leads to an increase in an individual's spontaneous impulses to gamble and ill-considered betting. Thus, it is hypothesized that higher exposure to gambling advertisements causes stronger and more frequent behavioural impulses to gamble (H1).

Impulsivity is one of the most consistently confirmed personality traits associated with predisposition to gambling addiction. For example, patients with pathological gambling addiction are significantly more likely than non-pathological gamblers to prefer a small immediate gain to a larger delayed gain, even if the latter is objectively more favourable — a classic sign of impulsive choice (Mestre-Bach et al., 2020). All these data support clinical observations: impulsive individuals are at increased risk of developing gambling addiction.

It should be noted that impulsivity in the case of gambling addiction manifests itself in a complex way: in addition to personality traits (low stamina, risk-taking), such individuals are often found to have cognitive distortions that reduce the rational assessment of consequences. For example, reduced risk perception and a false sense of control over the outcome of a game are strongly associated with an impulsive decision-making style (Spurrier & Blaszczynski, 2014). Taken together, the data suggests a strong relationship between im-

pulsive behaviour and pathological gambling. Individuals with a high level of impulsivity are significantly more prone to developing gambling addiction, and the degree of impulsivity is positively associated with the severity and stability of addictive symptoms (loss of control, duration of gambling sessions, volume of losses). Based on this, the following assumption is formulated: the higher the impulsiveness of an individual, the higher the probability of formation and severity of gambling addiction (H2).

Indirect evidence is provided by a study by Lopez-Gonzalez et al. (2025) that examined the combined role of a number of psychological factors in patients diagnosed with gaming disorder. The concept of mediation is also echoed in theoretical models of gambling advertising harm. Thus, experts suggest that the impact of advertising on problem gambling behaviour is not straightforward but is implemented through changes in psychological variables — primarily emotions, cognitive assessments and impulsive tendencies of players. Advertising forms in the mind the "ground" for immediate gambling action, and then the dynamics of reinforcement (wins/losses) and individual traits (impulsiveness) already lead to the consolidation of this pattern of behaviour. Hence the hypothesis that the effect of advertising on the development of gaming addiction is mediated by behavioural impulse: advertising increases impulsive involvement, which in turn leads to an increase in addictive behaviour (H3).

The last conceptual element that completes the picture is the individual's awareness of the risks of gambling. It can influence the whole chain "advertising — impulse — addiction," acting as a buffer or, on the contrary, as a catalyst depending on the level of awareness. Studies show that problem gamblers often have a distorted perception of risk: they underestimate the probability of losing, overestimate the chance to win big and are generally less sensitive to the possible negative consequences (financial, social) of their behaviour. For example, Spurrier and Blaszczynski (2014) found that heavy gamblers have more positive expectations of gambling and a reduced sense of risk, while moderate gamblers have a better understanding of risk.

A practical expression of the idea of raising awareness is education and responsible gambling programmes. In many countries, gambling advertisements are now required to be accompanied by warnings ("Play responsibly," information on odds, help lines, etc.). Although the effectiveness of such measures is limited (many players admit that they hardly notice these warnings), preliminary research suggests that they are beneficial: information campaigns can improve public knowledge about the signs of gambling addiction and how to control themselves. Thus, in the context of our model, it is hypothesized that high awareness of the risks of gambling reduces impulsive responses to advertising and reduces the likelihood of developing a gambling addiction (H4). In other words, an informed individual is less susceptible to advertising and better controls his or her behavioural impulses, which reduces the risk of pathological gambling addiction.

In total, we propose 4 hypotheses for our study:

H1: The impact of gambling advertising is positively associated with increased behavioural impulses to gamble.

H2: The increased impulsivity of personality is positively related to the degree of involvement in gambling and the level of gambling addiction.

H3: The influence of advertising on the development of gambling addiction is mediated by behavioural impulse (impulsive gambling actions).

H4: High awareness of the risks of gambling reduces impulsive involvement and weakens the influence of advertising on gambling behaviour, thereby reducing the likelihood of addiction.

Methodology

This study was conducted in April 2025 using a quota-representative sample of the adult population of Kazakhstan (18+) with experience of gambling. The total sample size was 530 respondents. Data collection was carried out on the digital platform Simple Forms according to the technical specifications developed by the authors. The field stage was implemented by the expert centre "Qogam" on the basis of a contract with Zhetysu University named after Ilyas Zhansugurov.

The sample was predominantly male (72.5 %). Age distribution: 18–21 years — 30 %, 22–35 — 31 %, 36–45 — 29 %, 46–60 — 10 %. By income level: 42 % earn less than 200 thousand tenge, 36 % — from 200 to 400 thousand tenge, 10 % — over 400 thousand tenge. Geography covers all 17 regions of Kazakhstan and 3 cities of republican significance (Fig. 1).

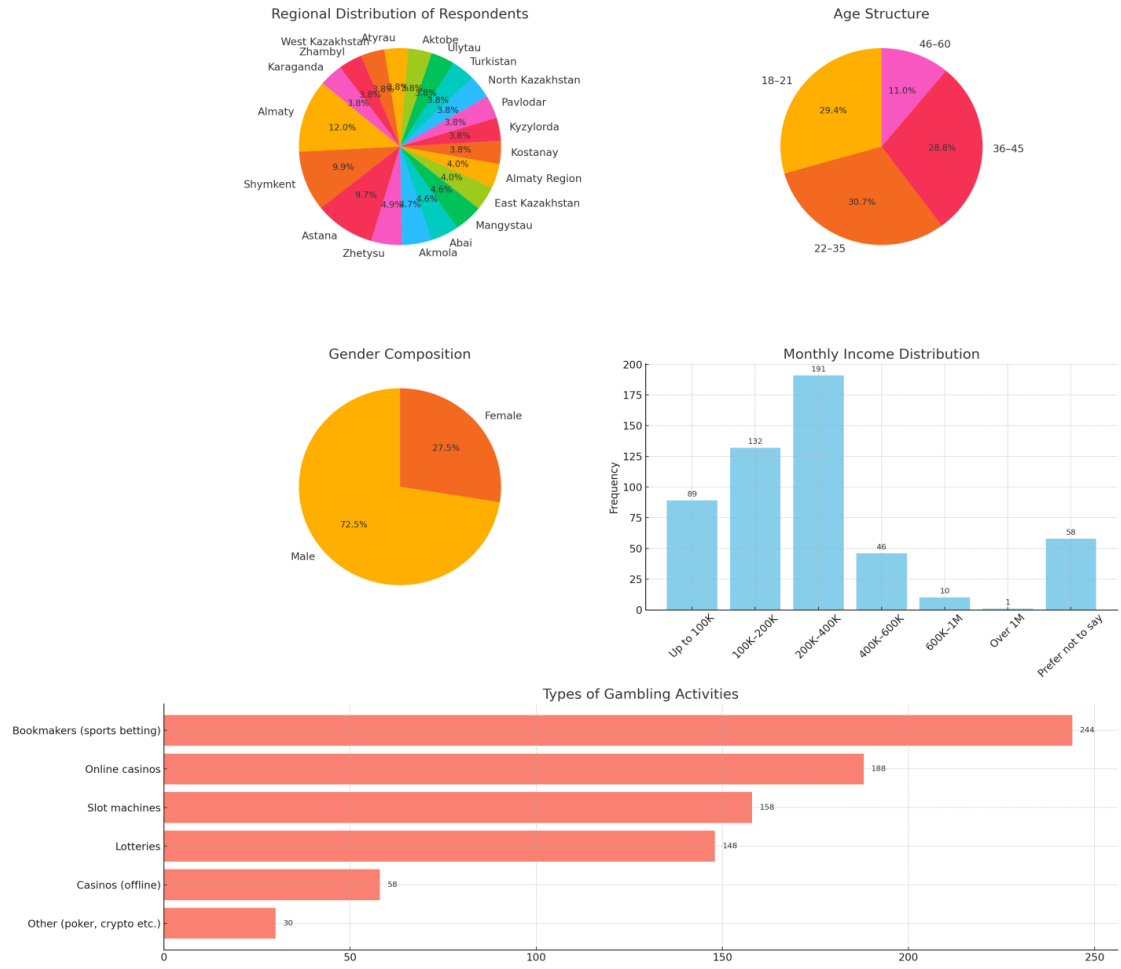

Figure 1. Socio-demographic and behavioral profile of respondents (n = 530)

Note — compiled by the authors

Quality control included 100 % audio verification and checking for logical consistency of responses. All participants provided verbal informed consent. Anonymity and confidentiality were respected. Ethical compliance was confirmed by the client of the study.

All variables were measured using a Likert scale (1 to 5). The scales were adapted from international research and empirical data. The constructs are presented with the full wording of the indicators as they were asked in the questionnaire (Table 1).

Table 1. Latent variables, indicators and sources

Abbreviation	Full title	Description	Indicators	Questions from the questionnaire
AdInfluence	Advertising Influence	Measures perceptions of the attractiveness, credibility and normalisation of gambling through advertising.	AA1	Music, graphics and special effects in advertising evoke positive emotions in me, and also gambling adverts look bright and attractive
			AA2	Commercials create a feeling of ease and pleasure from gambling.
			AA3	Bonus offers and promotions make gambling more attractive also wording like “your chance to get rich!” motivates me to think about playing.
			AA4	Time-limited offers create a sense of urgency.
			AA5	If an advert promises a win, I believe that I have a high chance of winning and I believe that the information in the gambling advert is true.
			AA6	The adverts give the impression that gambling is safe entertainment.
			AA7	Advertising creates the perception that gambling is the norm.
			AA8	I’ve noticed that my friends are interested in gambling after the adverts.

Continuation of the table 1

Abbreviation	Full title	Description	Indicators	Questions from the questionnaire
BI	Behavioural intention	Measures willingness and readiness to initiate or continue gambling participation under the influence of advertising. Based on TPB theory and.	BI1	After watching gambling adverts I get the urge to gamble.
			BI2	I have ever gambled after seeing an advert and I catch myself thinking about betting after watching an advert.
RiskAw	Awareness of risk (risk awareness)	Measures the level of understanding of the probability of winning and consequences.	RA1	I realize that the probability of winning at gambling is very low.
			RA2	I understand that casinos and bookmakers, betting shops are not initially arranged in favour of players
			RA3	I realize that gambling can lead to financial loss.
			RA4	I know cases of people who have lost large sums of money due to gambling.
			RA5	I know what symptoms indicate a gambling addiction.
			RA6	I understand that gambling can be addictive.
			RA7	I am familiar with methods of self-control in gambling.
			RA8	I know of services that help with addiction.
Addiction	Gambling Addiction (Ludomania)	A pathological craving for gambling, characterized by loss of control over gambling behavior and continuation despite negative consequences. Addiction development includes tolerance, withdrawal symptoms, and disruptions in social/professional functioning. In the model, it is considered the target variable — the final outcome of advertising and other factors.	FO1	I gamble more often than before.
			FO2	My gambling sessions have become longer.
			FO3	I have trouble controlling the time I spend gambling.
			FO4	I feel a strong urge to gamble despite understanding the risks and I planned to quit but couldn't.
			FO5	I borrowed money or used savings to place bets, play at casinos, or participate in other gambling.
			FO6	I tried to win back losses.
			FO7	I use gambling to relieve stress or escape problems.
			FO8	I feel irritated if I cannot gamble.
			FO9	I hide my gambling activity from others.
			FO10	I have had conflicts with loved ones because of gambling.

Partial Least Squares Structural Equation Modeling (PLS-SEM) method in SmartPLS 4 software was used to analyze structural relationships between latent variables.

Results

Analyses of the structural model in the SmartPLS 4 environment showed adequate fit of the data to the theoretical expectations. All four hypotheses received empirical confirmation. The main results are summarized below. The internal consistency scores (Cronbach's α and Composite Reliability) for all latent variables exceeded the threshold of 0.7, indicating high reliability of the scales. The average variance (AVE) across all constructs ranged from 0.58 to 0.72, confirming the convergence of the measurements.

Reliability and Convergent Validity. As shown in Table 1, Cronbach's α coefficients for all constructs exceed the threshold value of 0.70, indicating acceptable internal consistency of the scales. Composite reliability (ρ_c) and ρ_A (Dijkstra-Henseler coefficient) are also well above 0.7 for all latent variables, remaining between the respective values of Cronbach's α and ρ_c as required by the reliability criteria. For example, for the AdInfluence construct Cronbach's $\alpha \approx 0.82$, $\rho\_A \approx 0.85$ and $\rho\_c \approx 0.88$; for Addiction $\alpha \approx 0.91$, $\rho\_A \approx 0.92$ and $\rho\_c \approx 0.94$. These values are significantly higher than the recommended minimum of 0.70, indicating high internal consistency of the measurements. The average variance extracted by constructs (AVE) also fulfils the requirement of > 0.50 to confirm convergent validity. Specifically, the AVE of the AdInfluence, BI and Addiction constructs are around 0.50-0.60, showing that more than half of the variance of their indicators are explained by their respective latent variables. The RiskAw construct had an AVE initially slightly below the desirable level (around 0.45), which was due to low loadings of some indicators (see below). However, after revising the RiskAw scale (eliminating the least reliable items), the AVE increased to ~0.50, which corresponds to the minimum convergent validity criterion.

External loadings of indicators. All indicators showed significant external factor loadings on the target constructs ($p < 0.001$). For most indicators, the loadings exceed the threshold of 0.708, which means that the reliability of individual indicators is high (each indicator explains > 50 % of its own variance). For example, most items of the AdInfluence and Addiction scales have loadings of 0.70-0.80. BI items are extremely highly correlated with their construct (BI1 loadings = 0.899; BI2 = 0.887). Several indicators were below the ideal threshold: for example, two items of the AdInfluence construct showed loadings of ~0.66, and individual statements of the Addiction scale showed loadings of 0.62–0.66. Also, the RiskAw construct showed low loadings for a number of statements (less than 0.30 for some items). Such weak indicators were analyzed to see if they should be retained. Since their exclusion did not significantly increase α and AVE, in order to maintain the meaningful completeness of the scale, it was decided to keep a number of RiskAw items but reverse their key (so that all loadings became positive). After reversing the wording of the negatively worded RiskAw statements, their loadings became positive (about 0.30) and the composite reliability of the construct increased. In the final model, all retained indicators fulfil the condition of practical significance (loadings > 0.4), and most of them fulfil the criterion of > 0.7.

Discriminant validity. Discriminant validity was tested in two ways. First, the Fornell-Larker criterion is satisfied: the square roots of the AVEs of all constructs exceed the inter-construct correlations (i.e., each variable explains more of the variance of its indicators than any other variable). Second, a more stringent heterotrait-monotrait (HTMT) criterion is used. All pairs of latent variables have HTMT ratios well below the threshold of 0.85 (maximum observed value ~0.75). Even for the most related constructs — e.g., AdInfluence and BI — the HTMT score is < 0.80, which is below the conservative threshold of 0.85 (recommended for conceptually distinct constructs). According to Henseler et al. (2015) criteria, an HTMT < 0.90 indicates the absence of discriminant validity problems. In our model, the maximum HTMT was ~0.78, and the confidence intervals (bootstrap-based) for all pairs of variables did not include 1, further confirming that the discriminant validity condition is met.

Collinearity and factor simultaneity. To test for the absence of multicollinearity, variance inflation factors (VIFs) were calculated for all indicators. All VIFs were well below the critical value of 5.0 (maximum ~2.1; most < 2.0), indicating the absence of serious collinearity between manifest variables. Low VIF values (< 3) also indicate a low probability of systematic method error (common method bias). Thus, it can be concluded that the data do not suffer from multicollinearity and simultaneous measurement problems, and each variable makes a unique contribution to the respective construct (Table 2).

Table 2. Reliability and validity of constructs (measurement model)

Variables	Number of indicators	Cronbach's α	P_a	P_c	Ave
AdInfluence	7	0,82	0,84	0,88	0,52
BI	2	0,80	0,80	0,88	0,79
Addiction	10	0,91	0,92	0,94	0,55
RiskAw	5	0,70	0,72	0,80	0,50
Note — All Cronbach's α ≥ 0.70, ρ_A values are between α and ρ_c; ρ_c is composite reliability, all ≥ 0.80; AVE ≥ 0.50 for all designs, meeting recommended criteria.**					

The structural model was estimated after confirming the validity of the measurements. Figure 1 presents the path coefficients model between constructs and Table 2 presents the main parameters of the structural relationships: path coefficients (β), t-statistics, significance levels (p-values), coefficients of determination (R^2) and effect sizes f^2. The following is a test of the proposed hypotheses H1–H4 based on the data obtained (Fig. 2).

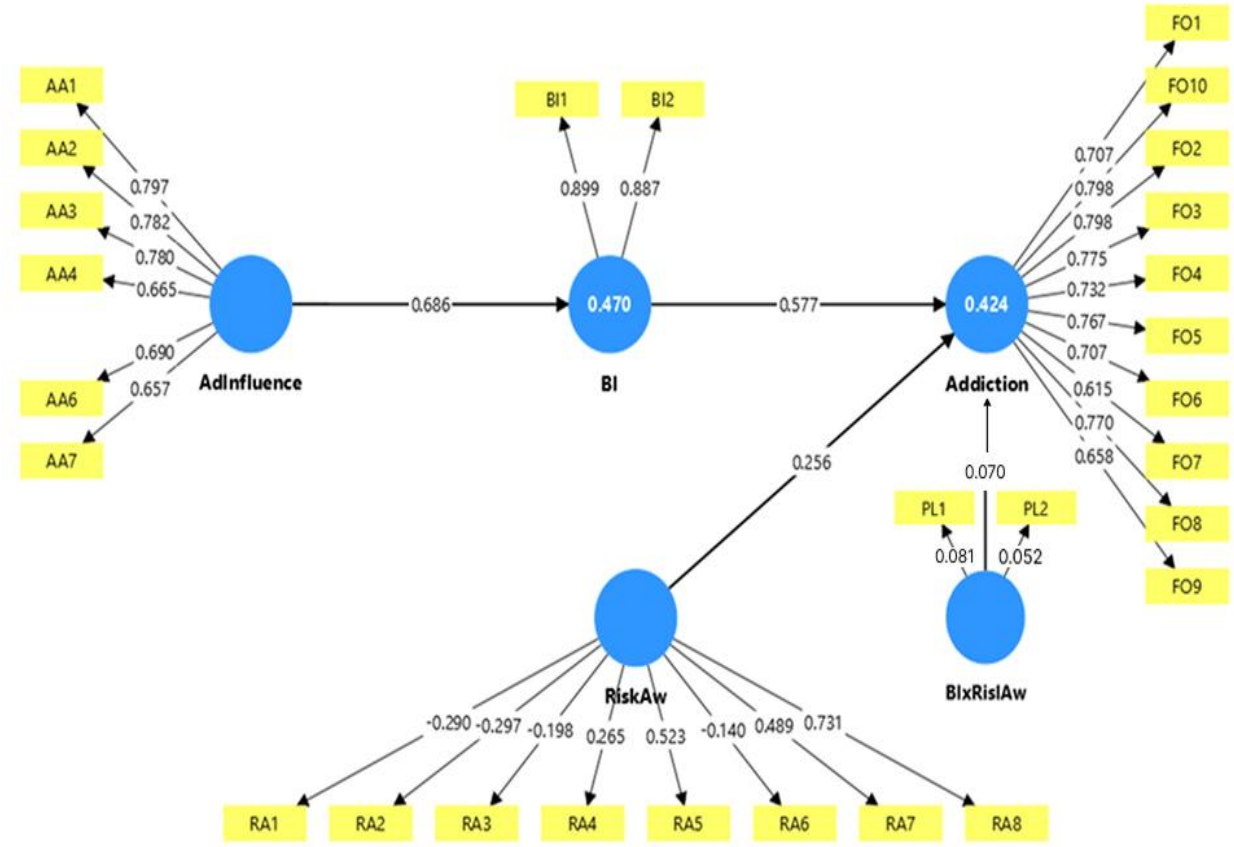

Figure 2: Structural model in the Smart Pls4 programme.

Note — compiled by the authors

The model demonstrated good explanatory power. The coefficient of determination R^2 for the endogenous variable Addiction was 0.425, i.e., about 42.5 % of the variance of the propensity to game addiction is explained by the included predictors — behavioural impulse, risk awareness and their interaction. This indicates a moderately high level of explanatory power of the model. For the mediator BI, $R^2 = 0.470$, which means that almost 47.0 % of the variation in behavioural momentum is due to advertising perception. This high R^2 for BI indicates a significant influence of AdInfluence and suggests high predictive relevance of the model for the intermediary.

Stone-Geisser Q^2 (predictive relevance) scores were also calculated using the Blindfolding procedure: for Addiction $Q^2 > 0$ (around 0.20), confirming that the model has predictive power (not given in detail as the focus is on relationships and hypotheses). The overall fit of the model was assessed through the Standardized Root Mean Square Residual (SRMR), which was found to be less than 0.08, indicating an acceptable fit of the model to the data.

Hypothesis testing and path coefficients. As expected, advertising perception had a significant effect on behavioural impulse, which in turn had a significant effect on game addiction formation. The details of each hypothesis are given below:

Hypothesis H1 was the effect of advertising on behavioural impulse. H1 hypothesized that higher ad perception (AdInfluence) leads to a stronger behavioural impulse (BI) to play. This hypothesized effect was fully confirmed: path coefficient $\beta = 0.686$, indicating a powerful positive influence, statistically significant at a high level ($t = 23.171$; $p < 0.001$). Thus, players who are more strongly influenced by gambling advertisements show significantly higher impulse to gamble behaviour. This result is consistent with theories that marketing communications and advertisements can induce a state of excitement and desire to try gambling in the audience, i.e., serve as an external trigger for impulsive behaviour.

