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## Regional Differences of Women's Online Shopping Behaviour in Kazakhstan: An In-Depth Analysis of the Factors<sup>1</sup>

**Abstract.** Despite the growing popularity of online shopping, there is a lack of research on regional differences in consumer behaviour and preferences, particularly among women. The study aims to investigate the regional differences in women's online shopping behaviour in Kazakhstan by conducting an in-depth analysis of the factors influencing female consumers. Using data from a survey of 400 women across different regions of Kazakhstan, logistic regression analysis was utilised to examine the relationship between online shopping frequency and several independent variables. The analysis found that the pandemic significantly affected online shopping behaviour in Kazakhstan, leading to decreased shopping frequency across all regions. Additionally, we found that women living in urban areas were significantly more likely to shop online frequently than those in rural areas, with an odds ratio of 0.504 ( $p = 0.014$ ). The research also revealed notable differences in Internet penetration rates, with Karaganda, Pavlodar regions and Astana city having the highest rates among women (93.1 %, 93.0 %, and 94.5 %, respectively), while Atyrau and Kyzylorda regions had the lowest (80.7 % and 80.0 %). Therefore, it is recommended that policymakers should focus on expanding Internet infrastructure in remote regions by developing customised online marketplaces that meet the needs of urban areas like Almaty city. The findings of this study underscore the importance of considering regional differences in understanding the factors that drive online shopping behaviour in Kazakhstan. By investing in initiatives that promote e-commerce adoption and cater to consumers' unique needs and preferences in different regions, policymakers can help foster a more inclusive and dynamic e-commerce ecosystem in Kazakhstan.

**Keywords:** region, regional differences, rural areas, online shopping, online purchase, digital literacy, Kazakhstan

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## Региональные различия в поведении женщин при совершении покупок в интернете в Казахстане: глубокий анализ факторов

**Аннотация.** Несмотря на растущую популярность онлайн-покупок в настоящее время практически нет исследований, посвященных региональным различиям в поведении и предпочтениях потребителей, особенно среди женщин. Цель статьи – изучить региональные различия в поведении женщин при совершении покупок в интернете в Казахстане при помощи глубокого анализа факторов, влияющих на покупательниц. На основе данных опроса 400 женщин из разных регионов Казахстана была построена логистическая регрессионная модель для анализа взаимосвязи между частотой онлайн-покупок и несколькими независимыми переменными. Проведенный анализ показал, что пандемия значительно повлияла на поведение женщин при совершении покупок в интернете, приведя к снижению частоты покупок во всех регионах Казахстана. Кроме того, женщины, проживающие в городских районах, значительно чаще совершают покупки в интернете по сравнению с женщинами из сельской местности (отношение шансов 0,504 ( $p = 0,014$ )). Исследование также выявило заметные различия в уровне распространения интернета: самые высокие показатели среди женщин наблюдаются в Карагандинской, Павлодарской областях и Астане (93,1 %, 93,0 % и 94,5 % соответственно), а самые низкие – в Атырауской и Кызылординской областях (80,7 % и 80,0 %). Таким образом, необходима политика по расширению интернет-инфраструктуры в отдаленных регионах и созданию специализированных онлайн-рынков, которые отвечают потребностям городских районов, таких как Алматы. Результаты исследования подчеркивают важность учета региональных различий при изучении факторов, определяющих поведение при совершении покупок в интернете в Казахстане. Инвестиции в различные инициативы, способствующие внедрению электронной коммерции и учитывающие уникальные потребности и предпочтения потребителей в разных регионах, позволят сформировать более инклюзивную и динамичную экосистему электронной коммерции в Казахстане.

**Ключевые слова:** регион, региональные различия, сельская местность, онлайн-покупки, цифровая грамотность, Казахстан

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### 1. Introduction

The rapid growth of the Internet and e-commerce has fundamentally transformed how consumers purchase goods and services. Online shopping has become increasingly popular due to its convenience, variety of products, and competitive prices. With a population of more than 18 million, Kazakhstan is the largest landlocked country in the world and has experienced a significant increase in Internet penetration and e-commerce adoption in recent years. The COVID-19 pandemic has further accelerated the shift toward online shopping as physical distancing measures and lockdowns have limited traditional brick-and-mortar retail options.

Despite the growing popularity of online shopping in Kazakhstan, more studies should ex-

amine regional differences in consumer behaviour and preferences, particularly among women. Women are an important demographic group in the e-commerce landscape, as they often play a significant role in household purchasing decisions and are increasingly active in the labour market. Understanding the factors that influence women's online shopping behaviour is crucial for businesses seeking to optimise their marketing strategies, tailor their offerings to meet the needs of this critical demographic group, and capitalise on the growing e-commerce market in Kazakhstan.