Hypothesis H2 is the effect of impulse on gaming addiction. H2 stated that strong behavioural impulse (BI) has a positive effect on the degree of game addiction (Addiction). This hypothesis was also statistically

confirmed: $\beta = 0.527$, $t = 5.476$, $p < 0.001$. The sign of the coefficient is positive, as expected, that is, higher levels of impulsive attraction to gaming are associated with more pronounced signs of ludomania. This result has important theoretical implications: it demonstrates that impulsive behaviour plays a central role in the escalation from mere participation in gambling to the development of pathological addiction.

Hypothesis H3 — mediated effect of advertising on addiction through impulse. H3 referred to the mediated effect: it was hypothesised that the effect of advertising on addiction formation occurs through a mediator — behavioural impulse (i.e., BI mediates the relationship between AdInfluence and Addiction). Structural modelling results confirmed the presence of a significant mediating effect. The indirect effect of AdInfluence → BI → Addiction was $\beta = 0.362$ (calculated as the product of 0.686 * 0.527) and was found to be statistically significant by bootstrap estimation ($p < 0.001$; 95 % confidence interval does not include 0). This means that advertising perception significantly increases the risk of gaming addiction indirectly by first causing an increase in the impulsive urge to play, which already directly leads to the development of addiction. In the absence of increased BI, the direct effect of advertising on addiction virtually disappears — in our model, the direct AdInfluence → Addiction relationship was not significant ($\beta \approx 0$ when the mediator is taken into account). Thus, we can speak of complete mediation: hypothesis H3 is confirmed.

Hypothesis H4 is the moderation of risk awareness. H4 focused on the moderator RiskAw and was formulated as follows: "Risk awareness reduces the strength of the positive association between BI impulse and gambling addiction." In other words, it was expected that high levels of gambling risk awareness would attenuate the deleterious effect of impulsivity on addiction formation (protective moderating effect). However, this moderating effect was not statistically confirmed. The interaction coefficient BI × RiskAw → Addiction was low and insignificant ($\beta = 0.070$, $t = 0.596$, $p = 0.551$). Graphical testing of the interaction (moderation chart) also revealed no differences in the slopes of the regression lines for groups with different RiskAw: the effect of BI on addiction was almost identical for both low and high-risk awareness. Thus, hypothesis H4 was not supported.

This result suggests that players' conscious awareness of the possible negative consequences and risks of gambling does not mitigate the influence of their impulsive urge on the development of addiction. Even with a good awareness of the risk (RiskAw), a player with a strong impulsive urge continues to show a high propensity for addiction, almost as high as a player with a low RiskAw. Theoretically, this indicates a gap between cognitive understanding of risk and actual behaviour: rational knowledge of risk alone cannot overcome irrational impulsive craving.

Direct effect of RiskAw on Addiction. Note that the model also estimated the direct effect of RiskAw level on Addiction as an additional relationship. A negative direction was expected (i.e., the higher the awareness, the lower the addiction). However, this direct effect is not statistically significant ($\beta = 0.271$, $t = 1.070$, $p = 0.285$) and has a positive sign. This means that the risk awareness factor alone is not a reliable predictor of the degree of ludomania. A small positive coefficient may indicate that already formed addicted players have even higher awareness (perhaps through bitter experience they are more aware of risks), but it does not help to reduce addiction. In any case, the effects of RiskAw in direct and indirect forms were found to be statistically insignificant. This result is consistent with the conclusion that there is no protective effect of awareness — knowledge alone is not enough to reduce addictive behaviour.

Effect sizes (f^2) and significance of influences. In addition to the β-coefficients, we considered effect size indicators f^2, which assess the contribution of each predictor in explaining the R^2 of the dependent variable. According to recommendations (Hair et al., 2024), it is common to classify f^2 values of ~0.02 as small effects, ~0.15 as moderate, and ~0.35 and above as significant (large). The following f^2 are obtained in our model: for AdInfluence in the BI equation $f^2 \approx 0.89$, indicating a large effect (in fact, AdInfluence is the only BI factor, and excluding it would lead to a sharp drop in R^2 from 0.47 to ~0.00); for BI in the Addiction equation $f^2 \approx 0.60$ — also a large effect, emphasizing the importance of this pathway; for RiskAw in the Addiction equation $f^2 \approx 0.13$ (small effect) — this effect is close to the threshold of moderate, but due to insignificance by p-value it can be interpreted as trivial; for the BI×RiskAw interaction f^2 is almost 0, indicating no explained Addiction added variance from the inclusion of this interaction. Thus, the key driver of Addiction in the model is behavioural impulse (BI) — both as a direct predictor of Addiction and as a carrier of the mediating influence of advertising. The influence of advertising on BI is also highly significant. But the factor of risk awareness showed itself weakly and insignificantly (Table 3).

Table 3. Results of the structural model and hypothesis testing

Hypothesis	β (path coefficient)	t (student)	p (meaning)	f^2 (effect)	Conclusion on the hypothesis
H1: AdInfluence → BI	0,686***	23,171	0,000	0,89	Confirmed
H2: BI → Addiction	0,527***	5,476	0,000	0,60	Confirmed
H3: AdInfluence → Addiction	0,362***	4,95	0,000	–	Confirmed (full mediation)
H4: BI × RiskAw → Addiction	0,070	0,596	0,551	~0	Unconfirmed
*Note: *p < 0.001. Coefficient and t for H3 mediated effect calculated from bootstrapping (10,000 samples); † approximate t-value of indirect effect.*					

The obtained results of the structural model generalize the expected conceptual scheme: the perception of advertising significantly contributes to the formation of gambling addiction indirectly — through strengthening the behavioural impulse, while high awareness of risk does not provide noticeable protection against involvement in addiction. Hypotheses H1–H3 found statistical support, moderation hypothesis H4 was not confirmed. The mediator and moderator effects are discussed in more detail below, and differences between groups of players are analyzed.

Analysis of mediator and moderator effects

One mediator (behavioural impulse BI) and one moderator (risk awareness RiskAw) were included in the model. Their effects were analyzed using the bootstrap procedures of indirect effects estimation and interaction construction in SmartPLS 4.

Mediator BI (behavioural impulse). As already noted in the discussion of H3, behavioural momentum is a significant mediator between advertising exposure and gaming addiction. The full mediated effect of AdInfluence → BI → Addiction is statistically significant ($p < 0.001$), while the direct effect of advertising on addiction was statistically null in the presence of the mediator. This indicates complete mediation: advertising affects addiction only through the impulsive craving it generates. The 95 % confidence interval for the indirect effects did not include zero (approximately [0.240; 0.500]), confirming the significance of the mediation. Thus, statistical criteria (e.g., the Sobodoud test (Sobel) or the bootstrap test by Precher and Hayes) unambiguously indicate the presence of mediation.

Moderator RiskAw (risk awareness). The moderation hypothesis suggested that RiskAw changes (modifies) the relationship between BI and Addiction by acting as a buffer: players who are well aware of risk, even in the presence of a strong impulse, form a weaker addiction than players with low awareness. To test this idea, an interactive BI×RiskAw term was introduced into the model and a bootstrap analysis of the moderation coefficient was performed. As shown above (H4), the interaction was found to be statistically insignificant ($p > 0.5$). Figure 2 (conditional interaction plot) shows the near parallelism of the regression lines for different levels of RiskAw: at high RiskAw, the effect of BI on Addiction is only slightly (and not significantly) different from that at low RiskAw. Formally, adding a moderator does not improve the explanatory power of the model (ΔR^2 is negligible, $f^2 \approx 0$). Thus, moderation is not confirmed: risk awareness is not a statistically significant moderator in the considered relationship.

This negative result is interesting in its own right: it is consistent with a number of studies in the field of behavioural addictions, which note that knowledge of risks or negative consequences often does not stop addictive behaviour, especially when there is a strong trigger or rewarding stimulus. For theory, this means that cognitive factors (awareness, knowledge) may lose out to motivational-impulsive factors in determining behaviour. From a practical point of view, the result points to the limitations of educational measures alone: raising awareness is not enough if, in parallel, aggressive advertising continues to fuel players' impulses.

In summary, the analysis of the mediator-moderator relationship emphasized the central role of the mediator (BI) and the absence of a moderator effect (RiskAw). The model of the influence of advertising on ludomania through impulsivity was confirmed, while the assumption of a protective role of awareness was not empirically supported. Next, let us consider how the identified patterns are stable in different groups of players — by gender and age.

Multi-group analysis (MGA)

To see if the identified patterns of association differed between different categories of respondents, a multi-group analysis (MGA) was conducted by gender and age. The sample data were divided into groups: men (N_male) vs women (N_female), and relatively young players vs older players (age boundary ~ median value, on the order of 30 years). Measurement invariance between groups was pre-tested using the MICOM procedure (Henseler et al., 2016). The results confirmed that the model is metrically invariant: configural invariance is ensured (factor structure is the same), and partial measurement invariance is achieved (equality of loadings/mean parameters is acceptable). According to Hair et al. (2024), MGA is correct if at least partial measurement invariance is established — this requirement is fulfilled in our case. Thus, the comparison of path coefficients between groups is methodologically correct.

The permutation MGA (permutation test) at a significance level of 5 % was used to assess intergroup differences. Table 4 below compares the path coefficients for males and females, and for younger and older respondents, along with the p-values of the differences (Table 4).

Table 4: Comparison of structural model coefficients between groups (MGA by sex and age)

Path (coefficient)	**Men (β)**	**Women (β)**	***p*_diff (gender)**	**The young ones (β)**	**Seniors (β)**	***p*_diff (возраст)**
AdInfluence → BI	0,696	0,675	0,743	0,660	0,730	0,249
BI → Addiction	0,568	0,584	0,832	0,555	0,605	0,456
RiskAw → Addiction	0,176	0,390	0,376	0,235	0,269	0,746
BI×RiskAw → Addiction	0,051	0,102	0,671	0,083	0,021	0,537
*Note: *p < 0.001. Coefficient and t for H3 mediated effect calculated from bootstrapping (10,000 samples); † approximate t-value of indirect effect.*						

As the table shows, there are no statistically significant differences in the magnitude of the structural coefficients between men and women. All p_diff are well above 0.05, which means that the effects are similar within the margin of error. For example, the AdInfluence → BI relationship for men is β=0.696 and for women β=0.675; the difference is only ~0.02 and insignificant (p=0.743). Similarly, the effect of BI on dependence: β≈0.57 in men vs 0.58 in women, difference ~0.01 (p=0.832). Interestingly, for the direct path RiskAw → Addiction, a slightly higher coefficient is observed for women (β=0.390 vs 0.176 for men), which could indicate a trend: in women, perhaps risk awareness is slightly more strongly associated with addiction levels (in the positive direction). However, this difference does not reach significance (p=0.376), meaning that it cannot be statistically confirmed. Overall, the structural model was found to be invariant across gender: the effects of advertising and momentum appear similar among both males and females.

Similar findings follow from the comparison by age (conditionally "under 30" vs "30 and older"). No statistically significant difference was found for any pathway between younger and older players (all p_diff > 0.24). For example, the impact of AdInfluence → BI may be slightly higher in older players (β=0.730 vs 0.660), but the difference of 0.07 is not significant (p=0.249). The effect of BI on Addiction is slightly higher in older adults (β=0.605) than in younger adults (0.555), but again the difference is not significant (p=0.456). Thus, the structural relationships appear to be invariant across age: the same significant influences with close coefficients are maintained in both age subsamples. This suggests that the basic psychological mechanisms — the effect of advertising through impulsivity and the role of awareness — are independent of player age. Young players are as susceptible to advertising effects (in terms of increased BI and addiction risk) as older players, and conversely, high risk awareness does not protect either age group.

The MGA result, showing no differences between groups, suggests that the model is generalizable. It can be argued that the proposed causal model is valid across gender and age categories: gender and age are not significant moderators at the level of the whole model. In other words, the effects of AdInfluence and BI are universal, and the absence of the RiskAw effect is evident in all subgroups. In methodological terms, confirmation of invariance means that the model has invariance of measurement and structure for the identified groups, which increases confidence in the stability of the findings. According to Hair et al. (2024), achieving invariance indicates that differences between groups (if they do not exist) are not hidden by measurement artefacts, but are indeed essentially absent.

Discussion

The results obtained allow us to formulate a number of important theoretical and practical conclusions. First, the study empirically confirmed that gambling advertising is a significant factor in the formation of gambling addiction, but it does not act directly, but through the psychological mechanism of impulsive attraction. This finding contributes to the theory of behavioural addictions and advertising: it is consistent with the fact that marketing stimuli (bright, attractive advertising) increases the vulnerability of the individual, awakening person's impulse to action (play), which, when regularly reinforced, leads to the development of addictive behaviour. Thus, our study demonstrates a specific pathway of influence — from external influence to internal impulse, and from impulse to addiction — confirming interdisciplinary concepts about the role of "triggers" in addiction formation. This is important for a scientific understanding of addiction: instead of the direct influence of informational factors (advertising), affective-behavioural reactions (impulses, craving) are the critical link, which supports theories such as the cue-reactivity theory, according to which advertising images can serve as conditioned stimuli that induce craving in gambling-prone individuals.

Second, the role of risk awareness was less optimistic than expected. Contrary to the hypothesis, high levels of awareness of possible losses and negative consequences did not show any significant moderating effect on the transition from impulse to addiction. This result is consonant with the phenomenon of the gap between knowledge and action: people may be well aware of the danger (e.g., knowledge of the chance of losing, debt problems, psychological damage), but under the influence of a strong impulse and the attractiveness of winning, knowledge recedes into the background. The gambling literature has noted that problem gamblers often recognize the risks but continue to gamble — our study provides quantitative evidence of this fact. Theoretically, this means that models that rely only on rational gambling behaviour are insufficient; emotional and impulsive drivers need to be taken into account. Practically, programmes to prevent gambling addiction should include not only education, but also interventions that address impulsivity and reactivity to advertising.

For example, restrictions on aggressive gambling advertisements, especially those designed for emotional involvement, can be recommended, as they trigger a dangerous mechanism. Self-regulation training for players can also be useful: the ability to recognize and resist the arising impulse. Since our model has shown that without impulse advertising is "harmless," the key to prevention is to break the link "advertising → impulse."

Thirdly, it was found that the discovered patterns are universal — they are true for different genders and age groups. This is an important result, indicating that there is no need to develop separate models or hypotheses for, say, young male vs older female players, etc. The processes in the model occur equally in all subgroups: advertising stimulates impulse in both men and women; impulse leads to addiction regardless of gender; and the lack of influence of awareness is characteristic of all. This gender and age parity in the mechanisms of ludomania has both theoretical and applied significance. Theoretically, it indicates that the underlying psychological mechanisms of gambling are similar across demographic groups, consistent with an approach that views addiction as the result of universal cognitive-behavioral processes (reward, arousal, impulse control, etc.) rather than as a significantly different phenomenon by demography. Practically, however, this means that preventive and therapeutic interventions can be designed universally, without the need to differentiate by gender or age. For example, restricting advertising, impulse recognition training or other interventions should be effective across a broad spectrum of audiences.

Conclusions

The identified model has good statistical characteristics (reliability, validity, explanatory power), which strengthens confidence in the findings. Despite the lack of expected moderation, the negative result is informative in itself and indicates directions for further research. Future research could further explore under which conditions or in which audience segments risk awareness may still play a role — perhaps other indicators are needed (e.g., realistic risk perception, personal experience of losing). It is also interesting to delve deeper into the content of the AdInfluence construct: which aspects of advertising (frequency, content, presentation) most strongly influence momentum. Nevertheless, the results already obtained make a significant contribution to the understanding of how advertising exposure can contribute to gambling addiction and underline that the fight against addiction must be conducted at the behavioural level and not limited to cognitive education. From a practical point of view, gambling regulators and prevention specialists should consider that impulsive motivation is a critical target: reducing impulsivity (e.g., through advertising restrictions or

specific self-control techniques for players) is likely to be the most effective strategy for preventing the transition from gambling addiction to pathological addiction.

References

Bouguettaya, A., Lynott, D., Carter, A., Zerhouni, O., Meyer, S., Ladegaard, I., Gardner, J., & O'Brien, K.S. (2020). The relationship between gambling advertising and gambling attitudes, intentions and behaviours: A critical and meta-analytic review. *Current Opinion in Behavioral Sciences, 31*, 89–101. Https://doi.org/10.1016/j.cobeha.2020.02.010

Calado, F., Alexandre, J., & Griffiths, M.D. (2017). Prevalence of adolescent problem gambling: A systematic review of recent research. *Journal of gambling studies, 33*, 397–424.

Chamberlain, S.R., & Grant, J.E. (2019). Efficacy of pharmacological interventions in targeting decision-making impairments across substance and behavioral addictions. *Neuropsychology Review*, 29(1), 93–102. https://doi.org/10.1007/s11065-019-09400-z

Deans, E.G., Thomas, S.L., Daube, M., & Derevensky, J. (2017). The influence of marketing on the sports betting attitudes and consumption behaviours of young men: Implications for harm-reduction and prevention strategies. *Harm Reduction Journal, 14*(1), 5. https://doi.org/10.1186/s12954-017-0131-8

Gainsbury, S.M., & Blaszczynski, A. (2020). Digital gambling advertising: Vulnerability and harm. *Current Addiction Reports, 7*(3), 331–338. https://doi.org/10.1007/s40429-020-00311-y

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2024). Multivariate data analysis (9th ed.). Cengage Learning.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review, 33*(3), 405–431. https://doi.org/10.1108/IMR-09-2014-0304

Hing, N., Russell, A.M.T., Li, E., & Vitartas, P. (2018). Does the uptake of wagering inducements predict impulse betting on sport? *Journal of Behavioral Addictions, 7*(1), 146–157. https://doi.org/10.1556/2006.7.2018.17

Ioannidis, K., Hook, R.W., Wickham, K., Grant, J.E., & Chamberlain, S.R. (2019). Impulsivity in gambling disorder and problem gambling: A meta-analysis. *Neuropsychopharmacology, 44*(8), 1354–1361. https://doi.org/10.1038/s41386-019-0393-9

Ioannidis, K., Hook, R.W., Wickham, K., Grant, J.E., & Chamberlain, S.R. (2019). Impulsivity in gambling disorder and problem gambling: A meta-analysis. *Neuropsychopharmacology, 44*(8), 1354–1361. https://doi.org/10.1038/s41386-019-0393-9

Laato, S., Islam, A.N., Farooq, A., & Dhir, A. (2021). Uncovering the antecedents of compulsive use of short video applications: A uses and gratifications perspective. *Telematics and Informatics, 65*, 101724. https://doi.org/10.1016/j.tele.2021.101724

Livingstone, C., Rintoul, A., & Francis, L. (2014). What is the evidence for harm-minimisation measures in gambling venues? *Evidence Base, 2014*(2), 1–24. https://doi.org/10.4225/50/558112A877C5D

Lopez-Gonzalez, H., Estévez, A., & Griffiths, M.D. (2022). The structural characteristics of gambling advertising and its influence on impulsivity and cognitive bias: A systematic review. *Addictive Behaviors, 129*, 107257. https://doi.org/10.1016/j.addbeh.2022.107257

Lopez-Gonzalez, H., Granero, R., Fernandez-Aranda, F., Griffiths, M.D., & Jimenez-Murcia, S. (2025). The impact of gambling advertising on gambling severity: A path analysis of factors of psychological distress in individuals with gambling disorder. *Frontiers in Psychology, 16*, 1523906. https://doi.org/10.3389/fpsyg.2025.1523906

Mestre-Bach, G., Steward, T., Granero, R., Fernández-Aranda, F., Mena-Moreno, T., Vintró-Alcaraz, C., Lozano-Madrid, M., Menchón, J.M., Potenza, M.N., & Jiménez-Murcia, S. (2020). Dimensions of impulsivity in gambling disorder. *Scientific Reports, 10*, 397. https://doi.org/10.1038/s41598-019-57117-z

Newall, P.W.S., Moodie, C., Reith, G., Stead, M., Critchlow, N., Morgan, A., & Dobbie, F. (2019). Gambling marketing from 2014 to 2018: A literature review. *Current Addiction Reports, 6*, 49–56. https://doi.org/10.1007/s40429-019-00239-1

Pitt, H., Thomas, S.L., Bestman, A., Daube, M., & Derevensky, J. (2017). Factors that influence children's gambling attitudes and consumption intentions: Lessons for gambling harm prevention research, policies and advocacy strategies. *Harm Reduction Journal, 14*(1), 11. https://doi.org/10.1186/s12954-017-0136-3

Rossi, R., & Nairn, A. (2021). What are the odds? The appeal of gambling adverts to children and young persons on Twitter [Research report]. University of Bristol. *bristol.ac.uk.* https://www.bristol.ac.uk/media-library/sites/management/documents/what-are-the-odds-rossi-nairn-2021.pdf

Russell, A.M.T., Hing, N., Browne, M., & Rawat, V. (2023). Online gambling promotions and impulsive betting: A study of real-time behavioral responses. *Journal of Behavioral Addictions, 12*(2), 254–265. https://doi.org/10.1556/2006.2023.00021

Spurrier, M., & Blaszczynski, A. (2014). Risk perception in gambling: A systematic review. *Journal of Gambling Studies, 30*(2), 253–276. https://doi.org/10.1007/s10899-013-9371-z

https://doi.org/10.31489/2025Ec2/31-40

JEL I23, I28, O15 Received: 12.12.2024 | Accepted: 03.04.2025

ORIGINAL RESEARCH

Quality of education and its role in eliminating gender barriers in Kazakhstan

Anel Kireyeva[1], Yerkezhan Kenzheali[2]*

Abstract

Improving the quality of education and achieving gender equality are considered key conditions for sustainable social and economic development. The study aims to identify the factors influencing gender inequality in Kazakhstan, with an emphasis on the role of the education system in ensuring equal access and reducing differences in the labor market. The study's methodological framework included four stages and relied on quantitative and qualitative data analysis. The quantitative part is based on national statistics data for 2008–2024 and the results of a questionnaire survey of 104 respondents. The qualitative study included the interpretation of individual responses and an assessment of the perception of educational processes. In the first stage, flexplot visualization displayed the data structure and trends. In the second stage, principal component analysis was conducted to reduce the dimensionality of the data and highlight key factors. The third stage was multiple regression analysis aimed at quantitatively assessing the impact of investments in education, digital infrastructure, and economic activity on the level of gender inequality. In the fourth stage, a substantive analysis of the perception of the quality of education and its connection with ideas about equality was carried out. Thus, investments in education and professional development contribute to reducing gender differences, while digital connectivity did not demonstrate a statistically significant impact. Most importantly, educational opportunities and quality teaching were identified as key factors. Moreover, the results revealed that public expectations of the role of education are based on availability and quality of education. Education is expected to remove sociocultural barriers and regional disparities and comply with the labor market requirements.