The study of regional features of online shopping for women in Kazakhstan is important due to the significant differences in the levels of Internet penetration and access to technology in various regions. Considering the large territory of

Kazakhstan and the uneven distribution of the Internet, especially access to online stores, it is very important to analyse the features of regional e-commerce among women. For example, the use of the Internet by men and women in Kazakhstan increased by 15.3 % in 2015–2020 (Bureau of National Statistics, 2021). However, in terms of gender, the rate of Internet use by men is consistently slightly higher. In particular, the number of users increased from 73 % in 2015 to 88.5 % in 2020 among men and from 72.7 % to 88 % among women. This disparity highlights the impact of different factors, such as infrastructure development and technology accessibility, on women's access to online shopping platforms. Thus, understanding these regional differences is crucial for studying women's behaviour when shopping online in Kazakhstan.

The majority of online users are financially independent women; the main factors that motivate them to shop online include ease of use, product utility, trust and security in Internet transactions (Pavlou, 2003; Gefen et al., 2003; Molla & Licker, 2005), as well as recommendations from friends and family as a trusted source of information (Dittmar et al., 2004), website design, Internet accessibility and usage frequency (Garbarino & Strahilevitz, 2004; Gu et al., 2016; Riffai et al., 2012), individualism, collectivism, and preferences for product quality and authenticity (Al-Qeisi et al., 2014; Kleisiari et al., 2021). Regional studies have shown that women are more cautious about the security of money transfers and appreciate customer service and free delivery when shopping online (Hsiao & Chen, 2016; Lu et al., 2016), as well as that women are more susceptible to the influence of social networks (Aslam et al., 2018; Kim & Lee, 2019).

The results of numerous studies show that COVID-19 has significantly affected women's online shopping behaviour, increasing the number of purchases made online, raising preferences for health and wellness products, and placing greater emphasis on trust and security in online transactions (Sigala, 2020; Leong & Chaichi, 2021; Sayyida et al., 2021). Research has also demonstrated that digital information literacy among women is an integral part of the development of online shopping for women (Mahmood et al., 2022). According to some studies, online shopping for women in Kazakhstan is influenced by such factors as convenience, accessibility of product information and the influence of social networks (Abdunurova, 2019; Toleuly et al., 2020; Khamzina et al., 2020).

Therefore, to comprehensively understand what other factors may be significant in women's online shopping, it is essential to continue the literature review on the topic. We need to identify unexplored factors, at least for the conditions of Kazakhstan. At the same time, online shopping is becoming increasingly popular in Kazakhstan, but there is still insufficient research on regional differences in consumer behaviour, especially among women. Since women often make basic shopping decisions in their households and are becoming increasingly active users of electronic infrastructure, understanding the factors that influence women's online shopping behaviour allows businesses to effectively develop marketing strategies, adapt products and services to the needs of this significant demographic group, and identify new growth opportunities at the regional level.

By examining the regional differences in women's online shopping behaviour, this research will contribute valuable insights to the existing literature on consumer behaviour in Kazakhstan. The findings will help businesses and policymakers better understand the needs and preferences of female consumers in different regions, facilitating the development of targeted marketing strategies, product offerings, and policies to support the growth of e-commerce in Kazakhstan. Additionally, this study will shed light on the impact on women's online shopping habits, providing insights into the long-term effects of the crisis on consumer behaviour and the e-commerce industry.

This study aims to investigate the regional differences in women's online shopping behaviour in Kazakhstan by conducting an in-depth analysis of the factors influencing female consumers. The frequency of online shopping will serve as the dependent variable, allowing us to explore the underlying patterns and trends in women's online purchasing behaviour across different regions of the country. In accordance with the aim, the following tasks were identified:

- to analyse the existing literature on the direction of research in terms of women's behaviour when shopping on the Internet;
- to develop a reliable methodology for studying regional differences in women's online shopping behaviour (the methodology should include suitable data collection methods that will enable a comprehensive study of the factors);
- to test the developed methodology and get the results of measuring the degree of influence on women's behaviour when making online purchases or shopping online.

## 2. Literature Review

The progress associated with the development of digital technologies and the Internet affected online purchases. Numerous Internet resources have become channels for generating income from important purchases while online trade volume is growing. Conversely, many people try to provide a high level of privacy to secure and preserve information. However, online shopping will continue to evolve, since many online purchases have become convenient for obtaining goods and services. As a result, online shopping behaviour has been a widely researched topic in the field of consumer behaviour, as scholars seek to understand the factors that influence consumers' decisions to purchase products online. The scientific literature devoted to consumer purchasing decisions on the Internet mainly focuses on identifying factors that affect the willingness of consumers to make such purchases. However, the literature on women's online shopping behaviour and regional differences could be more extensive. This literature review will discuss relevant studies on online shopping behaviour, women's purchasing habits, regional differences in e-commerce adoption, and their potential impact on women's online shopping behaviour.

Several studies have identified various factors influencing consumers' online shopping behaviour, such as perceived ease of use, usefulness, trust, and security (Davis, 1989; Pavlou, 2003; Gefen et al., 2003). These factors have been found to impact consumers' attitudes toward online shopping and their intentions to purchase products online (Chen et al., 2002). In the context of regional differences, such factors may vary in importance and influence depending on local conditions, cultural norms, and access to technology and infrastructure (Gu et al., 2016).

One of the first stereotype-breakers in online shopping the research by Chiang and Dholakia (2003), who found that purchasing conditions vary depending on the type of retail outlet, product type, and purchase goal and are not inherently a male or female activity. Research on gender differences in online shopping behaviour suggests that women tend to prioritise such factors as trust, security, and website design, while men are more concerned with efficiency and convenience (Garbarino & Strahilevitz, 2004; Hasan, 2010). Women also tend to use more comparison shopping and are more likely to consider recommendations from friends and family when making online purchases (Rodgers & Harris, 2003; Dittmar et al., 2004). These gender-specific preferences and behaviours may manifest differently in various re-

gions due to such factors as local culture, education levels, and access to resources.

Studies on online shopping behaviour in developing countries have found that such factors as Internet access, Internet usage frequency, and perceived benefits of online shopping significantly influence consumers' online purchasing behaviour (Molla & Licker, 2005; Riffai et al., 2012). Additionally, cultural factors, such as individualism and collectivism, have been found to impact online shopping behaviour in developing countries (Kleisiari et al., 2021).

Women's online shopping behaviour may vary depending on various factors, including their cultural background, economic status, and personal preferences. Several studies have explored the differences in online shopping behaviour among women across various regions of the world. Stafford et al. (2004) investigated the online shopping behaviour of women in Europe. The research revealed that European women tend to be more price-sensitive and are more likely to compare prices across different websites before purchasing. They also tend to shop more frequently for apparel and accessories than other product categories. The paper uncovered that South Korean women tend to be more influenced by the social context when shopping online. They are more likely to purchase popular products on their social network and tend to rely heavily on social media for product recommendations. Al-Qeisi et al. (2014) explored the online shopping behaviour of women in the Middle East. The research established that women in the Middle East tend to be more concerned about privacy and security when shopping online. They also prefer shopping from websites with clear and transparent return policies. Chinese women value product quality and authenticity over price when shopping online. Thus, women's online shopping behaviour may vary depending on their regional location. As mentioned above, Chinese women tend to value product quality and authenticity, while women in the Middle East care about privacy and security.

The COVID-19 pandemic has significantly affected consumer behaviour, with many studies reporting increased online shopping due to lockdown measures and concerns about safety (Sigala, 2020; Sharma & Jhamb, 2020). The pandemic has also led to changes in consumers' preferences and priorities, with a greater emphasis on health and wellness products and the importance of trust and security in online transactions (Leong & Chaichi, 2021; Sayyida et al., 2021). These shifts may vary across regions, depending on the severity of the pandemic's impact, local responses to the crisis,

and differences in consumer behaviour and attitudes. Understanding the regional variation in the pandemic's effects on women's online shopping behaviour in Kazakhstan can provide valuable insights for businesses seeking to adapt their strategies and offerings to meet the changing needs and preferences of consumers in different regions.

Research on regional differences in online shopping behaviour has shown that urban consumers are more likely to engage in online shopping than their rural counterparts due to better Internet infrastructure, higher income, and greater exposure to online shopping platforms and digital information literacy (Mahmood et al., 2022; Banerjee & Seetharaman, 2022). Regional differences in online shopping behaviour exist due to cultural, economic, and technological factors. Consumers in Taiwan tend to be more cautious (Hsiao & Chen, 2016), while Indian consumers tend to be more price-sensitive (Aslam et al., 2018). Chinese consumers tend to value customer service and free shipping (Lu et al., 2016), and South Korean consumers tend to be more influenced by social media (Kim & Lee, 2019).

The growth of e-commerce in Kazakhstan has been a topic of interest among scholars and researchers in recent years. According to the study conducted by Gu et al. (2016), the e-commerce market in Kazakhstan is growing at a rapid pace, driven by increasing Internet penetration and the emergence of new e-commerce platforms. The exploration ascertained that the COVID-19 pandemic has accelerated the growth of e-commerce in Kazakhstan, with many consumers turning to online shopping due to restrictions on physical stores. Abdunurova (2019) examined the impact of social media on online shopping behaviour in Kazakhstan, noting that social media platforms such as Facebook and Instagram<sup>1</sup> were becoming increasingly popular among consumers for discovering new products and making purchase decisions. The study uncovered that social media significantly impacted trust in online retailers, with consumers relying on social proof, such as user reviews and recommendations, to make purchase decisions. Toleuuly et al. (2020) focused on the factors influencing online shopping behaviour in Kazakhstan. The findings showed that such factors as convenience, availability of product information, and trust in online retailers were significant determinants of online shopping behaviour. Finally, a study by Khamzina et al. (2020) exam-

ined the challenges facing the e-commerce industry in Kazakhstan: the industry's significant challenges were trust and security concerns, logistical challenges, and the lack of a comprehensive legal framework for e-commerce. The work also highlighted the need for greater collaboration between government, industry, and academia to address these challenges and promote the growth of e-commerce in Kazakhstan.