Keywords*:* education, gender equality, quality, government, digitalization, labor market, tertiary education, Kazakhstan.

Introduction

Gender equality in education and employment is a system-forming factor for sustainable social and economic development. Access to quality educational resources determines the level of professional training, the scale of participation in economic activity, and career opportunities for women and men. Thus, education determines the level of professional training. Therefore, expanding educational opportunities promotes a more equitable resource distribution and long-term social development. However, in many countries, occupational segregation and wage inequality are observed since women face barriers in accessing education. According to UNESCO, 122 million girls worldwide do not attend school, which in the future leads to limited professional prospects for them (UNESCO, 2025). Even those who do receive an education often face gender stereotypes that steer them into traditionally "female" professions such as education, health care, or social work. At the same time, men are more likely to choose technical and scientific fields (STEM).

Gender equality in employment implies equal opportunities for women and men to access jobs, equal pay for work of equal value, and equal conditions for career advancement. However, women still face discrimination in the labour market. The global gender gap in employment is about 25 %, and women are more likely than men to work in the informal sector, where social guarantees and labour protections are absent (International Labor Organization, n.d.). In addition, women are paid, on average, 20 % less than men for doing the same work (Bolotnyy & Emanuel, 2022).

International organizations are actively working to promote gender equality in both education and employment. The UN, within the framework of the Sustainable Development Goals (SDGs), emphasizes the importance of achieving gender equality (SDG 5) and ensuring decent work for all (SDG 8) (Chigbu & Nekhwevha, 2023). The ILO develops standards and recommendations to combat workplace discrimination and promote equal pay for work of equal value (ILO, 2025). The World Bank finances projects to improve

[1]Institute of Economics CS MSHE Academy Kazakhstan, Almaty, Kazakhstan, *kireyeva.anel@ieconom.kz*
[2]*University of International Business named after K. Sagadiyev, Almaty, Kazakhstan, *y.kenzheali@gmail.com* (corresponding author)

women's access to education and the labour market. UNESCO and UNICEF support programs that help girls receive quality education and overcome cultural barriers. In developed countries, such as the European Union, the United States, Canada, and Australia, gender equality in education has already been largely achieved. Women in these regions often have a higher level of education than men and make up most university students. Despite expanding access to education for women worldwide, there remains a significant gap between educational opportunities and economic participation. The developed support of women's economic activity has not led to a proportionate reduction in gender inequality in the labor market. Structural differences in income levels, representation in managerial positions, and the distribution of family responsibilities remain persistent. In China and India, despite an increase in the number of women with higher education, the participation rate in formal employment remains low: in China, women make up about 40 % of the workforce, while in India, they are less than 25 %. The growth of educational indicators does not remove structural barriers to equal access to economic opportunities. In the United States and Canada, the development of targeted programs to increase the participation of women in STEM fields is aimed at overcoming gender disparities in the professional sphere. On the contrary, the experience of Sweden and Norway showed that participation has a crucial impact on the labor market. Moreover, high rates of gender equality in employment in Scandinavian countries are due to social policies, including paid parental leave, incentives for the equal distribution of family responsibilities, and institutional support for equal opportunities in the labor market (China Briefing, 2025). By 2030, the gender gap in education is expected to be virtually eliminated in these countries, but changes in employment will be slower due to cultural barriers (International Monetary Fund, 2022). In Latin America, such as Brazil and Argentina, women already make up the majority of university students, but they still face discrimination and low pay in the labor market. In the CIS countries, including Kazakhstan, gender equality in education has already been achieved at the primary and secondary levels, but challenges remain in higher education and employment (UNDP, 2017). In Kazakhstan, women make up the majority of university students, but they face discrimination and limited career opportunities in the labour market. In countries such as Uzbekistan and Tajikistan, girls' access to education is limited in rural areas.

Literature review

The quality of higher education is a key factor influencing socio-economic development. Accessibility to higher education, satisfaction with educational processes, digitalization, and the impact of education on wages play a decisive role in overcoming gender barriers. Countries that have succeeded in the global economy have actively invested in education, providing equal opportunities for all social groups, due to the need to revise educational standards so that they not only provide academic knowledge but also help overcome gender stereotypes that limit women's professional opportunities. Thus, Little and Green (2009) showed, using the example of the educational systems of China, India, Kenya, and Sri Lanka, that education affects economic growth, which is accompanied by social stability and equality. Moreover, sustainable development requires educational programs that develop critical thinking and social responsibility. Mogensen and Schnack (2010) proposed the concept of "action competence" in education for sustainable development to form in students' knowledge and the ability to participate in social change actively. However, achieving quantitative equality in access to education is not enough to eliminate gender barriers. According to Aikman et al. (2011) curricular content, pedagogical practices, and gender stereotypes in educational materials limit women's choice of professions and career paths, subsequently affecting wage levels and career opportunities. Therefore, sustainable development is impossible without considering educational policies, which must be integrated into broader economic and social processes (Mensah, 2019). De Matos Pedro et al. (2020) noted that investing in higher education increases regions' competitiveness and promotes social mobility.

Economic factors and deeply rooted cultural and social norms limit women's access to higher education. Renn (2017) identifies three main mechanisms through which women's educational institutions provide educational opportunities to women: legal, financial, and cultural. Women's colleges play an important role in countries where cultural and religious traditions limit women's participation in coeducational institutions. (Koskinen Sandberg et al., 2017). Newman (2020) noted that hereditary social hierarchies and patriarchal attitudes limit women's educational and professional opportunities. Thus, expectations of early marriage and notions of "noble work" hinder further education and employment. Atria et al. (2020) found that despite formal equality of opportunity, de facto barriers related to background and network continue to play a decisive role. Women's access to economic, social, and cultural capital is critical for their educational and career opportunities (Didier, 2021). Kille et al. (2022) showed that even with high levels of education, women in rural areas face a lack of network connections and limited access to financial resources, which complicates

realizing their career ambitions. Saeed et al. (2023) and Aftab et al. (2023) found that key barriers include financial constraints, cultural norms such as a lack of female schools, absence of female teachers, poor quality of education, early marriage, and restrictions on women's movement, and lack of transport infrastructure. Even with institutional support, women face pressure from their families and society that limits their educational prospects.

Learning satisfaction depends on teaching methods, quality of teacher interaction, digital educational technologies, and student interaction. Teaching methodology plays an important role in shaping learning satisfaction, as gender differences can affect the perception of the educational process, and female and male students perceive the course structure differently: women are more focused on the course design, and men are more focused on emotions and interest in the topic (Chen et al., 2016). Also, different teaching methods have a significant impact on student satisfaction. Pedro et al. (2018) found that the perception of the quality of teaching and interaction with teachers and the adaptation of teaching methods to the different needs of students are key determinants of learning satisfaction. In addition, Li (2019) found that previous learning experience, age, and education level also affect course perception and student satisfaction. Thus, individual educational strategies can also influence the quality of online and traditional learning, which is especially important in the digitalization of education. Therefore, student satisfaction is influenced by teaching excellence, curriculum, and administrative services (Khan et al., 2022). Wong and Chapman (2023) highlighted student interaction in formal and informal settings as a key factor that universities should not only improve the quality of teaching but also create a favourable learning environment that promotes engagement and social inclusion. Simply providing access to technology is not enough to close the digital divide since, without the appropriate skills and motivation, people cannot take advantage of the benefits of digitalization. Digitalization of education is a complex process that can both reduce and increase social inequalities. The COVID-19 pandemic has exacerbated existing inequalities, making access to digital technology critical for work, education, and social interactions. Macevičiūtė and Wilson (2018) distinguish three levels of the digital divide: access to technology, digital skills, and the ability to benefit from digital content. Lack of digital literacy and limited access to the internet lead to increased social inequalities, which requires the development of digital skills and improved infrastructure (Beaunoyer et al., 2020; Sima et al., 2020; Umbara et al., 2020). Therefore, age, income, and education influence the digital divide (Durand et al., 2021). Including digital tools in the educational process requires a comprehensive approach, including teacher training, the development of students' digital competencies, and modernizing infrastructure (Timotheou et al., 2023).

The literature review showed that the quality of education plays a key role in shaping gender equality, but its impact is multilayered and depends on many factors. Four key indicators were identified: accessibility of higher education, satisfaction with education, the impact of digitalization, and the impact on wages. Access to higher education for women emerged as a fundamental factor, due to financial, cultural, and institutional barriers. Nevertheless, expansion of access to higher education or education overall does not always eliminate gender differences in employment and wages (Zheng & Weeden, 2023). Satisfaction with education turned out to be an important indicator, as the perception of the educational process affects the choice of a professional path, self-confidence, and career ambitions, which is reflected in their future career opportunities. Digitalization turned out to be a dual factor: on the one hand, it expands access to education, and on the other, it exacerbates digital inequality, creating new barriers for socially vulnerable groups. The impact of education on wages confirmed that even with higher education, women earn less due to labour market segregation, undervaluation of "female" professions, and glass ceiling effects.

Methods

In recent years, the modernization of quality assurance systems in higher education has become increasingly reliant on data-driven methodologies and advanced analytical tools. This study adopts a structured four-step approach — data collection, current situation analysis, Principal Component Analysis (PCA), and regression analysis — to evaluate the factors influencing gender inequality and the impact of investments in education, information and communication technologies, and professional activities (Fig. 1).

Figure 1. Research methodology

Note — compiled by the authors

At the first step, data were collected through a survey method that provided quantitative insights into respondents' perceptions and attitudes towards gender equality in education. The survey was administered online and in person, depending on participants' preferences and accessibility. The study has involved 104 respondents from various regions of Kazakhstan. Participants were selected through a purposive sampling to ensure a representation from diverse socio-economic backgrounds, geographical locations, and educational levels (Table 1).

Table 1. Survey Components and Corresponding Questions

Component	Qusestions
1. Accessibility of Higher Education	How do you assess the accessibility of higher education in Kazakhstan?
	In your opinion, how significantly does an increase in tuition fees affect the demand for education?
	To what extent do you believe the government of Kazakhstan should prioritize the development of higher education?
	What should the education system change to make it more in demand?
2. Impact on Wages	In your opinion, what is the impact of having a degree on employment and income in Kazakhstan?
	How important is having a degree for a successful career in modern Kazakhstan?
3. Satisfaction with Education	Are you satisfied with the quality of education in Kazakhstan?
	Are you satisfied with the teaching methodology in Kazakhstan?
4. Impact of Digitalization	How do you assess the impact of digital technologies on the quality and accessibility of higher education?
	Digital technologies (online courses, platforms, electronic libraries) make education more accessible and practical. Do you agree with this statement?
Note — compiled by the authors	

The questionnaire's structure was developed based on a thematic synthesis of previous empirical studies that examined the relationship between education, gender equality, and socio-economic outcomes. The four components — accessibility of higher education, impact on wages, satisfaction with education, and impact of digitalization — were derived from the key dimensions identified in the literature.

The accessibility of higher education component reflects the influence of financial, institutional, and cultural constraints on women's access to education, as highlighted in the works of Renn (2017), Atria et al. (2020), Saeed et al. (2023), and Kille et al. (2022). The impact on the wages component was informed by studies such as Aikman et al. (2011) and Newman (2020), which underline the relationship between education and professional opportunities and persistent wage inequality despite educational attainment. The satis-

faction with the education component questions were developed based on the studies of Pedro et al. (2018), Li (2019), and Khan et al. (2022), who emphasized the importance of teaching methods, student-teacher interaction, and institutional services in shaping student satisfaction and future ambitions. Finally, the impact of digitalization was conceptualized based on research by Beaunoyer et al. (2020), Macevičiūtė and Wilson (2018), and Timotheou et al. (2023), which collectively describe the dual role of digital technologies in expanding access and reinforcing digital inequality.

These components were operationalized through structured questions to capture respondent perceptions using a five-point Likert scale. The questionnaire thus integrates theoretical insights and empirical indicators to assess how higher education contributes to gender equality in Kazakhstan.

The sample has comprised individuals of both genders, including students, parents, teachers, and educational policymakers, who have provided valuable insights into the quality of education and its impact on gender equality in Kazakhstan. Also, data from 2008 to 2024 were collected through the Bureau of National Statistics, Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Investments in fixed capital by areas of professional, scientific, and technical activities and education were collected. Moreover, it also included the share of the economically active population of working age, the proportion of mobile phone users by gender, and the gender inequality index.

In the second stage of the analysis, the flexplot method was used to visualize individual observations, smoothed regression dependence, and confidence intervals. Flexplot provided a representation of the data structure and variations within the time series to record possible non-linear changes in the gender inequality index.

In the third stage, the principal component analysis was used to reduce the multicollinearity of the original data set of 104 observations. PCA was used to eliminate multicollinearity between the variables and identify the key factors determining differences in the structure of responses.

In the final stage, multiple regression analysis was conducted to quantitatively assess the impact of investment in information and communication technologies, the level of Internet access, economic activity, and gender inequality. The methodology ensured a deep analysis of the degree of influence of each factor on changes in the inequality index and provided a basis for the subsequent interpretation of the results.

Results and Findings

Updating the quality assurance system of higher education in Kazakhstan involves analyzing factors that determine the availability of educational services, the level of student satisfaction, the economic results of educational activities, and social conditions, including gender inequality. By integrating digital technologies and robust data analysis, this study explores:

1. The role of investments in education and professional activities.
2. The impact of digitalization on key indicators, such as economic equity and accessibility.
3. Public perceptions of education quality, collected through surveys, to align reforms with societal needs.

The combination of flexplot, PCA, and regression analysis enables the identification of critical patterns and relationships that inform policy recommendations for digital transformation in the higher education sector.

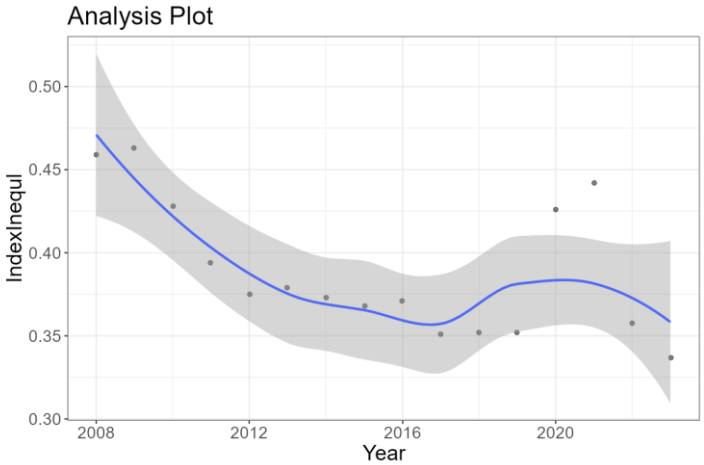

Figure 2. Flexplot of gender inequality index

Note — compiled by the authors

In Figure 2, the flexplot shows the relationship between the variable gender inequality index, which is shown as index inequality, and year (ranging from 2008 to 2024). From 2008 to approximately 2014, the inequality index shows a clear declining trend, indicating a consistent reduction in inequality over this period. Between 2014 and 2020, the trend stabilized, with some fluctuations around the midpoint. After 2020, moderate volatility in the gender inequality index's dynamic is observed, with a continuing downward trend. The recorded widening of the confidence interval at the extremes of the time series results showed an increase in the estimates' uncertainty. The smoothed trajectory reflects three stages of dynamics: a steady decline (2008–2014), stabilization (2014–2020), and subsequent volatility with a weak downward trend.

PCA was applied to survey data from 104 respondents to identify latent dimensions that summarize public perceptions of education quality, accessibility, and digitalization's impact on wages. The analysis's result is shown in Table 2.

Table 2. Principal Component Analysis

	Value	Df	P
Model	16.038	2	<0.001
Note — compiled by the authors			

This table shows the value of the test statistic corresponding to the number of parameters under study. At the same time, a p-value less than 0.001 indicates an extremely low probability that the observed effect is random, i.e., the result is statistically significant. Thus, components identified through the analysis are reliable, reflect the data's structural features, and contribute significantly to explaining the variation of the variables under study.

Next, in Table 3, the results for component loadings are presented.

Table 3. Component loadings

Component	**RC1**	**Uniqueness**
Accessibility of higher education	0.846	0.284
Satisfaction with education	0.845	0.286
Impact of digitalization	0.826	0.318
Impact on wages	0.815	0.336
Note — compiled by the authors		

According to Table 2, the chi-squared test for the PCA model yielded a statistically significant result **(χ^2 = 16.038, Df = 2, p < 0.001),** indicating that the model effectively captures the underlying structure of the data. All variables demonstrated a strong relationship, as their coefficients exceeded 0.8, which indicates that they were correctly selected to form the latent indicator. Each variable separately makes a significant contribution, strengthening the overall effect, and, in particular, changes in the indicators of accessibility and satisfaction have a particularly noticeable impact on the perception of the effectiveness of higher education. However, the results showed that, according to respondents, the quality of higher education is closely tied to its accessibility. This suggests that improvements in accessibility may contribute to higher levels of overall satisfaction with the education system. Thus, accessibility and satisfaction indicated extreme interdependence. It is worth noting that the results also revealed the significance of the variable "Impact of digitalization" (0.826) in forming the perception of the economic results of higher education by society. Thus, the studies showed that digital tools and technologies significantly improve graduates' employment and income levels. Consequently, society suggests that the integration of technologies in education is crucial. Moreover, integrating digital technologies in modernizing the educational environment forms positive economic prospects. The variable Impact on wages (loading = 0.815) indicates that respondents view the value of higher education and digitalization through their economic benefits. This connection emphasizes the need to align educational reforms with labour market demands. The low uniqueness values for all variables indicate that most of their variance is explained by RC1. The low uniqueness values for all variables indicate that most of their variance is explained by RC1.

Data from 2008 to 2024, collected from the Bureau of National Statistics, includes investments, demographics, and technological adoption metrics, providing a macro-level context for the study. Before the regression was conducted, the assumptions for the suitable model were checked, as shown in Figure 3.

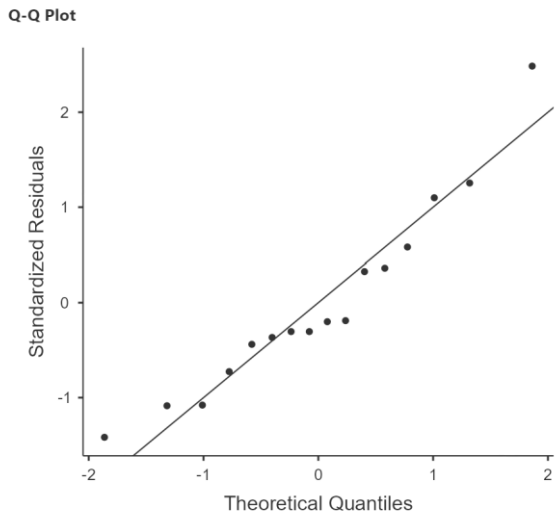

Figure 3. Q-Q plot of regression

Note — compiled by the authors

The Q-Q plot indicates that the regression model is well-suited for analyzing the factors influencing higher education quality and economic outcomes in Kazakhstan. The horizontal axis represents the theoretical quantiles expected if the residuals followed a normal distribution, whereas the vertical axis represents the observed standardized residuals from the regression model. The straight diagonal line represents the expected trend if the residuals are normally distributed. Since the points closely following this line indicate that the residuals approximate a normal distribution. The Q-Q plot supports the validity of the regression analysis, meaning the insights derived (e.g., the role of digitalization in improving education quality or reducing inequality) can be considered reliable. Policymakers can confidently use these findings to guide investments and reforms in higher education.

Investments in education and ICT play a critical role in reducing gender disparities, demonstrating the importance of digitalization in fostering equity. These findings support the argument that modernizing higher education quality assurance requires integrating investments with digital reforms. Regression analysis was conducted to evaluate how investments in education, ICT, professional/scientific activities, and demographic and technological factors influence the gender inequality index (IndexInequl) (Table 4).

Table 4. Result of regression analysis

Predictor	Estimate	SE	T	P-value
Intercept	–22.67	18.62	–1.217	0.251
Prof_science	4.91 e^{-4}	1.56 e^{-4}	2.681	0.023
Education	–7.19 e^{-4}	2.47e^{-4}	–2.911	0.016
PeractiveW	–4.795	1.75	–2.738	0.021
Year	0.0134	0.0098	1.377	0.199
Prop of mobile users, Women	–6.87 e^{-4}	0.0039	–0.176	0.864
Note — compiled by the authors				

In Table 2, the regression analysis examines the impact of investments and other factors on the gender inequality index (IndexInequl). Below is the interpretation of each predictor's result, its relevance, and justification for inclusion in the analysis.

The results obtained confirm that investments have a positive and statistically significant impact on reducing gender inequality, contributing to the expansion of opportunities for qualified specialists and the development of innovative potential. This contribution is particularly important in research and technology fields, as well as supporting equal access to high-skilled employment.

Additionally, investments have a negative impact on the Gender Inequality Index, which demonstrates the importance of higher education for increasing access to information and opportunities for women and underrepresented groups. Higher education is essential for economic mobility and social development, while at the same time, it is a crucial tool. The presence of a negative correlation between the share of the working-

age population and the level of gender inequality indicates that increased labor force participation helps to reduce the gender gap. This confirms the importance of involving both men and women in economic activity.

The optimistic estimate suggests a slight increase in gender inequality over time, but the non-significance indicates that this trend is not strong enough to draw firm conclusions. Including the year allows for tracking long-term trends and capturing potential systemic changes affecting gender inequality, even if not statistically significant in this case.