Research on online shopping behaviour in Kazakhstan has identified factors such as convenience, trust in online retailers, and the popularity of cash-on-delivery as essential determinants of online shopping behaviour in the country. The impact of social media on online shopping behaviour and the challenges facing the e-commerce industry have also been studied extensively. However, further research is needed to explore these topics in greater detail and to identify strategies for promoting the growth of e-commerce in Kazakhstan. Furthermore, based on the extensive literature review, it was revealed that there is no research on the behaviour of online purchases of rural women in the regions of Kazakhstan. In this regard, the present study aims to investigate the regional differences in women's online shopping behaviour in Kazakhstan by conducting an in-depth analysis of the factors influencing female consumers.

### 3. Research Methods

The methods of this study are based on the literature, as mentioned earlier in the review, which allowed us to justify the choice of research direction. So, in this empirical study, the identified research methods allowed us to explore the online e-commerce market with an emphasis on explaining consumer choices (Sayyida et al., 2021; Banerjee & Seetharaman, 2022). A quantitative survey was chosen as the primary method of collecting qualitative data. Considering the specifics of the e-commerce market, data collection was carried out online. The object of the study was Kazakhstani women using the Internet. Using qualitative data, it is possible to understand the content of connections, determine the behaviour and motives of consumers, and identify the interaction between social groups. Thus, social relations reproduced by market participants come to the fore. The collection of empirical material in many gender studies was carried out using questionnaire methods and semi-formal interviews (Chiang & Dholakia, 2003; Molla & Licker, 2005).

This study utilised logistic econometric regression to examine the regional differences in women's online shopping behaviour

<sup>1</sup> These social networks are owned by Meta Platforms Inc.\* recognised as extremist in the territory of the Russian Federation — editor's note.

in Kazakhstan using STATA for data analysis. Logistic regression is a widely used statistical method for analysing the relationship between a binary dependent variable (i. e., a variable with two possible outcomes) and a set of independent variables (Peng et al., 2002). This method has been successfully applied in various fields, including consumer behaviour, marketing, and e-commerce research (Hosmer et al., 2013; Nitzl et al., 2016; Venkatesh et al., 2012).

The present research posits the Null Hypothesis (H0) that there is no significant difference in the frequency of online shopping between women living in urban and rural locations in Kazakhstan. In contrast, the Alternative Hypothesis (H1) suggests a significant difference in online shopping frequency between these two groups. The study aims to test these hypotheses, thereby contributing to the extant body of knowledge on the influence of geographical locale on online shopping behaviour.

Null Hypothesis (H0): There is no significant difference in the frequency of online shopping between women living in urban and rural locations in Kazakhstan.

Alternative Hypothesis (H1): There is a significant difference in the frequency of online shopping between women living in urban and rural locations in Kazakhstan.

### **Dependent Variable**

The dependent variable is the shopping frequency of women in Kazakhstan, which is categorised into two levels: "Often" (1–2 times a month) and "Rarely" (1–3 times a year).

### **Independent Variables**

This paper used four main independent variables in our logistic regression model:

(1) Business from home: This variable captures whether the respondent runs a business from home and different working arrangements they may have (e.g., part-time or full-time work from home, working in an office, etc.).

(2) Location type: This variable represents the type of area the respondent resides in, either urban or rural.

(3) Post-pandemic period: This variable assesses how the respondent's online shopping behaviour changed after the COVID-19 pandemic, with three possible responses: decreased, has not changed, or increased.

(4) Regions: This variable represents the respondent's place of residence within Kazakhstan, with 14 different regions included in the analysis.

### **Logistic Regression Model**

This study employed logistic regression to estimate the probability of women in Kazakhstan shopping online "Often" instead of "Rarely" based on the selected independent variables. The logistic regression model can be represented as follows:

$$\begin{aligned} \text{Logit}(P(Y = 1)) = & \beta_0 + \beta_1 \cdot \text{businessfromhome} + \\ & + \beta_2 \cdot \text{locationtype} + \beta_3 \cdot \text{post-pandemicperiod} + \\ & + b4 \cdot \text{Regions} \end{aligned} \quad (1)$$

where in the formula (1):  $P(Y = 1)$  — the probability of a woman shopping online "Often";  $\beta$  — coefficients representing the independent variables' effects on the dependent variable's log odds.

### **Data Collection**

Data for this study were collected through an online survey targeting a representative sample of women in Kazakhstan. The research is based on primary data and uses a sample of 400 women. Particularly, primary data collection is used since the study collected information directly from people in an online format. The survey included questions related to the respondents' online shopping behaviour, working arrangements, place of residence, and the impact of the COVID-19 pandemic on their purchasing habits. To ensure a diverse and representative sample, we used a stratified random sampling technique, considering factors such as age, income, and education levels.