The proportion of mobile users among women shows no significant effect on gender inequality in this model. This suggests that, on its own, mobile usage does not directly influence the gender gap. Including mobile usage helps assess the role of digital connectivity in addressing inequality. While it is not significant in this analysis, it remains a relevant factor in broader digital access and equity discussions.

This regression analysis demonstrates that investments in education, professional activities, and workforce participation significantly contribute to reducing gender inequality. The empirical results have shown the need to strengthen the role of certain areas in modernizing higher education in Kazakhstan. Although individual variables such as mobile device usage and timeframe have shown little statistical significance in isolation, their inclusion demonstrates the importance of digital processes and institutional transformation in the long term. Based on these findings, this paper identifies modernization approaches, mechanisms, and data platforms based on data analysis to promote equality and improve educational quality. The results obtained correspond with the goals of reforming higher education to achieve socially significant outcomes, such as ensuring gender equality. As noted earlier, investments in education and professional development play a significant role in training human potential, promoting social mobility, and eliminating institutional barriers. While the impact of digital access, as measured by the use of mobile devices, may be limited, its integration into educational practices has the potential to contribute to increased inclusivity through improved access to knowledge.

Therefore, the modernization of higher education in Kazakhstan should focus on a differentiated approach that combines the development of educational programs with the integration of digital technologies in order to support social inclusion.

While digital access (as measured by mobile users) was insignificant, its integration with education systems could still play an important role in fostering inclusivity through improved access to resources and knowledge.

Conclusion

The study results showed that significant changes had been made. Thus, Kazakhstan has made significant progress in ensuring access to higher education. However, gender inequality persists, especially in employment and digital access. According to the analysis, access to education was a key factor influencing gender equality, confirming its importance. Notwithstanding, some negative results were observed, which showed the real state of actions toward gender equality. First, investment in education showed a negative relationship, indicating inefficient allocation of funds or maintaining educational programs that do not contribute to eliminating the gender gap. Future studies should consider regional approaches and analyze the differences within regions of Kazakhstan. Therefore, the study results showed that targeted funding for programs to achieve gender equality is required to expand opportunities for women in high-paying sectors. Satisfaction with education also plays a significant role. Despite broad access to higher education, women often experience limitations in choosing professions and career opportunities, which decreases their satisfaction with the educational process (Abbas et al., 2021). Thus, a reform of curricula is required. One of the directions may be the introduction of mentoring initiatives and changes in ideas about gender roles in the professional sphere. Despite being an important factor in the analysis, digitalization of education did not show a significant relationship between the share of women using mobile technologies and gender equality. Thus, access to digital resources alone does not eliminate barriers. Consequently, digital inequality in Kazakhstan is associated with infrastructure and insufficient digital literacy among women, especially in rural areas. One of the key approaches is access to online education.

The impact of education on wages has also confirmed its significance, but the data show that even with women's high economic activity, a significant income gap remains. Women face difficulties in career growth, the "glass ceiling" effect, in which women receiving an education do not have equal opportunities to advance to high-paying positions.

Thus, despite Kazakhstan's achievements in providing educational opportunities for women, barriers remain in the labor market, the digital space, and professional development.

Investments in education are not a sufficient solution since the distribution of funds requires a targeted approach and monitoring.

Acknowledgements: This research has been funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan ("Modernization of the quality assurance system of higher education in Kazakhstan based on digitalization: development of approaches, mechanisms and information base" No.BR24992974)

References

(2017). United Nations Development Programme. *Gender and employment in the South Caucasus and Western CIS*. *undp.org*. Retrieved from https://www.undp.org/sites/g/files/zskgke326/files/migration/eurasia/GenderandEmploymentin-theSouthCaucasusandWesternCIS.pdf

(2022). International Monetary Fund. *Tackling gender inequality: Definitions, trends, and policy designs* (IMF Working Paper No. 2022/232). *imf.org*. Retrieved from https://www.imf.org/en/Publications/WP/Issues/2022/12/16/Tackling-Gender-Inequality-Definitions-Trends-and-Policy-Designs-525138

(2025). UNESCO. *Gender equality in education. unesco.org*. Retrieved from https://www.unesco.org/en/gender-equality/education

Abbas, F., Abbas, N., & Ashiq, U. (2021). Glass Ceiling Effect and Women Career: Determining factors in Higher Education Institutions. *SJESR*, 4(1), 1–8. https://doi.org/10.36902/sjesr-vol4-iss1-2021(1-8)

Aftab, M.J., Ali, H.H., & Bashir, R. (2023). The Cultural Barriers Faced by Women in Acquiring Higher Education in Tribal Areas of Pakistan: A Case of Dera Ghazi Khan. *IUB Journal of Social Sciences*, 5(1), 82–94. https://doi.org/10.52461/ijoss.v5i1.1500

Aikman, S., Halai, A., & Rubagiza, J. (2011). Conceptualizing gender equality in research on education quality. *Comparative Education*, *47*(1), 45–60. https://doi.org/10.1080/03050068.2011.541675

Atria, J., Castillo, J., Maldonado, L., & Ramirez, S. (2020). Economic elites' attitudes toward meritocracy in Chile: A moral economy perspective. *American Behavioral Scientist, 64*(9), 1219–1241. https://doi.org/10.1177/0002764220941214

Beaunoyer, E., Dupéré, S., & Guitton, M.J. (2020). COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in human behavior, 111*, 106424. https://doi.org/10.1016/j.chb.2020.106424

Bolotnyy, V., & Emanuel, N. (2022). Why do women earn less than men? Evidence from bus and train operators. *Journal of Labor Economics*, *40*(2), 283–323. https://doi.org/10.1086/715835

Chen, S.C., Yang, S.J., & Hsiao, C.C. (2016). Exploring student perceptions, learning outcome and gender differences in a flipped mathematics course. *British Journal of Educational Technology, 47*(6), 1096–1112. https://doi.org/10.1111/bjet.12278

Chigbu, B.I., & Nekhwevha, F. (2023). Exploring the concepts of decent work through the lens of SDG 8: addressing challenges and inadequacies. *Frontiers in Sociology, 8*, 1266141. https://doi.org/10.3389/fsoc.2023.1266141

China Briefing. (2025). *Gender equality in China's labor market 2025*. *china-briefing.com*. Retrieved from https://www.china-briefing.com/news/gender-equality-in-chinas-labor-market/

de Matos Pedro, E., Leitão, J., & Alves, H. (2020). Bridging intellectual capital, sustainable development and quality of life in higher education institutions. *Higher Education Institutions and Sustainable Development, 217*. https://doi.org/10.3390/su12020479

Didier, N. (2021). Does the expansion of higher education reduce gender gaps in the labor market? Evidence from a natural experiment. *International Journal of Educational Development, 86*, 102467. https://doi.org/10.1016/j.ijedudev.2021.102467

Durand, A., Zijlstra, T., van Oort, N., Hoogendoorn-Lanser, S., & Hoogendoorn, S. (2021). Access denied? Digital inequality in transport services. *Transport Reviews*, *42*(1), 32–57. https://doi.org/10.1080/01441647.2021.1923584

International Labour Organization. *Breaking barriers: Unconscious gender bias in the workplace*. ILO. *webapps.ilo.org*. Retrieved from https://webapps.ilo.org/infostories/en-GB/Stories/Employment/barriers-women#women-preference

Khan, S., Zaman, S.I., & Rais, M. (2022). Measuring student satisfaction through overall quality at business schools: a structural equation modeling: student satisfaction and quality of education. *South Asian Journal of Social Review, 1*(2), 34–55. https://doi.org/10.57044/SAJSR.2022.1.2.2210

Kille, T., Wiesner, R., Lee, S.Y., Johnson Morgan, M., Summers, J., & Davoodian, D. (2022). Capital factors influencing rural, regional and remote women's entrepreneurship development: An Australian perspective. *Sustainability, 14*(24), 16442. https://doi.org/10.3390/su142416442

Koskinen Sandberg, P., Törnroos, M., & Kohvakka, R. (2017). The institutionalized undervaluation of women's work: The case of local government sector collective agreements. *Work, employment and society, 32*(4), 707–725. https://doi.org/10.1177/0950017017711100

Li, K. (2019). MOOC learners' demographics, self-regulated learning strategy, perceived learning and satisfaction: A structural equation modeling approach. *Computers & Education, 132*, 16–30. https://doi.org/10.1016/j.compedu.2019.01.003

Little, A.W., & Green, A. (2009). Successful globalization, education and sustainable development. *International Journal of Educational Development, 29*(2), 166–174. https://doi.org/10.1016/j.ijedudev.2008.09.011

Macevičiūtė, E., & Wilson, T.D. (2018). Digital means for reducing digital inequality: Literature review. *Informing science: the international journal of an emerging transdiscipline, 21*, 269–287. https://doi.org/10.28945/4117

Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent social sciences, 5*(1), 1653531. https://doi.org/10.1080/23311886.2019.1653531

Mogensen, F., & Schnack, K. (2010). The action competence approach and the "new" discourses of education for sustainable development, competence and quality criteria. *Environmental education research, 16*(1), 59–74. https://doi.org/10.1080/13504620903504032

Newman, A. (2020). Honour, respectability and "noble" work: descent and gender-based obstacles to the education and employment of young Haalpulaar women in northern Senegal. *Children's Geographies, 18*(6), 654–666. https://doi.org/10.1080/14733285.2020.1743820

Pedro, E., Mendes, L., & Lourenço, L. (2018). Perceived Service Quality and Students' satisfaction in Higher Education: the Influence of Teaching Methods. *International Journal for Quality Research, 12*(1), 165.

Renn, K.A. (2017). The role of women's colleges and universities in providing access to postsecondary education. *The Review of Higher Education, 41*(1), 91–112. https://doi.org/10.1353/rhe.2017.0034

Saeed, S., Ahmad, S., Mushtaq, F., & Samiullah, M. (2023). Barriers and Challenges Faced by Rural Females in Accessing Higher Education in Punjab, Pakistan. *Harf-o-Sukhan, 7*(3), 661–668. Retrieved from https://harf-o-sukhan.com/index.php/Harf-o-sukhan/article/view/947

Sima, V., Gheorghe, I.G., Subić, J., & Nancu, D. (2020). Influences of the industry 4.0 revolution on the human capital development and consumer behavior: A systematic review. *Sustainability, 12*(10), 4035. https://doi.org/10.3390/su12104035

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S.V., Giannoutsou, N., Cachia, R., Martínez Monés, A. & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and information technologies, 28*(6), 6695–6726. https://doi.org/10.1007/s10639-022-11431-8

Umbara, I.A.A.P., Sujana, I.W., & Negara, I.G.A.O. (2020). Model Pembelajaran Problem Based Learning Berbantuan Media Gambar Seri Berpengaruh Terhadap Kompetensi Pengetahuan IPS Siswa. *Mimbar Ilmu, 25*(2), 174–186. https://doi.org/10.23887/mi.v25i2.25154

Wong, W.H., & Chapman, E. (2023). Student satisfaction and interaction in higher education. *Higher education, 85*(5), 957–978. https://doi.org/10.1007/s10734-022-00874-0

Zheng, H., & Weeden, K.A. (2023). How gender segregation in higher education contributes to gender segregation in the US labor market. *Demography, 60*(3), 761–784. https://doi.org/10.1215/00703370-10653728

https://doi.org/10.31489/2025Ec2/41-53

JEL J12, J16, J22, O31, O15, R23

ORIGINAL RESEARCH Received: 06.01.2024. | Accepted: 03.04.2025

From Household Duties to Innovation: The Role of Gender Norms in Women's Economic Participation

Irina Kovaleva[1]*, Leon Taylor[2], Eldar Madumarov[3], Gerald Pech[4], Anastassiya Korosteleva[5]

Abstract

This study examines how cultural norms and household structure affect women's participation in the labour force and their capacity to contribute to innovative activity, emphasizing patrilocality theory in Kyrgyzstan. According to the theory, women who reside with their husband's family are expected to spend more time on household duties and may be less likely to participate in income-generating and innovative activities outside the home. Econometric analysis uses data from the 2019 Life in Kyrgyzstan (LiK) panel survey. The Tobit model analyses the relationship between women's living arrangements, labour force participation and earnings. The analysis reveals that, other things being equal, women earn lower wages if they have many household responsibilities; however, this does not mean that women in patrilocal living arrangements have low earnings. It also shows that education, location, and other socio-economic factors are most important in determining the rate of women's economic participation and the innovation potential. Moreover, household decision-making power and cultural expectations are most likely to affect women's opportunities for labour market participation. The study finds that resolving gender inequalities in domestic responsibilities and power to make decisions is crucial to unlock the potential of women in innovation for the economy. The study contributes to the existing literature as the first empirical analysis of these dynamics in CIS countries and as policy recommendations to promote gender equity and economic growth.

Keywords: Innovation, Patrilocality hypothesis, Household structure, Women's labour, Gender roles, Cultural norms, Econometric analysis

Introduction

Anthropologists assert the "patrilocality hypothesis": when the wife moves into her husband's family house, as is often the case in developing societies, she may be forced to work in the household while he does not (Chen & Mace, 2023). The current article statistically tests the hypothesis with a model that examines how the household structure may affect women's labour market participation and their ability to engage in innovative activities. The study's central hypothesis is that women who live in patrilocal households — that is, with their husband's family — have greater domestic labour responsibilities. These have a detrimental impact on their outside income and restrict their ability to participate in creative economic endeavours.

The patrilocality hypothesis favours gender over resources or negotiation within the household as an explanation of how home chores are assigned. According to gender theory, which includes the patrilocality hypothesis, women perform the majority of housework since it is seen as their duty (Kolpashnikova & Kan, 2020). In contrast, resource theory states that the allocation of labour is contingent upon the man's and woman's time, labour, and capital. Finally, bargaining theory states that the allocation of labour is determined by psychological forces in the home. These theories may intersect. Allocating resources, for example, may impact household work patterns and negotiating strength. Because unequal labour loads can prevent women from participating in economic innovation, the structure of these allocations is crucial.

The introduction of new technology could also be a factor: labour-saving devices such as vacuum cleaners and washing machines may encourage men to work harder and do fewer household chores. To ensure that the disutility of doing the job himself does not outweigh the disutility of her being unhappy, the controlling spouse in our model avoids doing the housework. The husband does more housework due to

[1] *Department of Economics, KIMEP University, *irina.kovaleva@kimep.kz* (corresponding author)
[2] Department of Economics, Tulane University, *taylorleon@aol.com*
[3] Department of Economics, KIMEP University, *madumarov@kimep.kz*
[4] Department of Economics, KIMEP University, *gpech@kimep.kz*
[5] Department of Economics, KIMEP University, *miss.anastassiya@gmail.com*

technological advancements that lower the marginal disutility of the task. As a result, the woman has less labour to do around the house and can work outside the home. This gives her the chance to be creative

This technological progress can have other economic consequences. For instance, liberating women from domestic responsibilities may make them more capable of contributing to areas of the economy that are knowledge-based, such as education, entrepreneurship, and creative industries. On the other hand, the degree of the wife's dissatisfaction with imposed work depends on cultural expectations. Some cultures, like the one studied in this paper, expect her to do domestic work. This lowers her dissatisfaction and his disutility in imposing work on her. This consequence reveals how cultural norms can constrain women in the labor market and the extent to which they are prevented from innovating. In total, this paper combines gender, resource, and bargaining theories to create a complete framework for looking at household labour allocation and its economic implications.

This paper makes several contributions. It offers both the first econometric examination of the patrilocality hypothesis and the first econometric analysis of how it affects women's participation in domestic work and innovation. Additionally, it offers the first empirical examination of these problems in Kyrgyzstan. The study clarifies the connection between home labour and economic involvement through a statistical examination of personal traits, cultural beliefs, and living situations. In addition, it reveals how household structures and cultural factors may hinder or promote the ability of women to innovate. This has important policy implications for promoting gender equality and economic growth. In particular, the paper examines how these factors affect womens outside income and readiness to innovate. It analyses these key variables: age, education, ethnicity, location, employment, religious beliefs and love marriage.

Literature review

After marriage, it is more common for wives worldwide to live with their husbands' families than vice versa (Kovaleva & Taylor, 2023a). Patrilocality is more common when the wife and husband live away from their families. Chen and Mace (2023) found that in partnerships with patrilocal structure, the woman takes 12 thousand work steps per day (by milking cows and collecting mushrooms), whereas the man takes 9 thousand. They surveyed 561 persons from 6 national groups in the rural Tibetan region of China. In this setup, women continued to exert greater effort than men, even after adjusting for household size and age (Chen et al., 2023).

Bias in patrilocal relationships does not have to be eliminated by contemporary labour markets. According to a Spanish study by Moreno-Colom (2017), a woman's job did not ensure she would share household chores equally. The employment of women is an essential but insufficient prerequisite for the equality of gender, according to Moreno-Colom (2017). In the US, breadwinners still clean and cook (Kolpashnikova, 2018). Kolpashnikova and Kan (2020) also concluded that factors other than resource-based explanations continue to account for the majority of the gender gap and could include gender bias. However, the effect of gender is determined by the task. According to a Canadian study by Kolpashnikova (2016), economic reasons explained only 31 % of the gender difference in cooking time but 39 % of the gender difference in cleaning time. According to this research, societal conventions surrounding gender roles still exist in contemporary economies. These conventions affect the division of labour and might limit female access to fields that foster innovation.

This perspective is based on the assumption that women put in more effort than men, due to the pressure from their husbands' families, also known as the patrilocality hypothesis. A different hypothesis is that men demand women's labour to be free to fight. The level of competition between and within kin groups dictates gender roles, asserted Micheletti, Ruxton, and Gardner (2020). While the sex that competes more with outsiders is more likely to be serviced, the sex that competes more with relatives is more likely to serve the other sex. The authors explain that warfare can induce cooperative and altruistic behaviour because the winning groups have a reproductive advantage, reducing the competition among the kin. But the economic and societal barriers that keep women from becoming innovators and entrepreneurs may not be fully explained by such evolutionary ideas, despite their relative usefulness.

Patrilocality, where a wife lives after marriage with her husband's family, prevails in various societies and has profound implications for women's labour participation. In Kyrgyzstan, Landmann et al. (2018) find that a strongly patrilocal setting, living with in-laws has no discernible impact on women's labor force participation. Co-residing women, however, devote more time to elder care without getting the normal amount of help around the house. This constraint limits their options for paid work and reinforces traditional gender norms.

Living with in-laws restricts women's autonomy and labour force participation in India. Parents-in-law present in the household constrain mobile women and limit their decision-making power. This keeps them from the labour market (Heath & Tan, 2020).

Marriage practices, including early marriage and bridal dowries, greatly affect women's economic well-being. Early marriage is linked to low achievement in education and the labour market, prolonging poverty and financial dependence (Field & Ambrus, 2008). In African contexts, bride wealth practices can constrain women's autonomy and agency, limiting their economic participation (Anderson, 2007).

Economic shocks also play a role in marriage practices. For instance, adverse economic conditions may lower the age at which girls marry, that is, when families may turn to early marriage as a coping mechanism (Corno et al., 2020). Such practices disenfranchise women in the labour market and social spheres.

Some tax policies, such as joint filing in the United States, disincentivise the participation of married women in the workforce. Such policies include higher marginal tax rates on secondary earners, usually women. This suppresses the motivation to work full time and climb the career ladder. This exacerbates economic inequalities (Eissa & Hoynes, 2004).

The unequal distribution of household labour is a persistent problem worldwide. In Spain, equitable housework allocation is not guaranteed by women's employment. Gender equality cannot be attained solely through employment (Moreno-Colom, 2017). Even breadwinning wives in the US must handle a greater portion of the household chores. This obligation limits their capacity for creativity (Duxbury & Higgins, 1991).

In addition, having young children in the home reduces female labour force participation. Women with children under six years of age are less likely to work for pay and thus need help from public policy in balancing work and life (Kimmel, 1998).

Challenges posed by patrilocality, traditional marriage practices, and gender norms require comprehensive policy interventions. Policies that support shared decision-making in the household and childcare sector and reform of tax systems can improve women's labour market participation and economic outcomes. Policymakers must also meet the challenge of societal norms that limit women's autonomy to foster an environment conducive to innovation and economic growth.

This study of the literature demonstrates how women's employment habits in Kyrgyzstan are influenced by migration, household dynamics, gender norms, religious beliefs, cultural and marital customs, and commute times. In addition, they affect women's capacity to innovate by affecting their control over time, resources, and decision-making power directly or indirectly.

According to Landmann, Seitz, and Steiner (2018), women who live with extended families receive no parental assistance with housework but spend more time providing elder care than women who do not live with their parents. This disparity between genders in the division of labour limits women's opportunities for paid employment and entrepreneurship, which is essential in fostering innovation. The study views female labour supply as a family optimization problem in which family members would provide the scheduling flexibility that women need to work additional hours. However, co-residence is key in elder care: women who live with their extended family reduce their leisure time on caregiving responsibilities and have less chance to participate in innovative activities.

Empirical research shows that gender norms along with coercive marital practices and household dynamics limit women from participating in the economy and innovating. According to Haq et al. (2023) religiosity acts as a strong factor which reduces female participation in the workforce while strengthening patriarchal barriers against women's independence. The patrilocality hypothesis receives support from Becker et al. (2017) and Arabsheibani et al. (2021) who studied Kyrgyzstan to show how bride kidnapping and forced marriage decrease labor supply while increasing unpaid household work. The research by Karymshakov and Sulaimanova (2017) demonstrates that when men leave their homes for work the remaining women must handle more responsibilities which prevents them from taking paid employment. The research by Farré et al. (2020) and Foster and Stratton (2018) from higher-income settings shows that labor market events such as commuting time or job loss do not lead to household chore rebalancing because women maintain their dominant role in domestic work regardless of their employment status. The research demonstrates that women face ongoing economic limitations because of structural inequalities and gender norms which persist in both traditional and contemporary societies.

This literature study highlights economic, social, and cultural elements influencing females' patterns of employment in Kyrgyzstan. The elements limit women's time, income-earning opportunities, and innovation capacity, thus sustaining gender inequality and economic growth.

The literature could use a simplified model that can capture the complex interplay of these factors. The following section outlines a model to bolster gender equality and improve women's economic power and welfare. According to Flèche, Lepinteur, and Powdthavee (2020), longer workdays and an unbalanced distribution of domestic duties reduce women's life satisfaction. These are issues that could not only enhance life satisfaction but also increase the potential of women to participate in economic innovation.

Methodology

In our approach, the husband decides the extent of her work outside the home (Kovaleva & Taylor, 2023b). The inconvenience (disutility) of performing housework and child rearing himself, his wife's earnings and the emotional bond (her love) within the relationship affect his decision. This framework allows us to analyze how household dynamics influence women's ability to innovate by examining the constraints imposed by traditional gender roles.

Where X_h stands for the time the wife spends on household work, and X outside the home, if we denote her household labour as L_n and her outside labour as L_v, then her total work time z is the sum of involuntary labour L_n and voluntary labour L_v, $z = L_n + L_v$. For simplicity, we assume that $z = 16$ is the number of hours per day.

The husband's utility is derived from household work, commodity goods, and his wife's affection M. He determines the proportion a of his wife's labour allocated to household work, leading to the following labour division: $L_n = az$ and $L_v = (1–a)z$. The wife's affection M decreases due to the increase, meaning that the more household work she is required to do, the less affection she expresses. Her wage rate is P, so her total earnings from outside work are PX. These earnings are entirely spent on commodity goods.

To incorporate the innovation potential, we extend the model by assuming that L_v can contribute to creative or entrepreneurial work, which is more likely when the wife faces fewer household responsibilities.

The husband's utility maximization problem can be formulated as follows:

$$L = U\left[X_h\left(L_n(a)\right), PX\left(L_v(a)\right), M(a)\right] + \lambda_1[az - L_n] + \lambda_2[(1-a)z - L_v] + \lambda_3[z - L_n - L_v].$$

To derive the first-order condition for the husband's utility maximization problem, we take the derivative of the objective function with respect to a: $\frac{dL}{da} = \frac{dU}{dX_h}\frac{dX_h}{dL_n}\frac{dL_n}{da} - \frac{dU}{dX}\frac{dX}{dL_v}\frac{dL_v}{da} + \frac{dU}{dM}\frac{dM}{da} + \lambda_1 z - \lambda_2 z = 0$. $\frac{dL}{d\lambda_1} = az - L_n = 0$; $\frac{dL}{d\lambda_2} = (1-a)z - L_v = 0$; $\frac{dL}{d\lambda_3} = z - L_n - L_v = 0$. We assume that $\frac{dX_h}{dL_n} > 0, \frac{d^2X_h}{dL_n^2} \leq 0$; $\frac{dX}{dL_v} > 0, \frac{d^2X}{dL_v^2} \leq 0$.

That is, we assume that more labour increases household output, but at a diminishing rate: $f'(L_n)>0$, $f''(L_n)<0$. Household chores can vary from sweeping floors to child care. To capture this diversity, we express X_h as a vector of k distinct duties, each requiring a specific type of labor: $X_h = (X_{h1}, \ldots, X_{hk})$.

Thus, the derivative of total household work X_h with respect to household labor L_n is the sum of the marginal contributions of labor across all household duties: $\frac{dX_h}{dL_n} = \sum_{i=1}^{k} \frac{dX_{hi}}{dL_{ni}}$. In a simplified scenario, we assume $k = 1$: $\frac{dX_h}{dL_n} = \frac{dX}{dL_v} = 1$.

That is to say, for every hour of labor, there is an additional hour of work performed outdoors or in home. We also assume that: $\frac{dL_n}{da} = z, \frac{dL_v}{da} = -z$.

That is, if the husband wants the wife to work only in house, then his wife's total household work hours will be equal to the full workday, z. We assume that the utility function is: $U(a) = X_h^a X^{1-a} M^{-a}$.

This function then takes its logarithm, since it is a strictly increasing or decreasing function, it preserves the order of values. Since we assume a single optimum, taking the logarithm does not alter the optimal decision — it results in the same decision.

To measure how household constraints influence innovation, we extend the utility function to include innovation I, which depends positively on L_v. Thus, the revised utility function becomes: $U(a) = X_h^a X^{1-a} M^{-a} \mathrm{I(Lv)}^{\beta}$ where $\beta > 0$ captures the wife's ability to innovate as her outside work increases.

Under these assumptions, the first-order conditions result in: $\frac{dM/M}{da/a} = z + \lambda_1 - \lambda_2$. The elasticity of the wife's attachment with respect to the percentage of her involuntary labour is also negative since the right-hand side is negative (as indicated in the appendix). This implies that she shows less love for her husband the

more he makes her work from home. Moreover, as the share of outside work (L_v) increases, innovation (I) rises, highlighting how reducing household burdens can promote innovation.

The solution yields: $a = \frac{M}{dM/da}[z + \lambda_1 - \lambda_2]$. The variable *a* falls within the range of 0 to 1. The phrase inside the brackets must also be negative because on the right-hand side, the first term is negative.

Empirical model

This study seeks to understand if a woman's housing situation affects her earnings and innovativeness. To this end, her outside income is given by Income (i, t), where the subscripts i and it denote the particular woman and t denotes time, respectively. This system enables us to examine the effects of living arrangements on income and women's potential to innovate. Since many women in Kyrgyzstan are not employed, we use a Tobit model, corrected for zero censorship, to analyze the data. A frequently employed practical model is:

$$Income(i,t) = a + b*Love(i) + c*Loved(i) + d*Decision(i) + e*Move(i) + f*Move(i)*Love(i) + g*Move(i)*Loved(i) + h*Years\ of\ marriage(i;t) + i*Chores(i) + j*Children\ under\ 6\ (i,t) + k*Schooling(i,t) + l*Spous\_schooling(i,t) + m*Age(i,t) + n*Age^2(i,t) + o*Kyrgyz(i) + p*Religious(i) + q*Housework(i;t) + r*Rural(i) + s*East(i) + x(i,t) \quad (13)$$

These variables fall into four categories, capturing both traditional and innovation-related dynamics:

(1) *Type of marriage*: *Love, Loved,* and *Decision*.

(2) *Family characteristics*: *Move, Years of Marriage, Chores, Children Under 6*

(3) *Individual characteristics*: *Schooling, Age, Age^2, Kyrgyz, Religious, Housework, Wage, Hourstotal*

(4) *Location*: *Rural, East*.

Depending on the answers to the question about whether a wife in a love marriage has heavy duties, such as having to labor for her husband's family, the variable *Love* has a range of 0 to 3: 0 (impossible); 1 (possible); 2 (likely); 3 (very possible). According to this study, greater values of this variable are consistent with patrilocality, which implies the conviction that women in love marriages are subjected to heavy home labor demands.

Loved is a dummy variable equal to 1 if the woman got married by love and 0 for the other case. Her answer to the query, "How did you get married to your spouse?", is the basis for this variable. If she indicated an arranged marriage or bridal kidnapping, she signals a love marriage. If she reported a love marriage, the variable is set to 1; if she claimed a bridal kidnapping or an arranged marriage, the variable is set to 0. We anticipate a favourable coefficient. Then, those in involuntary marriages and women in voluntary marriages have a better chance of having the right to work outside the home and innovate.

Decision is a dummy variable indicating whether the husband makes labour decisions for the household. We expect a negative impact on women's wages under the patrilocality and related hypotheses.

Move is a dummy variable equal to 1 if the woman reported moving because of marriage, to be with her husband's family and 0 otherwise. We expect that $e<0$, women who move for marriage should bear a greater household labour burden since they live with in-laws and may have more domestic responsibilities. *Move*Love* and *Move*Loved* are multiplications.

The number of years that a couple has been married is known as their *Years of marriage*. Assuming that the wife has additional children as the marriage goes on, we utilize the *Number of Children Under 6* variable as a stand-in. We assume that $h > 0$, meaning that the wife's bargaining position strengthens as the marriage progresses. Therefore, it is unlikely that her position within the home would deteriorate over time, given her initial lack of authority.

Chores measures the strength of the wife's agreement with the statement that the husband should share in household work. The larger the value of Chores, the stronger her agreement. Its values are 0 (strongly disagree); 1 (disagree); 2 (agree); and 3 (strongly agree). We expect a positive coefficient, as greater household cooperation may free up time for income-generating and innovative activities.

Children under 6 indicates how many children and grandchildren live in the home and are younger than six.

Schooling represents the **total number of years of education** that the woman has completed, where university (bachelor, diploma, master) and PhD = 15 years, secondary technical/special = 11, secondary general and primary technical = 10, basic = 8, primary = 4, illiterate = 0 years.

The number of years that the male in a woman's home has completed his education is known as *Spouse Schooling*, since education boosts productivity and tolerance, we anticipate that $k > 0$ and $l > 0$; this could improve the wife's economic prospects and the dynamics of the home.

Age indicates the woman's age. Because older women have more work experience and are not responsible for tiny children, we think that m > 0. This can only increase their productivity and income. *Age²* equals the woman's age squared. Given that the benefits of becoming older diminish with age, we expect $n < 0$: while experience enhances wages at the beginning, the effect becomes smaller over time, and such factors as age or the obsolescence of skills may even decrease earnings.

If the woman is ethnically *Kyrgyz,* the dummy variable *Kyrgyz* equals 1; if not, it equals 0. Since *Kyrgyz* social networks are known to safeguard and advance the interests of their members, which may provide them with specific social and economic advantages, we anticipate that o > 0.

If the respondent identified herself as *Religious* using one of the following definitions — firm atheist, not a religious person, or a religious person (given a value of 1) — *Religious* is a dummy variable set to 1.

Housework is the wife's number of years of housework. We expect a negative coefficient because higher household responsibilities reduce labour market participation and the likelihood of engaging in innovative pursuits.

Wage is a proxy for *Income.* The wife's hourly wage outside the home is measured in the Kyrgyz currency *soms*.

Hourstotal represents the total number of hours per week that the wife spent working at her job. It is also a proxy for *Income.*

Rural is a dummy variable for a non-urban location. We expect a negative impact on income because cities' productivity and labour demand are higher.

East includes regions of Issyk-Kul, Naryn, Chuy and the Bishkek city. We anticipate $s < 0$ because these regions are typically calmer than the western regions, which are more prone to ethnic and political tensions.

Data

The dataset includes 11,913 observations from the 2019 Life in Kyrgyzstan (LiK) panel survey, a special and extensive longitudinal survey that has been carried out yearly since 2010. The LiK dataset is designed to provide insights into the living conditions and socio-economic development of individuals and households in Kyrgyzstan. It covers various topics: employment, migration, education, household structure, and well-being. Virtually all observations used in this study are for married women (3,055 observations), making this one of the few empirical studies to leverage this rich dataset for analyzing household dynamics and innovation potential.

According to the official website of the Life in Kyrgyzstan Study, the survey aims to support evidence-based policymaking and promote research on Kyrgyzstan's economic and social development. The dataset includes variables that capture individual characteristics and household-level dynamics, making it particularly suitable for analysis of patrilocality, labour allocation, and innovative activities.

According to the correlation matrix (Table 1), most variables' correlations are low, including the interaction terms, age, and square, and are likely free from multicollinearity issues in the analysis (correlation matrix can be provided **upon request**).

Table 1. Correlation matrix

	Love	**Loved**	**Decision**	**Move**	**Move * Love**	**Move * Loved**	**Years of marriage**	**Chores**	**Children under 6**	**Schooling**
1	2	3	4	5	6	7	8	9	10	11
Love	1									
Loved	-0.08	1								
Decision	0.07	-0.07	1							
Move	-0.04	0.18	-0.04	1						
Move*Love	0.05	0.15	-0.02	0.66	1					
Move*Loved	-0.02	0.27	-0.04	0.71	0.58	1				
Years of marriage	-0.06	-0.04	-0.02	-0.06	-0.05	-.005	1			
Chores	-0.1	0.03	-0.04	-0.01	-0.02	-0.004	-0.07	1		

Continuation of the table 1

1	2	3	4	5	6	7	8	9	10	11
Children under 6	0.02	0.03	-0.001	-0.01	-0.02	-0.008	-0.33	0.05	1	
Schooling	0.02	0.03	-0.07	0.01	0.04	0.008	0.12	-0.03	-0.11	1
Age	-0.01	-0.23	0.07	-0.11	-0.07	-0.09	0.8	-0.03	-0.28	0.03
Age^2	-0.01	-0.2	0.05	-0.09	-0.06	-0.07	0.8	-0.03	-0.26	0.003
Kyrgyz	0.02	0.05	-0.03	0.01	0.03	0.012	0.1	-0.02	-0.14	0.2
Religious	0.04	-0.1	0.1	0.02	0.01	0.008	-0.09	-0.04	0.18	-0.18
Housework	0.01	-0.05	0.01	-0.03	-0.02	-0.02	-0.03	-0.01	0.03	0.004
Wage	-0.01	-0.01	-0.06	-0.03	-0.03	-0.03	0.24	0.004	-0.13	0.2
Hourstotal	-0.02	-0.04	-0.003	-0.05	-0.04	-0.03	0.35	-0.02	-0.15	0.17
Rural	0.08	-0.04	0.08	-0.03	-0.01	-0.03	0.02	-0.06	0.07	-0.17
East	-0.08	0.08	-0.23	0.06	0.05	0.09	0.16	-0.05	-0.18	0.13
Affection	-0.16	0.12	-0.04	0.04	0.02	0.05	-0.13	0.001	-0.01	0.11
Age	1									
Age^2	0.99	1								
Kyrgyz	0.03	0.01	1							
Religious	–0.1	–0.1	0.03	1						
Housework	–0.05	–0.06	–0.03	0.04	1					
Wage	0.08	0.05	0.02	–0.12	–0.08	1				
Hourstotal	0.13	0.08	0.09	–0.09	–0.09	0.62	1			
Rural	–0.06	–0.06	0.13	0.22	–0.04	–0.10	–0.01	1		
East	0.12	0.11	–0.03	–0.33	–0.06	0.18	0.17	–0.14	1	
Affection	–0.04	–0.04	–0.05	–0.1	–0.002	0.01	–0.02	–0.12	0.12	1

Note — the table presents pairwise correlation coefficients for all independent variables used in the model. Values close to 0 indicate weak correlation, while values near ±1 indicate strong correlation.
Source: Kovaleva's estimates using 2019 LIK data.

In the following part, Table 2 displays the descriptive statistics. The standard deviation is so high that it exceeds the mean for most variables. However, in some instances, such as the ones presented in the last column of the output, there is still enough data variability to allow for reasonably accurate coefficient estimates even when the standard deviation is less than or equal to the mean.

Table 2. Descriptive statistics

Variable	Observations	Mean	Standard deviation	Min	Max
Love	2785	1.034	0.935	0	3
Loved	3055	0.0812	0.273	0	1
Decision	2785	0.198	0.399	0	1
Move	3055	0.0128	0.112	0	1
Move*Love	2785	0.01	0.124	0	3
Move*Loved	3055	0.007	0.081	0	1
Years of marriage	621	8.77	8.274	2	31
Chores	2736	1.978	0.609	0	3
Children under 6	3055	1.386	1.341	0	9
Schooling	2916	10.602	2.115	0	15
Age	3055	39.664	14.132	17	89
Age2	3055	1772.8	1254.4	289	7921
Kyrgyz	3055	0.684	0.465	0	1
Religious	2785	0.924	0.266	0	1
Housework	3055	0.24	1.013	0	22
Wage	3055	14.31	30.144	0	348.8
Hourstotal	3055	14.285	20.514	0	70
Rural	3047	0.719	0.45	0	1
East	3055	0.327	0.47	0	1
Affection	2756	7.933	2.09	0	10

Note — (i) schooling indicates the number of years a person has been enrolled in an educational institution.
Source: Kovaleva's estimates using 2019 LIK data.

Empirical results

The earnings of women who did not work outside the home are set to zero in the observations used for the regressions in Table 3 of women's pay on 13 independent factors. A Tobit model is employed since the dependent variable is not normally distributed (70 % of the salaries are reported to be zero). The model explained about 10 % of the total pay variation across households.

Of the eight variables that test the patrilocality hypothesis, four are consistent with it and four are not. Statistical significance is measured at the 10 % level. Key conclusions include:

1. A woman who almost certainly lives with her husband's family does not make less money than other wives, according to the statistically insignificant *Move* coefficient. Thus women in patrilocal households might still be able to innovate outside the home, which runs counter to the patrilocality concept.

2. Because *Loved* is statistically insignificant, a woman in a love marriage does not make more money than other women. This contradicts the theory of patrilocality, which implies that a woman with some control in her marriage would choose to earn more money on her own. However, innovation in household decision-making might still be present in other forms, such as flexible work arrangements.

3. The *Love* coefficient is statistically insignificant; a woman who believes that a love marriage is less taxing for the wife than an arranged marriage does not earn more than other women. Even a poor woman may favour a love marriage because she thinks it could boost her income or values things other than money. In terms of innovation, this reflects how social norms influence women's economic participation.

4. The *Kyrgyz* ethnic group does not lower wages. Therefore, even if traditional practices are incompatible with a contemporary economy, they do not always impact women's earnings. However, wages are lower when the husband is the decision maker in the house, as indicated by the negative and statistically significant *Decision* coefficient. This could mean that husbands deny their wives' work opportunities or restrict their freedom to earn or innovate.

5. *Religious* women earn lower wages in the OLS model (the coefficient is statistically significant and negative). This is consistent with the patrilocality hypothesis, which holds that cultural beliefs affect how much the wife works outside the home. Lower income for religious women may also indicate fewer opportunities for entrepreneurship or innovation.

6. Each additional year of work as a housewife (*Housework*) lowers the wife's wage. This is consistent with the patrilocality hypothesis. It also suggests that time spent on housework reduces innovation by women.

7. Each additional child or grandchild under age 6 (*Children under 6*) lowers the woman's wage. This is consistent with the patrilocality hypothesis, but with others as well. The caregiving burden limits women's engagement in outside work, which could otherwise foster innovation.

Male decision-making power, religious feeling, and long-term housework lower the wife's wages. However, co-residence, ethnicity, a nonlove marriage, and belief in a love marriage do not reduce her wages. Overall, cultural and economic factors favour the hypothesis more than marital and location factors do. Importantly, these findings underline how social structures influence women's capacity for innovative work and entrepreneurship.

Results from control variables (that is, independent variables that do not test the patrilocality hypothesis) are mostly unsurprising:

1. The wages are higher in an eastern region (*East*) because this area is farther from ethnic conflicts along the western and southern borders. Higher wages in these regions also reflect increased access to education and technology, fostering women's innovation potential.

2. As anticipated, women's incomes rise with higher education levels (*Schooling*), underscoring the beneficial effect of education on income. Education also gives women the tools they need to be innovative and entrepreneurial.

3. Work experience, which increases salaries at a rate that diminishes over time, is substituted for *Age*. The age-related coefficient is positive, which means experience boosts earnings, and the coefficient on Age^2 is negative, which indicates that this effect gets weaker over time. The adverse effects of ageing may outweigh any benefits for a woman. Alternatively, while experience is still valuable, its marginal benefits may be declining — possibly because there is a limit to the practical knowledge one can acquire. Also, older women with more experience might have greater potential to engage in household innovations or microentrepreneurship.

4. As the *Rural* coefficient is not statistically significant, salaries in rural areas are anticipated to be lower than those in urban areas. Because there are no industrial centers or urban job clusters like factories

and retail establishments in rural areas, one may anticipate lower pay there. This pattern, however, is only seen in OLS regressions, not in Tobit regressions (see Table 3). The primary distinction is that, since the majority of observed wages are zero, the Tobit model views zero wages as a typical value rather than an extreme one. According to the Tobit specification, the frequency of zero wages is comparable in rural and non-rural areas, supporting the idea that rural location has little bearing on earnings.

Table 3. Practical model: OLS and Tobit findings for the earnings and independent variables of married women

Wage	OLS		Tobit	
Love	–.22	(0.725)	–2.829	(0.147)
Loved	–.221	(0.920)	–7.005	(0.334)
Decision	–3.213**	(0.032)	–11.418**	(0.017)
Move	2.643	(0.729)	–21.562	(0.472)
Move*Love	–6.958	(0.260)	–12.03	(0.669)
Move*Loved	–10.506	(0.296)	–19.969	(0.650)
Chores	.739	(0.438)	2.244	(0.446)
Children Under 6	–1.696***	(0.000)	–5.354***	(0.001)
Schooling	2.273***	(0.000)	6.926***	(0.000)
Age	2.243***	(0.000)	11.205***	(0.000)
Age2	–.025***	(0.000)	–.126***	(0.000)
Kyrgyz	–1.386	(0.279)	–2.263	(0.572)
Religious	-4.248*	(0.076)	–8.853	(0.195)
Housework	–2.804***	(0.000)	–24.156***	(0.000)
Rural	–3.595***	(0.007)	–5.241	(0.203)
East	6.305***	(0.000)	15.311***	(0.000)
Constant	–45.077***	(0.000)	–315.769***	(0.000)
Sigma			71.546	
N	2682		2682	
Left-centered			1894	
R^2	0.1116***	(0.000)		
Pseudo R^2			0.0379***	(0.000)
Log likelihood			–5287.0887	

*Note — (i) only married females. (ii) Parentheses surround standard errors. * p<0.1; ** p<0.05; *** p<0.01.*
Source: Kovaleva's estimates using 2019 LIK data.

With a higher Adjusted R-squared, Table 4 represents a stronger but more condensed model. The percentage of people with no income has dropped from 70 % to 62 %, and the dataset is less than a fifth the size of that in Table 3. Every variable in this model is highly statistically significant at the 1 % level, with the exception of *Kyrgyz* ethnicity and *Religious*. At the 6 % level, the *Religious* variable is moderately significant. One finding defies previous conclusions: women in love marriages now earn more than predicted income, as indicated by the positive *Loved* coefficient.