Figure 1 shows the online shopping frequency of women in Kazakhstan regions, where a higher value means that they shop rarely and lower otherwise.

The data analysis was carried out in STATA and went through several necessary steps, making the results robust and reliable. The final survey data were first entered in STATA, and intensive control was done to ensure the quality of the imported dataset. The first step in this process was to address any missing values or outliers, ensuring the dataset remained sound. The logistic regression model (see Equation 1) was developed using the 'logit' command in STATA build with explicit dependent and independent variables. We conducted diagnostic tests to evaluate model goodness-of-fit and diagnose any potential problems. The methods exploited were the Hosmer-Lemeshow test, McFadden's pseudo R-squared, and the Akaike Information Criterion (AIC). Altogether, the tests cover model performance from multiple angles and most strata. The estimated coefficients were interpreted as odds ratios to marginal effects. They provided helpful information about how the independent variables affect online shopping "Often" for women.

# Online shopping frequency of women by regions (higher is rarely)

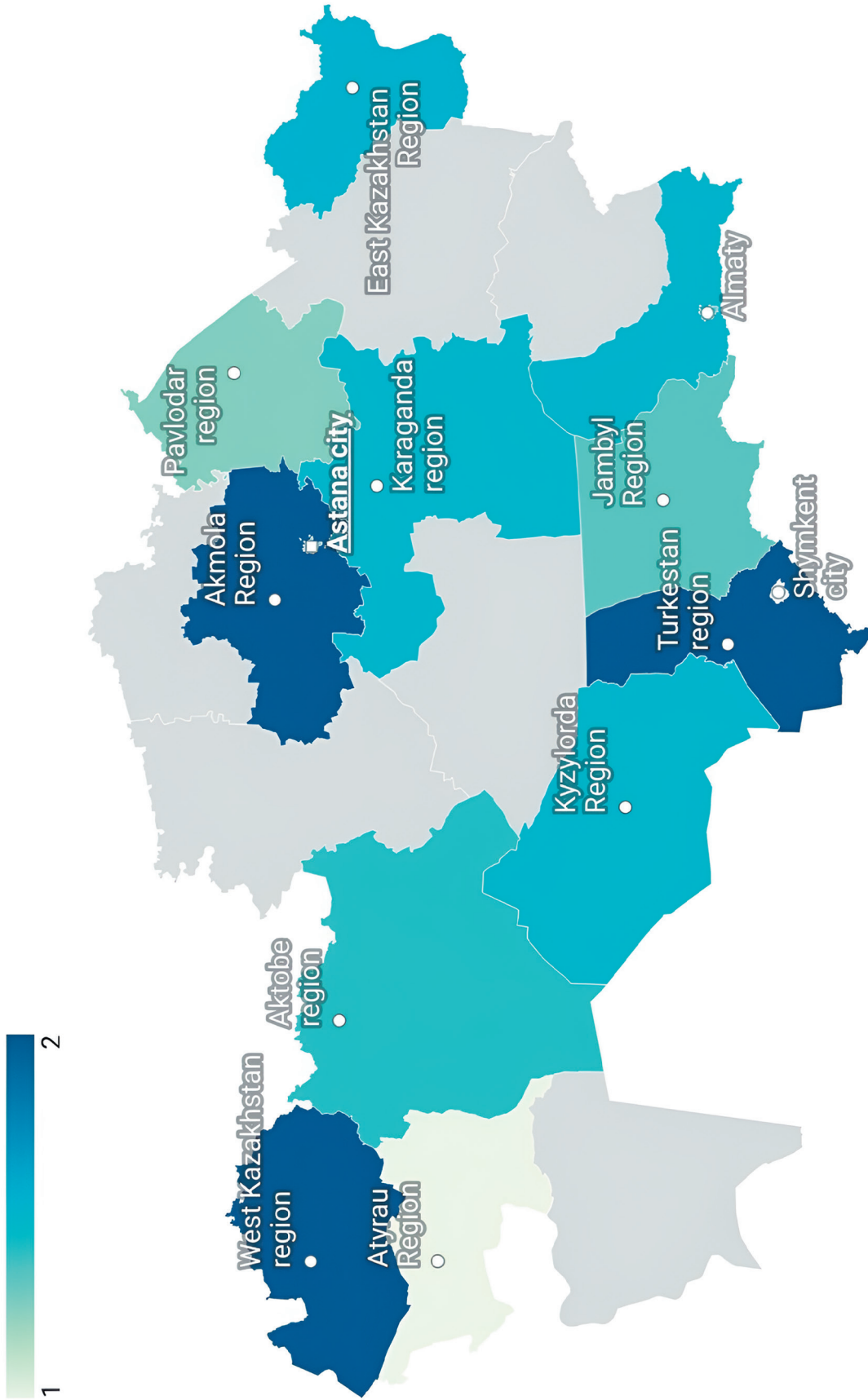


Fig. 1. Online shopping frequency of women by region (higher is rarely)