Table 4. Practical model that is more robust and slimmer than Table 3: Tobit and OLS findings

Wage	OLS		Tobit	
Loved	13.177***	(0.002)	37.603***	(0.009)
Years of marriage	.877***	(0.000)	4.242***	(0.000)
Children Under 6	–3.642***	(0.000)	–18.748***	(0.000)
Schooling	2.297***	(0.000)	7.0***	(0.000)
Age	2.607***	(0.000)	11.679***	(0.000)
Age^2	–.0356***	(0.000)	–.163***	(0.000)
Kyrgyz	–6.329***	(0.004)	–8.071	(0.388)
Religious	14.857***	(0.007)	37.885*	(0.062)
Housework	–2.23***	(0.000)	–21.962***	(0.000)
East	8.799***	(0.000)	21.681***	(0.009)
Constant	–68.652***	(0.000)	–346.066***	(0.000)
Sigma			59.254	
N	576		576	
Left-centered			452	
R^2	0.2477***	(0.000)		
Pseudo R^2			0.1066***	(0.000)
Log likelihood			–807.36148	

*Note — (i) only married females. (ii) Standard errors are in parentheses. * p<0.1; ** p<0.05; *** p<0.01.*
Source: Kovaleva's estimates made by the author using 2019 LIK data.

A comparison of Table 4 to Table 3 yields several new findings.

1. A woman's earnings increase with the length of her marriage. This could be because her negotiating position strengthens over time (the positive coefficient on *Years of Marriage*). Kolpashnikova and Kan (2020) emphasize the importance of marital bargaining to determining how family duties and labour are divided. This improved bargaining power may allow women to explore innovative economic activities.

2. Interestingly, the strength of women's religious devotion is associated with their wages. All else equal, greater religious commitment may be a function of higher levels of self-discipline, which could positively impact productivity, earnings and innovation potential.

3. The OLS model's coefficients have the same signs and statistical significance as in the Tobit model (see Table 4). The only exception is that the Kyrgyz ethnicity is negative and significant in the OLS model.

This model generally supports the patrilocality hypothesis more consistently than the first one. This suggests that patrilocality matters but is not comprehensive in its effects. The low R-squared and pseudo-R-squared values buttress this conclusion.

A final prediction of the theoretical model is that housework decreases the wife's affection for her husband. Table 5 calculates the elasticity. Although a negative elasticity was predicted, it is positive, perhaps because a more loving wife is more inclined to help out around the house. The wife's willingness to perform household chores (*Ln Chores*) improves by 0.1 % for every 1 % increase in attachment. A longer marriage (*Years of marriage*) may decrease her affection, as may living with her husband's family (*Move*).

Table 5. Elasticity of affection concerning housework

Ln Affection	OLS	
Ln Chores	.105***	(0.008)
Loved	.0595	(0.296)
Decision	.0194	(0.541)
Move	–.497***	(0.003)
Years of marriage	–.006***	(0.000)
Rural	–.077***	(0.003)
Constant	2.048***	(0.000)
N	563	
R^2	0.0785***	(0.000)
*Note — (i) only married females. (ii) Parentheses surround standard errors. * p<0.1; ** p<0.05; *** p<0.01.* *Source: Kovaleva's estimates made by the author using 2019 LIK data.*		

In interpreting ***Ln Affection***, the authors evaluated the wife's level of happiness with her life via her answers to several questions in a survey. Of course, her happiness may depend on nonmarital factors as well as marital ones. A rural location may decrease her happiness.

Table 5 highlights how affection and shared responsibilities may foster a cooperative environment where women can innovate household practices.

Policy recommendations

The analysis suggests several policy recommendations to foster an environment conducive to gender equity and economic innovation. First, the government could develop educational programs that raise awareness about gender roles and the economic benefits of gender equity, based on Chen and Mace's (2023) insights into cultural constraints women face in patrilocal arrangements. Furthermore, the curriculum should be reformed to include gender studies and innovation to show the role of women in economic development. This would support the findings of Kolpashnikova and Kan (2020) on cultural expectations and their impact on labour allocation.

Second, grants and subsidies should be created for female entrepreneurs, especially in rural areas where traditional norms are more likely to prevail (Landmann, Seitz, & Steiner, 2018). Encourage microfinance and credit for women starting or growing businesses, and make sure that these financial products address the special needs arising from women's household duties.

Third, enforce laws prohibiting discrimination based on gender, specifically on issues of pay and job availability. Moreno-Colom (2017) notes that employment does not guarantee equal gender equality for women. Encourage technological enhancements that enable work from home, flexible working hours, and part-time work. This would help women to balance work and household responsibilities.

Fourth, promote and invest in labour-saving home technologies that reduce the time women and other caregivers spend on household chores so they can devote more time to earning an income. This would be a

positive effect of technological advancements in reducing gender-based labour disparities. Promote community-based projects that provide shared resources for domestic tasks, such as community laundries and childcare cooperatives.

The government could also partner with local community leaders and influencers to change cultural norms restricting women's economic participation. Kolpashnikova (2018) discusses the challenges that women face in traditional societies. Media campaigns could inspire young girls by celebrating women's achievements in the workforce and as innovators.

Periodically review gender-related policies to address the barriers to women's economic participation and innovation.

Support initiatives that enable rural women in community decisions. Encourage women's networks and associations to support and mentor women and advocate for their rights and market participation.

Finally, offer accessible and quality childcare options to enable women to work and become entrepreneurs. To help women manage work and family responsibilities, promote partnership with the private sector for workplace childcare facilities.

Based on recent studies and empirical evidence, one can conclude that these policy initiatives can eliminate socio-cultural and economic barriers preventing women from participating fully in the economy and innovating. They can also promote gender equality and economic growth in a culturally sensitive and effective way.

Limitations

This study has limitations due to data constraints and methodological issues. The cross-sectional data from a single country limits the ability to make causal inferences about other patrilocal contexts. "Innovation" and "economic participation" are hard to measure. Furthermore, the analysis assumes cultural homogeneity within Kyrgyzstan and does not analyze in detail regional differences or dynamics of change in household arrangements and gender roles.

Future research could benefit from longitudinal studies to understand causality and changes over time, and incorporate qualitative methodologies to enrich the understanding of cultural impacts on labour dynamics. The geographical scope could be expanded to include more countries with patrilocal traditions to increase the generalizability of the findings. Moreover, analyzing male and female roles within household structures might give a more comprehensive view of the interplay between gender, culture and economic participation.

Conclusion

The authors supported the current hypothesis with their previous research, which showed that household responsibilities and cultural norms limit women's economic and innovative capabilities in Kyrgyzstan (Kovaleva, Taylor, Pech, & Madumarov, 2025). Authors observed that the patrilocality hypothesis, which holds that living with the man's family makes the woman do more housework, is supported by the voluntary-marriage hypothesis, which asserts that women are likely to shoulder a greater share of domestic work in marriages they did not fully authorize.

Current empirical findings present a more nuanced picture. The patrilocality theory is refuted by the fact that women who reside with their spouse's family do not earn less money outside the home. However, the patrilocality notion is indirectly supported by the fact that women who spend more time on housekeeping earn less money outside the home. To build on these findings, future work should mitigate simultaneity bias by using lagged independent variables in the analysis to estimate causal effects more accurately. Future research should also examine how changes in cultural expectations and household structures affect economic outcomes and women's ability to engage in innovative and entrepreneurial activities, which can help develop society and the economy.

Across all models, compulsory marriage and patrilocality have a limited impact on determining a wife's wages and household responsibilities**.** However, the findings highlight the potential for household-level innovations, such as more equitable labour division and increased educational attainment, to enhance women's economic participation. As the broader literature consistently highlights, education and geographic location remain the most influential factors affecting women outside wages, shaping the division of household labour (Kovaleva, Taylor, Pech, & Madumarov, 2025). These findings show that family dynamics and socio-economic factors are intricately linked. Individual and couple-specific characteristics evolve, leading to changes in labour division.

Our last questions may be the most relevant: What difference does the type of marriage make? How does it influence a wife's labour allocation and opportunities to innovate? The initial labour division is primarily driven by expectations rooted in cultural norms. In cultures that expect women to spend most of their time on household duties, women are less likely to work in other occupations or start their own businesses. However, marriage can change over time. For example, after gaining experience in the outside world or negotiating more say in the family, the wife may move to a more active economic and innovative role.

The findings suggest two interesting paradoxes:

The productivity paradox: Although the number of hours worked decreases when a woman lives with her husband's family, her income does not always decrease. This makes it appear that wages may be more a function of productivity as well as personal traits like education and ethnicity than the household situation. In other words, the family environment may affect how much she works, but not how much she earns. This could suggest unrealized potential for innovation under the headings of household duties and economic activities.

The decision-making paradox: The husband takes control of home decisions, and his wife's working hours rise, but her wages drop dramatically, despite completing such chores as picking up her children from school and managing the household. She accepts long working hours and low wages without asking for better working conditions. Such factors are linked to intra-household power dynamics and hinder women as innovators.

Although patrilocality and marital arrangements may not directly determine women's economic outcomes, they bear on household labour dynamics. According to the findings, improvements in the home, such as collaborative decision-making, flexible work schedules, and easier access to education, may enhance women's overall well-being and engagement in the labour market.

In summary, the study partly confirmed the patrilocality hypothesis. The hypothesis predicts that living with the husband's family, or in a patrilocal household, is linked to lower incomes. But the study did not confirm his. On the other hand, lower earnings were indeed linked to childcare responsibilities (*Children under 6*), male decision-making authority (*Decision*), and home labor (*Housework*). The overall results support the broader theoretical logic of the patrilocality hypothesis: cultural and household dynamics restrict women's economic participation and innovation, even if co-residence with in-laws alone is not the direct cause.

Acknowledgments: *The study was funded by the Ministry of Science and Higher Education of the Republic of Kazakhstan (AP23487405). We also thank Annabel Benson for helpful comments.*

Data Availability Statement: *The data used is from the 2019 Life in Kyrgyzstan (LIK) panel survey. Available through the International Data Service Center of the Institute for the Study of Labour (IDSC IZA).*

References

Anderson, S. (2007). The economics of dowry and brideprice. *Journal of Economic Perspectives*, 21(4), 151–174. Retrieved from The Economics of Dowry and Brideprice — American Economic Association

Arabsheibani. G.R., Kudebayeva A., & Mussurov, A. (2021). A note on bride kidnapping and labour supply behaviour of Kyrgyz women. *Economic Systems, 45*(4), 100885. https://doi.org/10.1016/j.ecosys.2021.100885

Becker, C.M., Mirkasimov, B., & Steiner, S. (2017). Forced marriage and birth outcomes. *Demography*, *54*(4), 1401–1423. https://doi.org/10.1007/s13524-017-0591-1

Chen, Y., & Mace, R. (2023). Women work harder than men — our anthropological study reveals why. *The Conversation*. Retrieved from Women work harder than men — our anthropological study reveals why (theconversation.com)

Chen, Y., Ge, E., Zhou, L., Du, J., & Mace, R. (2023). Sex inequality is driven by dispersal. *Current Biology 33*(3), 464–473. https://doi.org/10.1016/j.cub.2022.12.027

Corno, L., Hildebrandt, N., & Voena, A. (2020). Age of marriage, weather shocks, and the direction of marriage payments. *Econometrica*, 88(3), 879–915. https://doi.org/10.3982/ECTA15505

Duxbury, L.E., & Higgins, C.A. (1991). Gender differences in work-family conflict. *Journal of applied psychology*, *76*(1), 60. https://psycnet.apa.org/doi/10.1037/0021-9010.76.1.60

Eissa, N., & Hoynes, H.W. (2004). Taxes and the labour market participation of married couples: the earned income tax credit. *Journal of Public Economics*, *88*(9-10), 1931–1958. https://doi.org/10.1016/j.jpubeco.2003.09.005

Farré, L., Jofre-Monseny, J., & Torrecillas, J. (2020). Commuting time and the gender gap in labor market participation. *IZA Discussion Papers*, 13213. https://dx.doi.org/10.2139/ssrn.3685824

Field, E., & Ambrus, A. (2008). Early marriage, age of menarche, and female schooling attainment in Bangladesh. *Journal of Political Economy*, *116*(5), 881–930. Retrieved from Early Marriage, Age of Menarche, and Female Schooling Attainment in Bangladesh | Journal of Political Economy: Vol 116, No 5

Flèche, S., Lepinteur, A., & Powdthavee, N. (2020). Gender norms, fairness and relative working hours within households. *Labour Economics, 65*, 101866. https://doi.org/10.1016/j.labeco.2020.101866

Foster, G., & Stratton, L.S. (2018). Do significant labour market events change who does the chores? Paid work, housework, and power in mixed-gender Australian households. *Journal of Population Economics, 31*, 483–519. https://doi.org/10.1007/s00148-017-0667-7

Haq, M., Ali, A., Ahmad, I., & Sajjad, W. (2023). Religiosity, gender attitudes, and women's labour market participation. *Nurture, 17*(1), 29–39. https://doi.org/10.55951/nurture.v17i1.147

Heath, R., & Tan, X. (2020). Intrahousehold bargaining, female autonomy, and labour supply: Theory and evidence from India. *Journal of the European Economic Association*, *18*(4), 1928–1968. https://doi.org/10.1093/jeea/jvz026

Karymshakov, K., & Sulaimanova, B. (2017). Migration impacts left-behind women's labour participation and time-use: Evidence from Kyrgyzstan (No. 2017/119). WIDER working paper. https://doi.org/10.35188/UNU-WIDER/2017/343-1

Kimmel, J. (1998). Child care costs are a barrier to employment for single and married mothers. *Review of Economics and Statistics*, *80*(2), 287–299. https://doi.org/10.1162/003465398557384

Kolpashnikova, K. (2016). Housework in Canada: Uneven convergence of the gender gap in domestic tasks, 1986–2010. *Doctor's thesis.* Vancouver, BC: University of British Columbia. https://doi. org/10.14288/1.0340502

Kolpashnikova, K. (2018). American househusbands: New time use evidence of gender display, 2003–2016. *Social Indicators Research*, *140*(3), 1259–1277. https://doi. org/10.1007/s11205-017-1813-z

Kolpashnikova, K., & Kan, M.-Y. (2020). Gender gap in housework: Couples' data analysis in Kyrgyzstan. *Journal of Comparative Family Studies, 51*(2): 154-187. Retrieved from https://utppublishing.com/doi/full/10.3138/jcfs.51.2.04

Kovaleva, I., & Taylor, L. (2023a). Why Do Women Work Harder Than Men? Testing the Patrilocality Hypothesis. *Qual Prim Care*, *31*, 31. Retrieved from https://www.researchgate.net/profile/Irina-Kovaleva-3/publication/378005014

Kovaleva, I., & Taylor, L. (2023b). A model of why women work harder than men. https://doi.org/10.21203/rs.3.rs-3191790/v1

Kovaleva, I., Taylor, L., Pech, G., & Madumarov, E. (2025). What household structure encourages innovation? Comparative analysis of a case study of female labor in Kyrgyzstan and Kazakhstan. *BUKETOV BUSINESS REVIEW*, 11730(1), 30–42.

Landmann, A., Seitz, H., & Steiner, S. (2018). Patrilocal residence and female labor supply: evidence from Kyrgyzstan. *Demography*, *55*(6), 2181–2203. https://doi.org/10.1007/s13524-018-0724-1

Micheletti, A.J.C., Ruxton, G.D., & Gardner, A. (2020). The demography of human warfare can drive sex differences in altruism. *Evolutionary Human Sciences*, *2*, 1–15. https://doi.org/10.1017/ehs.2020.5

Moreno-Colom, S. (2017). The gendered division of housework time: Analysis of time use by type and daily frequency of household tasks. *Time and Society*, *26*(1), 3–27. https://doi.org/10.1177/0961463X15577269

https://doi.org/10.31489/2025Ec1/54-65
ORIGINAL RESEARCH
Received: 21.12.2024| Accepted: 03.04.2025

JEL R23

Internal forced displacement in Ukraine as a challenge to social resilience

Olena Malynovska[1], Viktoriia Blyzniuk[2], Olena Borzenko[3]*, Liubov Yatsenko[4]

Abstract
The article examines internal displacement caused by large-scale aggression by the Russian Federation from the perspective of social resilience, which is a new approach. The humanitarian, economic, and social problems of displaced persons are systematized according to indicators that belong to generally accepted resilience assessment tools. The analysis led to the conclusion that forced migration is a serious challenge to stability at the level of individuals, communities, and society as a whole. In the context of a protracted war, the long-term solution to the problems of IDPs lies not only in creating conditions for their safe return to their places of permanent residence, but also in facilitating their integration into host communities. This is an extremely difficult task, which should be a priority for politicians and a subject of constant attention for civil society. Methodologically, the study is based on the use of historical, logical, comparative, and scientific abstraction methods.

Keywords: the factor of military confrontation, internal forced displacement, situation of IDPs, challenge to social resilience.

Introduction

The United Nations Office for Disaster Risk Reduction glossary defines resilience as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management" (UNDRR, 2015).

The term originated in the physical and natural sciences, has been widely used in medicine, psychology and ecology, and now increasingly is being used in economic, social and political research. The interest in studying the resilience of social actors is driven by the rapid changes taking place in the modern world, the increasing instability of political systems, the scale of financial crises, and the growing risks of natural and man-made disasters and military conflicts.

Social resilience is considered in the literature in three dimensions: as the ability of social actors to overcome various types of adversity; as the ability to adapt to challenges; and as the ability to transform, to create institutions that promote individual well-being and societal resilience in times of crisis (Keck, M., Sakdapolrak, P., 2013).

Researchers generally agree that the key to social resilience is mutual trust and support, which are influenced by informal social ties, as well as power relations, access to resources and information, and thus issues of equity, justice and human rights.

Increased global risks and hybrid threats, and aggravation of geopolitical confrontation increase the relevance of implementing the management concept of resilience. Starting from 2020, the European Commission has defined resilience as a "new compass of EU policy", characterized as the ability to maintain functionality and recover from shocks from various factors. Social resilience is considered in the literature as the ability of social actors to overcome various types of adversity (Keck, M., Sakdapolrak, P., 2013) and is characterized by the sustainability of functioning (Kozlovsky S.V., 2012); sustainability and flexibility (Bliznyuk V.V., Yatsenko L.D., 2025) and the availability of adaptive capabilities (Rodin, J., 2009). Recent studies have shown that the most important determinants of social sustainability are: accumulated human and social capital, industrial diversification, high export capacity and low financial constraints, i.e., comprehensive macroeconomic and financial sustainability of the system (Dube, J., PoleSe, M., 2016; Hijzeni, A.,

[1]National Institute for Strategic Studies, Kyiv, Ukraine, *malynovska@gmail.com*
[2]Institute for Economics and Forecasting of the NAS of Ukraine, Kyiv, Ukraine, *vikosa72@gmail.com*
[3]*Institute for Economics and Forecasting of the NAS of Ukraine, Kyiv, Ukraine, *slozko2003@ukr.net* (corresponding author)
[4]National Institute for Strategic Studies, Kyiv, Ukraine, *yatsenkol59@gmail.com*

Kappelerii, A., Paki, M., 2017). Social resilience, defined as the dynamic capacity of individuals, communities, and societies to successfully adapt to threats or significant hardships (Ungar, 2011, p. 15), is of critical importance in the context of forced displacement. In Ukraine, a large number of internally displaced persons (IDPs) is not only a consequence of the ongoing war, but also a significant factor affecting the social resilience of host communities.

For the theoretical search and practical implementation of measures to ensure social sustainability, it is important to be aware of the challenges they face and the risks they have to overcome. Without this, it is impossible to find adequate means to counteract the danger and achieve the necessary transformation of the social system, which would allow it to function successfully despite the negative factors affecting it.

It is quite clear that today the main challenge to social resilience in Ukraine is the full-scale aggression of the Russian Federation, the casualties and destruction it has caused, including the massive forced displacement of the population. The evacuation and flight of millions of citizens poses serious dangers to the forced migrants themselves, to their communities of origin and settlement, and to the country as a whole. To find the ways to ensure social sustainability — especially with regard to vulnerable groups, which certainly include IDPs — seems to be not only a scientific but also a political task.

The purpose of this article is to analyze the problems faced by IDPs, the challenges to their resilience and the resilience of society as a whole, the state's response to them, and possible further steps to address them.

The article provides an overview of the situation of war-related IDPs, the consequences of forced migration for individuals and communities, and the situation at the national level according to the main indicators included in the generally accepted resilience assessment tools, in particular the intensity of forced migration, property differentiation, risk of poverty and social exclusion, employment, gender gap in employment and income, meeting education and health needs, the level of social cohesion (European Commission, 2023).

The final part of the article is devoted to assistance to the affected population, i.e., targeted activities of the state and civil society, measures taken in response to the danger and aimed at ensuring social resilience, including assessment of the situation, accumulation of resources and development of a constructive approach to improving the situation of IDPs.

The purpose of the study is to substantiate the institutional architecture of ensuring social sustainability in the context of the spread of risks of forced internal displacement.

Methodology

The research methodology integrates historical, logical, comparative, and scientific abstraction methods to analyze how the spread of internal displacement influences social sustainability. The use of these methods, combined with empirical research, are important tools for a deep and comprehensive justification of the management tools of state social policy. The historical method is used to study the genesis and evolution of problems related to internal displacement and social resilience. The use of this method allows us to understand how approaches to supporting IDPs have changed, what historical events have influenced their situation, and what lessons can be learned from past experience. Building theoretical models, formulating hypotheses and drawing deductive conclusions about the relationship between various factors affecting social sustainability, substantiating cause-and-effect relationships and logical contradictions is possible through the use of logical and comparative methods. Methods of scientific abstraction involve highlighting the essential properties and relationships of the phenomenon under study, distracting from unimportant details. Using this method, the authors create theoretical constructs and concepts that reflect the key aspects of the impact of the phenomenon of internal displacement on social stability in a country in a state of protracted war.