Source: authors' elaboration from STATA

We used odds ratios to show the effect of a one-unit increase in the independent variable on change in odds, and marginal effects showed how much would be added or subtracted from probability given a one-unit increase of a shown dependent variable. Extensive robustness checks were performed to verify our results' strength. The latter included testing the model assumptions as alternative model specifications, interaction terms, and subgroup analyses. This extensive sensitivity testing was essential in establishing the robustness of results to different model specifications, thus reinforcing that the findings were valid and reliable. Overall, ensuring methodological rigor in the data analysis stage is based on reliable results and a solid foundation for deriving meaningful complete conclusions and practical implications for understanding regional heterogeneity of female online shopping behaviour in Kazakhstan. This study analyses the different patterns and drivers of online shopping behaviour among women in Kazakhstan on a detailed level, emphasising regional disparities. It contributes significantly to the available literature on consumer behaviour and e-commerce, providing essential perspectives for business enterprises as well as policymakers.

The data can be used by businesses to further refine their online marketing, create products and services that better address local tastes, and improve the overall shopping experience for women in Kazakhstan. Understanding and mitigating regional variation in e-shopping can motivate region-specific strategies for either tailoring to or capitalising on the unique requirements of female

consumers across different regions. In addition to stimulating e-commerce growth, that approach also speaks indirectly to digital inclusion by helping secure a more equitable distribution of gifts and opportunities across the country.

#### 4. Results

Today, women use digital communicators, mobile phones, and laptops more frequently and actively utilise various additional features to access the Internet. In general, women's behaviour is influenced by using digital communicators, such as Internet access, connection speed, financial conditions, and infrastructure. At the same time, assessing regional characteristics of women's online shopping behaviour is crucial, as it provides a comprehensive understanding of the specific problems, opportunities, and dynamics faced by the population in different regions of Kazakhstan regarding Internet usage, which is fundamental for online shopping.

Table 1 shows the share of Internet users in Kazakhstan for 2015–2020.

According to the data, in 2015, there was a significant gap between urban and rural areas in terms of the number of Internet users. However, by 2020, this gap has narrowed. This is apparently due to the policy of increasing the level of digitalisation of regions by building fibre-optic communication lines in rural settlements. Thus, the total share of Internet users aged 6 to 74 years increased to 88.2 % in 2020, compared with 72.9 % in 2015. In addition, there are significant regional

Table 1

Region	2015	2016	2017	2018	2019	2020
Akmola	60.9	70.0	70.8	73.8	79.4	84.6
Aktobe	66.4	77.7	80.8	81.1	85.7	88.0
Almaty	81.2	81.4	84.5	85.3	85.4	88.7
Atyrau	67.2	72.9	75.1	78.1	80.7	80.7
West Kazakhstan	89.0	67.4	72.7	76.9	80.4	83.9
Jambyl	61.6	68.7	70.1	80.9	81.6	86.0
Karaganda	68.6	72.5	72.8	73.9	80.5	93.1
Kostanay	77.0	83.7	85.5	85.7	86.9	87.1
Kyzylorda	70.2	76.7	76.2	77.7	77.9	80.0
Mangystau	66.3	72.5	72.6	78.9	82.3	85.9
South Kazakhstan	68.4	75.4	79.0	—	—	—
Pavlodar	81.2	80.3	82.1	83.3	85.7	93.0
North Kazakhstan	67.8	74.8	75.7	77.0	81.2	88.9
Turkestan	—	—	—	84.8	89.6	92.5
East Kazakhstan	68.1	74.5	77.4	79.2	81.7	84.1
Astana city	86.9	85.3	88.0	88.1	91.7	94.5
Almaty city	81.9	84.3	84.1	84.3	87.7	91.8
Shymkent city	—	—	—	80.0	80.1	82.3

Source: compiled by authors based on the data from the Bureau of National Statistics (2021)



differences in the distribution of the number of Internet users. For example, in 2020, the highest Internet penetration rates among women were recorded in Karaganda, Pavlodar regions and Astana (93.1 %, 93.0 %, and 94.5 %, respectively). In turn, the lowest rates were found in Atyrau and Kyzylorda regions (80.7 % and 80.0 %, respectively). Thus, an analytical review of the current situation in the field of Internet use before and after COVID-19 showed that online commerce and online shopping in Kazakhstan are developing rapidly. At the same time, large cities such as Almaty and Astana have high Internet penetration rates. Understanding these regional differences is crucial to identify regions with low levels of digitalisation.

The study of gender trends is essential for understanding the specific challenges and opportunities faced by women when making online purchases. Figure 2 shows the proportion of Internet users from the total population broken down by gender for 2015–2020.

The results obtained for 2015–2020 showed an increase in the number of Internet users among both men and women. In 2015, the proportion of Internet users was 72.9 %, with the figure being slightly higher among men (73.0 %) compared to women (72.7 %). By 2020, the overall level of Internet penetration reached 88.2 %, and this indicator is slightly higher for men (88.5 %) than for women (88.0 %). The data show that both men and women in Kazakhstan have been using the Internet for many years. Although the gender gap in Internet penetration rates is relatively small, it is worth noting that throughout the analysed period, women's indicators were consistently

slightly lower than men's. However, this gap has been narrowing over time, which indicates progress in bridging the gender digital divide in Kazakhstan.

The logistic regression analysis was conducted to examine the impact of the independent variables on women's online shopping frequency in Kazakhstan. The results are presented below in a more detailed and extended manner.

**Model Fit and Diagnostics:** The logistic regression model had a statistically significant LR chi-square (4) of 33.86 ( $p < 0.0001$ ), indicating that the model is a better fit than the null model. The pseudo R-squared value of 0.0956 suggests that our model explains approximately 9.56 % of the variance in women's online shopping frequency. The goodness-of-fit test, Pearson's chi-square (45) was 44.67 ( $p = 0.4857$ ), indicating that the model fits the data reasonably well. The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were 330.23 and 348.18, respectively, providing additional support for the model's fit.

The results in Table 2 show a change in the influence of independent variables on the frequency of online purchases by women in Kazakhstan.

The odds ratios and their corresponding 95 % confidence intervals for the independent variables are as follows:

**Business from home:** the odds ratio for this variable was 0.897 (95 % CI: 0.777 – 1.036,  $p = 0.139$ ), indicating that women who run a business from home were not significantly more likely to shop online more frequently than those who do not. This result suggests that working from home may not have a substantial impact on women's online

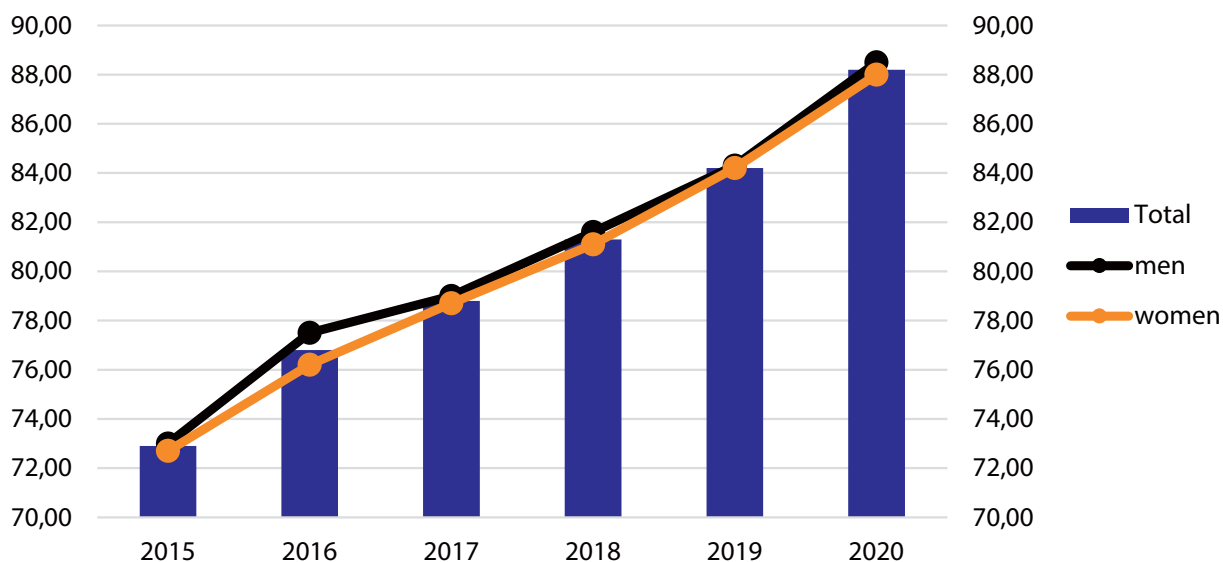


Fig. 2. The share of Internet users from the total population by gender

Source: compiled by authors based on the data from the Bureau of National Statistics (2021).

Table 2

## Logistic regression results

Predictor variable	Odds ratio	Std. Err.	Z-score	P-value	95% Conf. Interval
Business from home	0.897	0.066	-1.48	0.139	0.777 - 1.036
Location type	0.504	0.141	-2.46	0.014	0.292 - 0.870
Post-pandemic period	0.441	0.087	-4.15	0.000	0.299 - 0.649
Region1	0.937	0.053	-1.14	0.252	0.839 - 1.047
_cons	20.828	14.040	4.50	0.000	5.557 - 78.062

Source: authors' elaboration from STATA

Table 3

## Predictive margins of the constant term using the delta method

Delta-method					
Variable	Margin	Std. Err.	z	P>	z
_cons	0.3731343	0.0276642	13.49	0.000	0.3189134

Source: authors' elaboration from STATA

shopping frequency in Kazakhstan. Future research could explore the potential reasons behind this non-significant relationship, such as the influence of other factors that may moderate the relationship between running a business from home and online shopping frequency.