Results

The forced displacement of people as a result of war and its massive scale is an obvious challenge to social stability. Internal displacement creates complex social challenges that put pressure on social resilience. Increases in population in host regions can put strain on infrastructure and resources, including housing, social services, and utilities. As noted by Berry (Berry, J.W., 1997), acculturation processes that occur during migration can be accompanied by social tensions and complications in intergroup relations due to differences in cultural norms, values and socioeconomic status. In addition, the influx of IDPs can cause economic imbalances, particularly in the labor market (Torosyan, Karine & Pignatti, 2018). The psychological effects of traumatic experiences should not be underestimated, both for IDPs who have experienced displacement and related losses, and for members of host communities who may experience secondary stress (Fazel et al., 2012).

Forced displacement of the population as a result of the war and its massive scale is an obvious challenge to social stability. The available data on the number of internally displaced persons (IDPs) is rather conditional and belongs to the category of estimates. Two main sources are usually used. The first is administrative data on the registration of citizens as IDPs, which is carried out by social services. However, it should be borne in mind that the possibilities for statistical accounting are limited in the context of war. Moreover, the situation is constantly changing. Some people have been able to return to their homes, while others are forced to flee the regions of hostilities. Moreover, some of the actually displaced persons do not officially register as IDPs, while others do not deregister after returning home. The second source is survey data and estimates based on it. In times of war, when face-to-face interviews are virtually impossible, sociologists communicate with respondents through various online platforms or by dialing randomly selected phone numbers. Thus, when using sociological survey data, it should be borne in mind that, firstly, the range of respondents is limited to those who use the Internet and mobile communications, and secondly, the destruction of infrastructure has led to communication disruptions in many regions, which reduces the likelihood of getting into the sample of their residents. At the same time, the surveys are the main source of information about the needs, problems and attitudes of IDPs.

The first wave of forced internal displacement occurred in Ukraine in 2014. As a result of the annexation of Crimea and the hybrid war which Russian Federation began in the part of territory of Donbas, approximately 1.5 million IDPs were registered. The full-scale invasion of the Russia on February 24, 2022 led to an increase in the number of internal forced migrants by approximately 3.6 million people. As of 2024, 4,9 IDPs were registered by relevant authorities (Ministry of Social Policy, 2024).

According to estimates based on the IOM forced migration surveys (from April 202217 rounds of such surveys have been conducted, which makes it possible to monitor the dynamics of forced displacement and the needs of IDPs), the number of Ukrainians who were forced to change their place of residence after February 24, 2022, was 3.7 million as of August 2024 (IOM, 2024a. The IOM estimates of the number of IDPs reflect the dynamics of forced displacement, which was most active in the spring of 2022, as well as the return of displaced persons, which significantly intensified in the summer of 2022 due to the liberation of some occupied territories, but slowed down with the onset of winter 2022-2023 as a result of massive enemy attacks on Ukraine's civilian infrastructure caused by the destruction of electricity and heat supply systems. Some increase in the number of IDPs was also observed in 2024 as a result of certain successes of the Russian army at the front and increased shelling of Ukrainian cities. (Fig. 1).

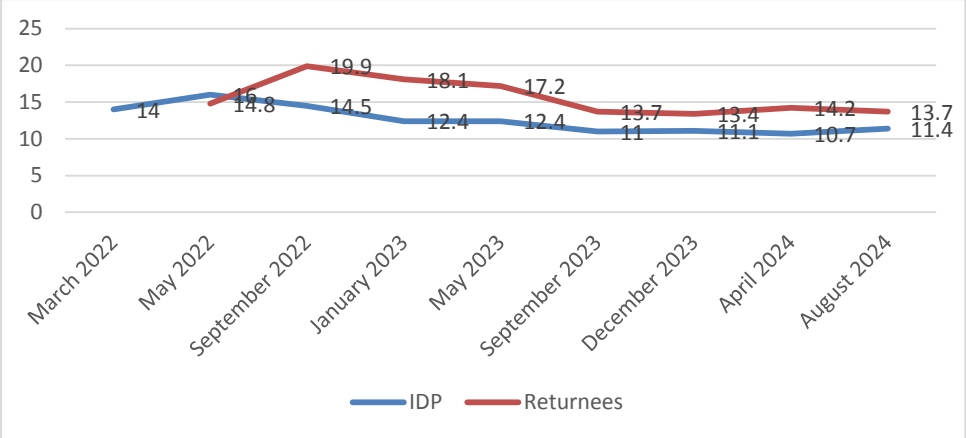

Figure 1. Share of IDPs and returnees in the total population of Ukraine according to IOM surveys from Round 1 (March 2022) to Round 17 (August 2024)

Note — compiled by the authors based on the source (IOM, 2024a).

Among citizens who found themselves in a situation of forced displacement after the beginning of the Russian invasion, 52 % are women, 48 % are men. A quarter of displaced persons (24 % each) are children or aged 60 or older (IOM, 2024a). IDP households are characterized by a high proportion of members belonging to vulnerable groups of the population. 29 % of them include disabled and 42 % chronically ill peo-

ple (IOM, 2024a). Thus, not only the scale, but also the composition of forced displacement poses a challenge to social resilience.

Institutions at the local level were often unprepared for the sudden increase in population. Communities that received large numbers of IDPs faced overloading of healthcare, education, housing infrastructure and social protection systems (Malynovska O., Yatsenko L., 2024). For example, in the western regions, the burden on schools has increased by 30–40 %, which has led to restrictions on access to quality education for local children. Internally displaced persons often have different social, economic, and cultural characteristics compared to the host population. According to a UNDP analytical report, more than 60 % of IDPs report difficulties in integration, including alienation, stigmatization or prejudice from local residents. Social cohesion is crucial for social resilience, as Putnam (Putnam R.D., 2007) emphasizes in his social capital theory. Loss of horizontal ties, trust and intergroup solidarity can lead to escalation of local conflicts, fragmentation of communities and reduced collective efficiency.

The institutional capacity of local governments is critical for social resilience, as, according to the Ostrom E. (Ostrom E., 2007), approach, it is local communities that have the potential to develop adaptive mechanisms for managing common resources. In the context of war, lack of funding, human resources and institutional fragmentation reduce the effectiveness of the response. In times of war, it is important to ensure the institutional capacity of not only host communities, but also communities close to the contact line.

It is important to note that since April 2022, when IOM began collecting information on returns, the share of returnees who assume that they will flee again if the situation changes has steadily decreased from 15 % to 5 % as of August 2024 (IOM, 2024b). People are gradually adapting to the conditions of protracted war. At the same time, returnees often continue to face the problems that led to their forced migration. According to an assessment of the conditions faced by returning IDPs conducted in the April-May 2024 (which analyzed the situation in 858 settlements according to five sets of indicators: livelihoods, destroyed housing, access to utilities and public services, security, and public life), in 40 % of the surveyed locations, a difficult situation for life has developed, primarily due to the slow recovery of the labor market and the closure of enterprises, which has severely limited employment opportunities; in 5 % of the surveyed settlements, the situation was assessed as extremely difficult. 75 % of returnees lived in settlements where about 40 % of the housing stock was damaged or destroyed as a result of the war, 59 % — where schools were affected, 43 % — medical institutions (IOM, 2024b). Thus, despite being at home, a significant number of returnees remain in a rather vulnerable situation. The challenge to their personal resilience and the resilience of the communities to which they return is not only the destruction and continued shelling, but also the fact of their prolonged absence (on average, returnees were in an IDP situation for 750 days), which affected the reliability of social ties, employment and sources of income, continuation of education etc.

The issue of integration is becoming more and more important with the passage of time, since in the conditions of a protracted war, the length of stay of people in the situation of IDPs is increasing, and at the same time, the share of IDPs who do not plan to return to their previous places of residence and will build their lives in a new place is increasing. Thus, according to the IOM survey, although the majority of IDPs plan to eventually return home, the share of such persons is gradually decreasing. It was 77 % in August 2022 and 62 % in September 2023. On the other hand, the share of those who plan to integrate in their current place of stay almost doubled during the year. It was 10 % in August 2022 and 18 % in September 2023 (IOM, 2023c). In August 2024 there were 32 % IDPs who plan to integrate in their current place of settlement, majority of them in the city of Kyiv, Kyiv and Dnipropetrovsk regions (IOM, 2024a).

One of the most obvious and dangerous consequences of forced displacement for social sustainability is the sudden poverty of many IDPs, not only those with the lowest incomes but also the middle class, and the deepening of wealth inequality. The World Bank estimates that the level of extreme poverty (consumption of less than $6.85 per day) in Ukraine increased from 5.5 % in 2021 to 24.1 % in 2022, adding 7.1 million poor people (World Bank, 2023). In the context of the war, due to the loss of property and jobs, inflation and rising prices, 65 % of Ukrainian households have seen their incomes decline, but among internally displaced persons and IDPs who have returned to their places of residence, the share of households whose incomes have declined is even higher — 74 % and 73 %, respectively (REACH, 2023a).

According to a survey of IDPs living in Kyiv, Dnipro and Lviv, the largest cities in Ukraine that have received significant numbers of IDPs, the majority of IDPs (46 %) live in poverty, with enough money only to buy food and other essential goods. Almost a quarter (23 %) are below the poverty line and do not always have enough money even for food. Despite the poor financial situation of many Ukrainians who have not been displaced, their situation is still better: 8 % are below the poverty line and 38 % have enough money to

buy only food (Bondarenko, P., 2023). Other studies confirm this situation. The World Bank estimates that one in four non-displaced Ukrainian households and one in three displaced households face the problem of malnutrition (World Bank, 2023).

Loss of housing is a major factor of poverty. According to the IOM survey, almost half of IDPs (47 %) had their homes destroyed or damaged as a result of the war. At the same time, only 8 % of the non-displaced population reported losing their property (IOM, 2023c). The majority of IDPs are forced to live in temporary shelters provided by local authorities or volunteers, or are staying with relatives or friends. The aforementioned survey in Kyiv, Dnipro and Lviv showed that 27 % of IDPs rented housing, while 10 % of locals rented, and 1.5 % of IDPs and 81 % of locals owned their own housing. Only 45 % of IDP households could afford to rent without government assistance, while housing subsidies are much lower than rents in many regions (Bondarenko, P., 2023).

In a context of widespread poverty, the main source of income for a significant proportion of IDPs (22 %) is government assistance to IDPs (their share is significantly higher for households with children, a third (30 %) of whom are primarily dependent on IDP assistance, and for households consisting only of women (28 %)) (IOM, 2023b). Only 38 % of IDPs relied on wages as their main source of income, compared to 51 % of the non-displaced population.

Roughly the same results were found in a survey conducted by REACH, an organization whose mission is to provide adequate information for an appropriate response to humanitarian crises. According to the survey, about half of all IDP households surveyed relied on humanitarian aid (45 %) and government social assistance (44 %), while only 26 % relied on salaries (REACH, 2023b).

The difficult financial situation of IDPs is largely the result of job losses and difficulties in finding employment in new locations. IOM research shows that only 45 % of working-age IDPs reported being employed, compared to 74 % before the full-scale invasion. The unemployment rate among IDPs is higher than among the non-displaced population. Among IDPs who had a job before the invasion and were unemployed at the time of the survey, 91 % cited the current war as the reason for their unemployment (IOM, 2024c).

This situation is confirmed by other studies. According to the aforementioned survey in Ukraine's largest cities 45 % of IDPs are employed, while 64 % of local residents are employed. The employment gap between these two groups is smallest among young people aged 18–29, at just 6 percentage points, and largest among those over 50, at 41 percentage points — indicating that older IDPs face the most disadvantaged position in the labor market. (Bondarenko, P., 2023).

As of fall 2022, 22.5 thousand internally displaced persons (IDPs) were officially registered as unemployed. As of December 2023, amid some adjustment of the labor market to the war and a general decrease in the number of unemployed, it has more than halved. At the same time, the share of IDPs among the registered unemployed remains unchanged and stable at 8-9 percent. The number of unemployed IDPs increased in 2024 again. Their number in September 2024 reached 22.9 thousand. In the last period the share of IDPs among the registered unemployed increased to 22.3 percent (Fig. 2).

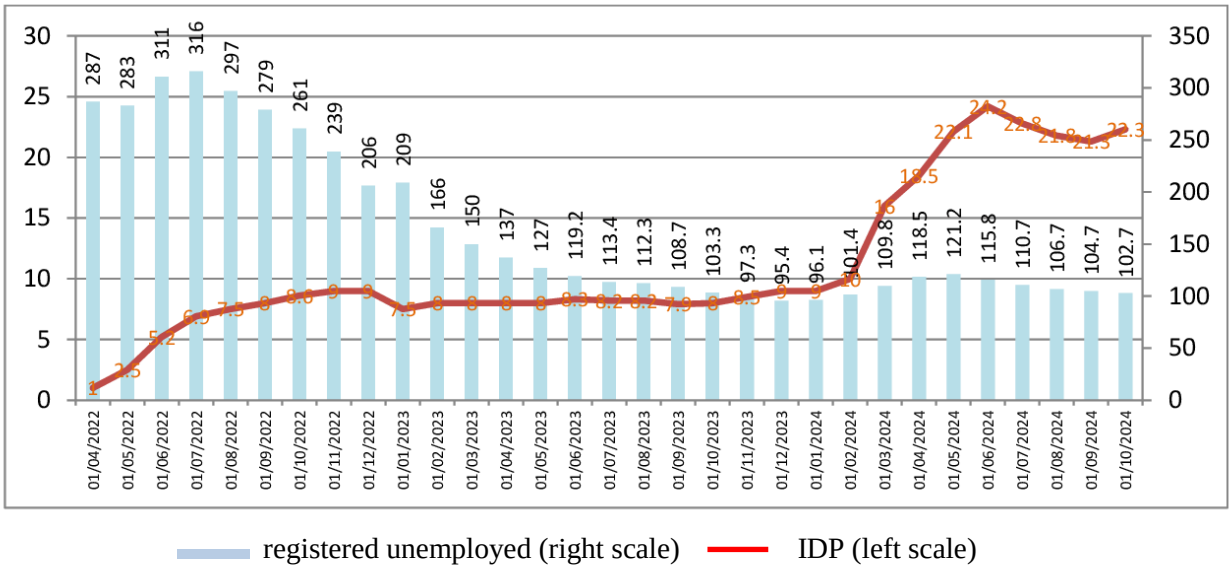

Figure 2. The number of officially registered unemployed, the people, and the share of IDPs among them, %.
Note — compiled by the authors based on the source (State Employment Service).

The level of employment of IDPs remains low. Only 50 percent of the officially registered unemployed will be employed in 2024.

Forced migrants are also prominently represented among those who had to change jobs after February 2022, switched to informal work, or had their salaries reduced (REACH, 2023a).

An analysis of IDPs' requests based on data from the job search portal "robota.ua" shows that the main obstacles to employment of IDPs are low salaries for the vacancies offered, employers' reluctance to hire IDPs for fear that the employee will soon return home, lack of vacancies, regardless of the level of education and experience, lack of professional skills or irrelevance of the profession (Judicial and legal newspaper in Ukraine, 2023).

Some informants reported that their IDP status prevented them from holding certain positions, such as those related to fiscal responsibilities (as such jobs require a permanent residence address). Another obstacle was the problem of confirming work experience due to the lack of necessary documents. In some cases, difficulties arose because employers feared that they would not be able to dismiss IDPs who, in their view, enjoyed certain benefits (REACH, 2023a). In 2024, among respondents who were unemployed and actively looking for a job, 76 per cent reported a scarcity of jobs in their region that matched their interests, experience or skills, 71 per cent indicated that the labor market in their region is not functioning because of the war. Moreover, more than 50 per cent of respondents reported receiving informal employment offers and 40 per cent reported discrimination based on age (IOM, 2024c).

Thus, the situation of IDPs in the labour market has a negative impact on the efficiency of the use of the country's labour potential, on the level of informal employment, exacerbates the problem of poverty and social exclusion, and thus poses a serious challenge to the sustainability of society. It also poses a serious challenge to resilience at the individual level, reducing self-esteem, increasing the risk of depression, and thereby worsening the prospects for overcoming difficulties. Studies of the long-term effects of forced displacement in Georgia, show that the labor market situation of IDPs is much worse than that of the local population, even twenty years after displacement. Georgian researchers have found that IDPs from Abkhazia and South Ossetia are 3.9 to 11.2 percentage points less likely to be employed, 11.6 percentage points more likely to be unemployed, and consistently receive lower wages than locals with similar qualifications (Torosyan, K., Pignatti, N., Obrizan, M., 2018).

At the same time, it should be emphasized that, according to the IOM survey, 16 % of IDPs are actively looking for work (IOM, 2024c). Thus, IDPs have a significant labor potential that they want to realize, but need support from society and the state.

As a result of the events that led to forced migration and the difficulties of living in new places of residence, forced migrants are exposed to negative consequences for their mental and physical health. Their condition is affected by poverty, unemployment, separation from their familiar environment, social isolation, etc. Constant stress leads to mental disorders. In the Human Impact Assessment of the war, 16 % of IDP households reported that at least one member of the household was too depressed or anxious to carry out normal daily activities (REACH, 2023a). Medical examinations at the IDP shelter in Lviv revealed that 31.5 % of patients suffered from post-traumatic stress disorder, 31.5 % from depression, 11.1 % from anxiety disorder and 1.5 % from psychosis. The level of mental disorders among IDPs was significantly higher than among the non-displaced population (Rizzi, D. et.al., 2022). Physical health also suffers from stress. IDPs reported sleep problems, poor and inadequate nutrition, and aggravation of chronic diseases.

Negative coping strategies, such as reduced consumption and total austerity, lead to the postponement of necessary treatment, with all the negative consequences for health and quality of life. At the same time, IDPs' access to health services is hampered not only by displacement, but also by the objective situation in the health sector, including the destruction of the sector's infrastructure and the lack of staff due to the departure of many workers abroad. It is estimated that the damage to medical facilities and the influx of IDPs have doubled the workload of medical facilities in some regions (Pandeya, A. et al., 2023). People with health problems are particularly vulnerable in this situation. According to ACAPS, a non-governmental, non-profit organization dedicated to providing evidence-based analysis of humanitarian crises, more than 920,000 IDPs suffered from cardiovascular disease, at least 200,000 from diabetes, more than 34,000 from cancer, about 30,000 from HIV, and about 4,500 from tuberculosis (Pandeya, A. et al., 2023). According to the third round of the World Health Organization survey, conducted in April 2023, although the situation had improved significantly compared to the first months of the war, IDPs still faced significant difficulties in accessing health

care. 16 % of IDPs did not have access to a family doctor, mostly because they did not register in their new place of residence, compared to only 4 % of the non-displaced population (World Health Organization, 2023). The deterioration of health and inadequate access to health services is a serious challenge to the resilience of the population in times of war, which will inevitably affect the resilience of society as a whole, its ability to cope with the hardships caused by war and to ensure post-war recovery. It will have long-term consequences, affecting the average life expectancy, the duration of labor activity, and the reproductive function of the population, thus exacerbating an already difficult demographic situation.

In addition to health issues, educational issues are extremely important for the future of IDP children. According to a REACH assessment of the education sector in the regions affected by war, 41–60 % of pupils and students and 77 % of teachers and lecturers were forced to leave the Donetsk and Kherson regions as a result of the hostilities (REACH, 2023b). According to the Ministry of Education and Science of Ukraine, in the academic year 2022/2023, more than 167,000 internally displaced children continued their education in functioning secondary education institutions, but it is not certain that all displaced children continued their education (Educational Ombudsman of Ukraine, 2022). Children who have been displaced within Ukraine have experienced disruptions in their education and educational losses due to displacement, and as a result of the stress they have experienced, their motivation to learn has been reduced. Adapting to a new educational institution and establishing communication with teachers and peers is a serious challenge for them.

In the IOM survey (Round 12, January 2023), 17 % of IDP households reported a lack of access to education for children (IOM, 2023a). As schooling has largely moved online since the outbreak of the war, the most common problems were the absence or poor quality of the internet (45 %) and the lack of online devices necessary for learning, i.e., personal computers, laptops, smartphones (10 %), as well as the complete absence of learning opportunities due to evacuation, displacement, staying in a shelter, etc.

The educational problems of students in the context of forced migration are compounded by the problems of teachers who have also been displaced but continue to work. IDP teachers are more likely than their non-displaced counterparts to report that they are unable to teach the full curriculum (43 % vs. 25 %) and that they have to cancel classes due to lack of electricity and/or internet (64 %).

The lack of adequate conditions for IDP children to receive the education necessary for socialization and self-realization significantly impairs their ability to overcome difficulties and adapt to life in a new place, to become full members of the community and society as a whole.

Another challenge to social security as a result of massive forced displacement is the widening gender gap. Women with children, who make up the majority of IDPs, are a more vulnerable group of displaced persons. As a result of forced migration and mobilization of men to the army, many families have been divided, and many women have become the sole breadwinners. 52 % of IDP women reported a loss of income compared to 31 % of women who were not displaced, 48 % of IDP women and 36 % of women in general experienced physical and mental health problems (BBC, 2023). A study on the economic activity of IDP women and their strategies to restore their well-being, conducted in the spring of 2023, found that the financial situation of displaced women is often extremely unsatisfactory. 59 % of IDP women are forced to save money to meet basic needs such as food and clothing, while 51 % of local women, 40 % of IDP men, and 35 % of local men do so. The worst situation is in the east of the country, near the frontline, where 75 % of IDP women have to save on the most basic needs. IDP women are the most dependent on social benefits and humanitarian aid: on average, 59 % of their family budgets are social benefits and humanitarian aid, compared to 42 % for IDP men, 44 % for local women, and 36 % for local men (Deutsche Gesellschaft für Internationale Zusammenarbeit, 2023).

The study also documented the increased vulnerability of IDP women in the labor market. Half of IDP women lost their jobs as a result of the Russian aggression, compared to 28 % of IDP men and 20 % of the local population. At the time of the survey, only 31 % of IDP women were employed, compared to 59 % of IDP men and 45 % of local women (Deutsche Gesellschaft für Internationale Zusammenarbeit, 2023). The proportion of women employed part-time has increased significantly. This is because children's institutions and schools are not functioning as usual, or it is difficult to enroll a child in a kindergarten in the places of residence due to overcrowding, which does not allow mothers to work full time. One in ten unemployed IDP women reported that they could not find a job due to poor mental health, depression and apathy. About the same proportion of unemployed women reported discrimination, as employers sometimes fear that women with children will be absent frequently due to their children's illnesses.

During the war, Ukrainian society demonstrated an unprecedented level of cohesion, mutual trust, and cooperation. According to opinion polls, massive forced displacement has not had a significant impact on

social cohesion. According to the SHARP assessment conducted at the end of 2022, 80 % of Ukrainians rejected the statement that tensions exist between IDPs and host communities, confirming the high level of compassion and willingness to help fellow citizens who were forced to leave their homes against their will. However, there were some tensions in the regions receiving large numbers of IDPs. These were related to access to basic necessities, public services and housing, and were fueled by certain stereotypes about the specific characteristics and political preferences of the inhabitants of the east of the country, who make up the majority of IDPs (UNDP, 2023a).

The second wave of the Resilience Assessment of the Ukrainian Population (June 2023) confirmed that the level of tensions caused by forced migration between IDPs and host communities remains low (UNDP, 2023b). However, it is worth noting that IDPs, returnees and the non-displaced population assess the situation differently. For example, 18 % of IDPs perceived tensions, compared to 14 % of local residents, once again confirming the increased vulnerability of forced migrants. It is also alarming that 11 % of returnees reported feeling tension, which means that not only the arrival of large numbers of new people in communities, but also the return of IDPs to their homes is a challenge to social unity. According to the 14th round of the IOM survey (August 2023), 48 % of returnees lived in settlements where residents were somewhat or very concerned about the level of tension in their communities (IOM, 2023d).

Most often, tensions arise in relation to the distribution of humanitarian aid, social assistance or compensation schemes, and are based on the perception of non-displaced people, especially vulnerable groups, that IDPs are unfairly receiving financial assistance and certain benefits. For example, a survey aimed at identifying opportunities and obstacles to the integration of IDPs revealed that 70 % of local residents believe that the authorities are more concerned with the needs and problems of IDPs than with those of the local population (at the same time, IDPs believe that the authorities pay equal attention to all) (Public space, 2023). Other sources of tension include the real or perceived antisocial behavior of newcomers, accusations that male IDPs are evading military service, especially when many locals are at the front, and cultural or linguistic differences. Researchers who have studied the situation of IDPs in Kyiv, Dnipro and Lviv have found that locals expect IDPs to be more socially active, make greater efforts to settle down and take more responsibility for their lives (Bondarenko, P., 2023).

Confusion, apathy, which is a consequence of a traumatic experience, on the one hand, becomes an obstacle to the adaptation of the new arrivals and their transformation into full-fledged members of the host communities, and on the other hand, it prevents adequate perception of forced migrants by local residents. Thus, 13 % of IDPs interviewed in Kyiv, Dnipro and Lviv reported that they faced negative attitudes from the local population. 6 % of respondents felt prejudiced by representatives of state institutions or local authorities, and 10 % complained that they were denied employment due to the fact that they are internally displaced persons (Bondarenko, P., 2023). Although these indicators are insignificant, they should not be neglected. Cases of discrimination against IDPs do occur. At the same time some displaced persons rely on assistance but are slow to make efforts to find work, study or retrain if needed.

Nevertheless, it should be emphasized that during the above-mentioned survey of IDPs in the three largest cities of Ukraine, when asked whether they feel like full-fledged members of the community in which they live, 72 % answered “yes”, which is a rather encouraging indicator. After all, the main condition for preserving social unity in the situation of mass forced displacements caused by war is, of course, the integration of IDPs in new places of residence or reintegration in the case of returning home, that is, finding a long-term solution for the affected population.

It is important to note that despite the problems common to all IDPs, persons who decided to integrate in their places of stay, i.e., thus already took a step towards improving their lives, stated that their circumstances were more favorable than those of resettled people in general. Thus, 22 % of IDPs determined to integrate are unable to cover basic costs, compared to 26 % of all IDPs. A high level of lack of access to adequate housing was noted by 15 %, an average level — by 12 % of integration-oriented respondents, and 18 % and 14 % of the total. A high level of improper access to food was noted by 6 % and average level by 10 % of IDPs oriented to integration and 7 and 13 %, respectively, of the total (IOM, 2023b). At the same time, forced migrants focused on long-term residence in the places of settlement, as well as IDPs in general, noted a high risk of inability to participate in public life — 26 %, which indicates an insufficient level of integration of arrivals into local communities (IOM, 2023c).

Massive internal displacement is not only a humanitarian challenge, but also a systemic problem for Ukraine’s social sustainability. It requires not only protection policies, but also active investment in the adaptation, integration and human capital development of IDPs. A resilience-oriented approach should combine

institutional, economic, social and cultural interventions, with an emphasis on inclusiveness, mutual responsibility and a long-term vision of social resilience (Fig. 3).

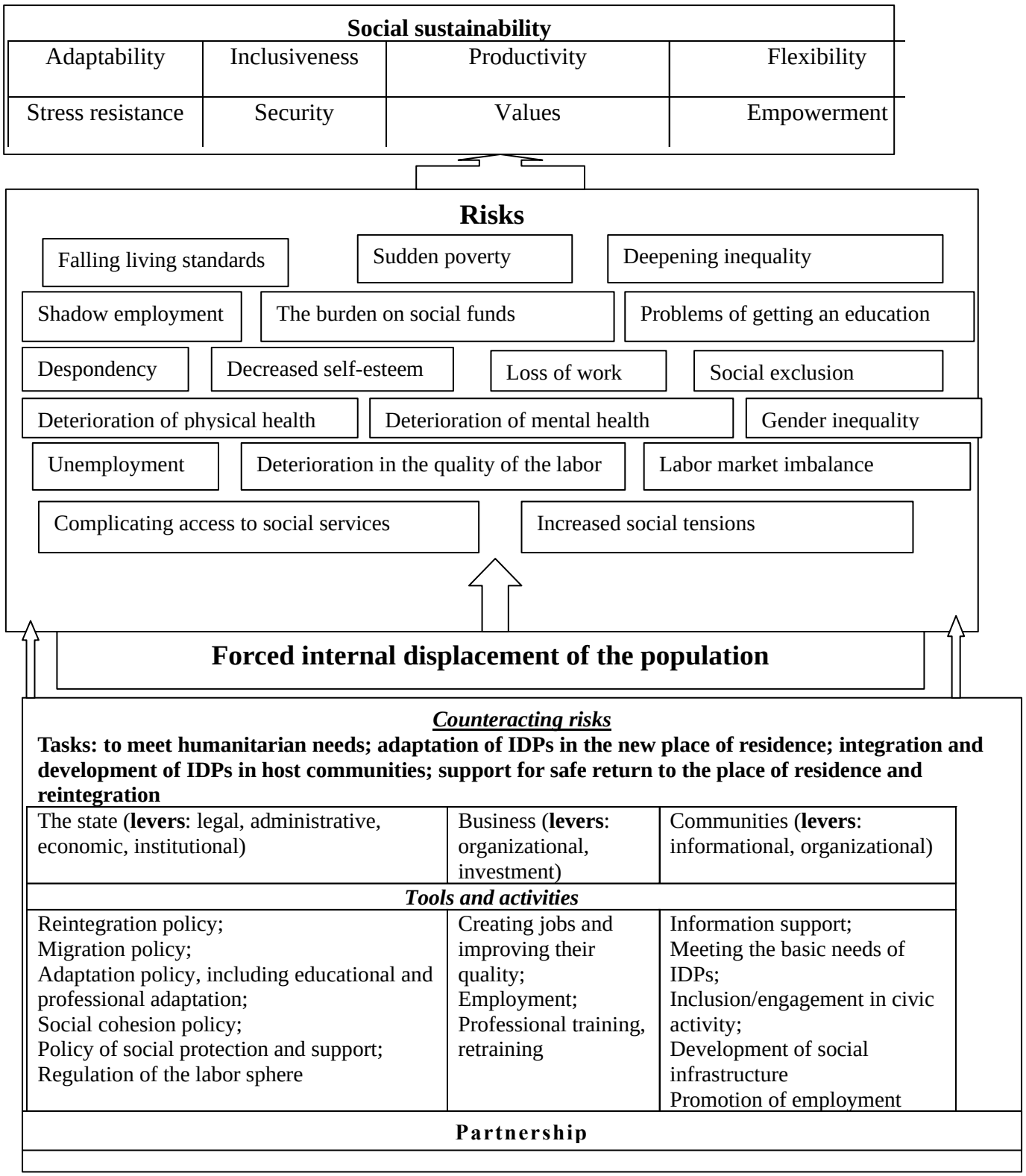

Figure 3. Cognitive scheme of the impact of the risks of forced internal displacement on the formation of social resilience

Note — compiled by the authors

An effective response to the risks of forced internal displacement and the use of IDPs' potential to strengthen social resilience requires coordinated work of various institutional actors. The architecture of the social resilience system includes the following structural elements:

– **economic socialization,** which will ensure IDPs' access to the labor market and economic opportunities. The state develops employment programs, local governments facilitate employment at the local level, international organizations support vocational training, and NGOs provide counseling;

– **flexibility of the labor market and labor relations,** which expands the opportunities for active involvement of IDPs in economic activities in host communities;

– **adaptability,** which will ensure the integration of IDPs and the readiness of host communities to change. The state supports educational programs, local governments develop flexible local initiatives, international organizations promote the development of life skills, and NGOs provide information support;

– **inclusiveness,** which should ensure the creation of an environment of equal opportunities and respect for the rights of IDPs. The state enforces anti-discrimination legislation, local governments implement inclusive local programs, international organizations monitor the observance of rights, and NGOs are engaged in advocacy and overcoming stereotypes;

– **psycho-emotional resilience,** which means ensuring access to psychological support and assistance in overcoming traumatic experiences. The state creates national programs, local governments open local centers, international organizations provide financial support, and NGOs provide free counseling and support groups;

– **productivity,** which encompasses not only economic efficiency but also quality of life, personal development, and general well-being, as productive employment, productive work, and decent remuneration for it are the basis for quality of life, while a person succeeds not only through external incentives but also through interest in activities and a sense of autonomy, where intrinsic motivation and all-round development are important aspects;

– **security,** namely: building a reliable system to protect people and the environment from the impact of hazards and prevent social risks;

– **empowerment**, which is one of the key principles of the Human Development Concept and means creating favorable conditions for IDPs to maximize their potential within their needs and interests, to acquire knowledge and have access to the necessary resources to ensure decent living conditions.

Social resilience in the context of internal displacement is a complex and multifaceted process that requires concerted efforts by all levels of government and civil society. An effective architecture of institutional response involves not only providing assistance, but also creating conditions for economic socialization, developing flexibility and adaptability, ensuring inclusiveness and supporting the psycho-emotional resilience of IDPs. Understanding the priorities and specific ways to minimize the risks associated with forced displacement and overcome their consequences is one of the most pressing and urgent tasks of modern Ukraine. Its solution is a prerequisite for ensuring social sustainability. The complexity and scale of this task requires a systematic approach, which primarily implies the coordination of actions of the state, business and communities. Formation of an effective risk management mechanism in these conditions will help to neutralize, prevent or reduce the impact of unforeseen or underestimated negative events on society.

Further research should be aimed at assessing the effectiveness of existing programs and developing new approaches to strengthen the social resilience of both IDPs and host communities in Ukraine.

Conclusion

Finding an adequate response to the challenges posed by the forced internal displacement of the population is a prerequisite for the viability of the Ukrainian state, its ability to withstand the war and successfully recover after it ends. In the short term, the state's priorities should be to create legal, economic, institutional, investment and information conditions to meet the humanitarian needs of IDPs, their adaptation and integration in host communities, and their safe return to their places of origin. The realization of this task is directly related to the restoration and putting the economy on a sustainable growth path and ensuring productive employment, restoration of housing and civil infrastructure, job creation, and access to social services on this basis. The state plays a key role in its implementation. State policy should be aimed at developing and unlocking people's potential through technology; focusing on the human component of sustainable development; creating the work environment of the future; and ensuring inclusiveness, equality, justice and diversity. An important prerequisite for the successful implementation of these tasks is the effective development of

social partnership, as the partnership between the state, business and communities ensures social dialogue and intensifies social responsibility in solving problems.

References

BBC. (2023). Women in Ukraine: What key problems do they face? *bbc.co.uk.* Retrieved from https://www.bbc.co.uk/mediaaction/documents/bbc-media-action-research-briefing-key-issues-ukrainian.pdf [in Ukrainian].

Berry, J.W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*(1), 5–34. Retrieved from https://doi.org/10.1080/026999497378467

Bliznyuk V.V., & Yatsenko L.D. (2025). Labor Market Sustainability: Modern Challenges and Tasks. *Actual Problems of Economics*, 2 (284), 127–136. DOI: 10.32752/1993-6788-2025-1-284-127-136 [in Ukrainian].

Bondarenko, P. (2023). Assessment of the level of integration of IDPs in Kyiv, Lviv and Dnipro communities. *dif.org.ua*. Retrieved from https://dif.org.ua/uploads/pdf/17999418164b50c59079022.65476063.pdf [in Ukrainian].

Deutsche Gesellschaft für Internationale Zusammenarbeit (2023). Research of the economic activity of IDP women and their strategies regarding the restoration of the source of income. *sapiens.com.ua*. Retrieved from https://www.sapiens.com.ua/publications/socpol-research/266/ISInt_IDPs_women_report.pdf

Dube, J., & PoleSe, M. (2016). Resilience Revisited: Assessing the Impact of the 2007–09. Recession on 83. Canadian Regions with Accompanying Thoughts on an Elusive Concept. *Regional Studies, 50*(4), 615–628.

Educational Ombudsman of Ukraine (2022). Where and how do Ukrainian children study during the war: problems, suggestions, recommendations. *znayshov.com.* Retrieved from https://znayshov.com/News/Details/de_i_Yak_navchaiutsia_ukrainski_dity_v_chasy_viiny_problemy_propozytsii_rekomendatsii [in Ukrainian].

European Commission (2023). Resilience Dashboards Update. Spring 2023. *jeodpp.jrc.ec.europa.eu.* Retrieved from https://jeodpp.jrc.ec.europa.eu/ftp/jrcopendata/RESILIENCEDASHBOARDS/Spring2023Update/Dashboard_SpringUpdate_2023.pdf

Fazel M, Reed RV, Panter-Brick C, & Stein A. (2012). Mental health of displaced and refugee children resettled in high-income countries: risk and protective factors. *Lancet, 379*(9812), 266–282. https://doi.org/10.1016/S0140-6736(11)60051-2

Hijzeni, A., Kappelerii, A., Paki, M., & Schwellnusi, C. (2017). Labour market resilience. The role of structural and macroeconomic policies. *OECD*, 1406, 1–38. https://doi.org/10.1787/d5c950fc-en

IOM (2023a). Ukraine Internal Displacement Report. General Population Survey. Round 12 (January 2023). *dtm.iom.int.* Retrieved from https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/IOM_Gen%20Pop%20Report_R12_IDP_FINAL_0.pdf.

IOM (2023b). Ukraine Internal Displacement Report. General Population Survey. Round 13 (June 2023). *reliefweb.int.* Retrieved from https://reliefweb.int/report/ukraine/iom-ukraine-internal-displacement-report-general-population-survey-round-13-june-2023

IOM (2023c). Internal Displacement Report. General Population Survey. Round 14 (September — October 2023). *dtm.iom.int.* Retrieved from https://dtm.iom.int/reports/ukraine-internal-displacement-report-general-population-survey-round-14-september-october

IOM (2023d). Evaluation of Condition for Return Information. Bulletin. Round 14. (August 2023). *dtm.iom.int.* Retrieved from https://dtm.iom.int/reports/ocinka-umov-povernennya-informaciyniy-byuleten-raundu-4-serpen-2023-roku [in Ukrainian].

IOM (2024a). UKRAINE INTERNAL DISPLACEMENT REPORT GENERAL POPULATION SURVEY ROUND (17 August 2024). *dtm.iom.int.* Retrieved from https://dtm.iom.int/reports/ukraine-internal-displacement-report-general-population-survey-round-17-august-2024

IOM (2024b). Ukraine Returns Report. General Population Survey. Round 17. (August 2024). *dtm.iom.int.* Retrieved from https://dtm.iom.int/reports/ukraine-returns-report-general-population-survey-round-17-august-2024

IOM (2024c). Ukraine Thematic Brief. Economic Resilience in Wartime: Income, Employment and Social Assistance in Ukraine (April 2024). *dtm.iom.int.* Retrieved from https://dtm.iom.int/reports/ukraine-thematic-brief-economic-resilience-wartime-income-employment-and-social-assistance? close=true

Judicial and legal newspaper in Ukraine (2023). More than 56 % of IDPs do not have a job and are actively looking for one — survey results. *sud.ua.* Retrieved from https://sud.ua/ [in Ukrainian].

Keck, M., & Sakdapolrak, P. (2013). What is Social Resilience? Lessons Learned and Ways forward. *researchgate.net.* Retrieved from https://www.researchgate.net/publication/235989714_What_Is_Social_Resilience_Lessons_Learned_and_Ways_Forward

Kozlovsky S.V. (2012). Theoretical and methodological approaches to determining the sustainability of economic systems. Collection of scientific works of VNAU. *Economic Sciences*, 106–110 [in Ukrainian].

Malynovska, O.M., & Yatsenko, L.D. (2024). Social consequences of forced internal displacement in Ukraine. Problems of modern transformations. *Series: Economics and Management*, 11. https://doi.org/10.54929/2786-5738-2024-11-07-01 [in Ukrainian].

Ministry of Social Policy (2024). Internally displaced persons. *msp.gov.ua.* Retrieved from https://www.msp.gov.ua/timeline/Vnutrishno-peremishcheni-osobi.html [in Ukrainian].

Ostrom, E. (2007). Multiple Institutions for Multiple Outcomes. A. Smajgl and S. Larson (Eds.). In *Sustainable Resource Use: Institutional Dynamics and Economics*, 23–50. London: Earthscan.

Pandeya, A. et al. (2023). Disease burden among Ukrainians forcibly displaced by the 2022 Russian invasion. https://www.pnas.org/doi/10.1073/pnas.2215424120

Putnam, R.D. (2007). E Pluribus Unum: Diversity and community in the Twenty-First Century, The 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies, 30*(2), 137–174. https://doi.org/10.1111/j.1467-9477.2007.00176.x

Public space (2023). Presentation of the results of the study "Attitudes, challenges and opportunities of integration of IDPs." *prostir.ua.* Retrieved from https://www.prostir.ua/? news=prezentatsiya-rezultativ-doslidzhennya-stavlennya-vyklyky-ta-mozhlyvosti-intehratsiji-vpo [in Ukrainian].

REACH (2023a). Human impact assessment. *undp.org.* Retrieved from https://www.undp.org/sites/g/files/zskgke326/files/2023-09/undp-ua-hia-3.pdf

REACH (2023b) Arrival and Transit Monitoring. *impact-repository.org.* Retrieved from https://www.impact-repository.org/document/reach/a1c818c6/UKR2208_REACH_ATM_Round-6_Factsheet_February2023.pdf

Rizzi, D. et.al. (2022). Running Away from the War in Ukraine: The Impact on Mental Health of Internally Displaced Persons (IDPs) and Refugees in Transit in Poland. *ncbi.nlm.nih.gov.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9778520/

Rodin, J. (2009). *The Resilience Dividend.* London: Profile Books Ltd.

Torosyan, K., Pignatti, N., & Obrizan, M. (2018). Job market outcomes for IDPs: The case of Georgia. *IZA DP*, 11301. Retrieved from https://docs.iza.org/dp11301.pdf

Torosyan, Karine & Pignatti, Norberto & Obrizan, & Maksym (2018). "Job market outcomes for IDPs: The case of Georgia," *Journal of Comparative Economics, Elsevier, 46*(3), 800–820. https://doi.org/10.1016/j.jce.2018.07.009

Ungar, M. (2011). The social ecology of resilience: A handbook of theory and practice. *SAGE Publications.* Retrieved from https://link.springer.com/book/10.1007/978-1-4614-0586-3

UNDP (2023a). SCORE-Inspired Holistic Assessment of Resilience of Population (SHARP): Assessing Social Cohesion, Resistance, and People's Needs in Ukraine Amid Russian Full-Scale Invasion — Wave 1 (2022). *undp.org.* Retrieved from https://www.undp.org/ukraine/publications/sharp-assessing-social-cohesion-resistance-and-peoples-needs-ukraine-amid-russian-full-scale-invasionwave-1-2022

UNDP (2023b). SCORE-inspired Holistic Assessment of Resilience of Population (SHARP). Wave 2. Findings. *api.scoreforpeace.org.* Retrieved from https://api.scoreforpeace.org/storage/pdfs/PRE_SHARP2_Wave2_Initialanalysis_06.12.2023_ENG.pdf

UNDRR (2015). Sendai Framework Terminology on Disaster Risk Reduction. *undrr.org.* Retrieved from https://www.undrr.org/terminology/resilience

World Bank (2023). Rapid Damage and Needs Assesment. (February 2022 — February 2023). *documents1.worldbank.org.* Retrieved from https://documents1.worldbank.org/curated/en/099184503212328877/pdf/P18 01740d1177f03c0ab180057556615497.pdfUKRAINE

World Health Organisation (2023). Health needs assessment of the adult population in Ukraine. Survey report. (April 2023). *iris.who.int.* Retrieved from https://iris.who.int/bitstream/handle/10665/372141/WHO-EURO-2023-6904-46670-70096-eng.pdf? sequence=1