Location type: the odds ratio for this variable was 0.504 (95 % CI: 0.292 – 0.870,  $p = 0.014$ ), suggesting that women living in urban areas were significantly more likely to shop online more frequently than those residing in rural areas. This finding aligns with previous research, indicating that urban residents may have greater access to the Internet, higher disposable income, and better access to delivery services.

Post-pandemic period: the odds ratio for this variable was 0.441 (95 % CI: 0.299 – 0.649,  $p < 0.001$ ), indicating that women who reported an increase in their online shopping frequency after the COVID-19 pandemic were significantly more likely to shop online more frequently. This result is consistent with the global trend of increased online shopping during the pandemic (Chen et al., 2002; Sharma & Jhamb, 2020). The COVID-19 pandemic has led to changes in consumer behaviour, with people turning to online shopping to maintain social distancing and avoid crowded places.

Region1: the odds ratio for this variable was 0.937 (95 % CI: 0.839 – 1.047,  $p = 0.252$ ), suggesting that there was no significant difference in the online shopping frequency of women in Region1 compared to the reference region. This result indicates that regional differences in Kazakhstan may not significantly impact women's online shopping frequency. However, it is essential to note that this analysis only considered one specific region. Future research

could examine other regions and their potential influence on women's online shopping behaviour.

Table 3 presents the regression model's predictive margins of the constant term using the delta method.

The delta method is a statistical technique employed to estimate the standard errors and confidence intervals of non-linear functions of estimated coefficients. The table shows the estimated constant term (\_cons) and its associated standard error, z-statistic, p-value, and 95 % confidence interval. The constant term (\_cons) has a value of 0.3731343 with a standard error of 0.0276642. The z-statistic of 13.49 and a p-value of 0.000 indicate that the constant term is highly significant. The 95 % confidence interval for the constant term ranges from 0.3189134 to 0.4273552, suggesting that the true value of the constant term lies within this interval with a 95 % level of confidence. The overall predictive margin for the model was 0.373 (95 % CI: 0.319 – 0.427), indicating that, on average, women in Kazakhstan had a 37.3 % probability of shopping online more frequently ("Often").

In summary, the logistic regression analysis revealed that women living in urban areas and those who reported an increase in online shopping frequency after the COVID-19 pandemic were significantly more likely to shop online more frequently. In contrast, running a business from home and residing in Region1 did not significantly impact women's online shopping frequency. These findings provide valuable insights into the regional differences in women's online shopping behaviour in Kazakhstan. They can inform targeted strategies for businesses and policymakers aiming to promote e-commerce growth and cater to the preferences of female consum-

ers across different regions. Moreover, the results emphasise the importance of considering the role of the pandemic in shaping consumer behaviour and suggest that further research is needed to understand the long-term implications of the pandemic on online shopping trends in Kazakhstan and beyond.

Regional variables were included in the logistic regression model to analyse the regional differences in women's online shopping behaviour in Kazakhstan. The regions included in the analysis are Aktobe, Almaty, Almaty city, Atyrau, East Kazakhstan, Karaganda, Kyzylorda, Astana city, Pavlodar, Shymkent city, Turkestan, West Kazakhstan, and Jambyl. Several regions (Atyrau, Shymkent city, Turkestan, West Kazakhstan, and Jambyl) perfectly predicted the outcome and were therefore dropped from the analysis.

The model's goodness-of-fit improved compared to the previous model (Prob > chi-square = 0.0001), indicating that including regional variables added valuable information to the analysis. The pseudo R-squared increased to 0.1061, showing that the model accounts for approximately 10.61 % of the variance in women's online shopping frequency.

Table 4 presents the logistic regression results for the shopping frequency (shopfreq) as the outcome variable and its relationship with various predictor variables.

Table 4 displays each predictor variable's odds ratios, standard errors, z-scores, p-values, and 95 % confidence intervals. The predictor variables in-

cluded in the analysis are "Business from home", "Location type", "Post-pandemic period" and several regional variables (Aktobe, Almaty, Almaty city, Atyrau, East Kazakhstan, Karaganda, Kyzylorda, Astana city, Pavlodar, Shymkent city, Turkestan, West Kazakhstan, and Jambyl). Some regional variables have been omitted due to collinearity issues.

Looking at the logistic regression results, it is essential to note that the 'after COVID' variable remains statistically significant ( $p < 0.001$ ) and is associated with a decrease in the odds of frequently shopping online. This indicates that the number of online purchases made by women in Kazakhstan has generally decreased after the COVID-19 pandemic, regardless of the region.

However, the regional differences in online shopping behaviour are not as clear-cut. Almaty city positively correlates with shopping frequency (OR = 1.778683), although it is not statistically significant ( $p = 0.214$ ). This suggests that there might be a higher likelihood of women in Almaty city shopping online more frequently than women in other regions. However, further research is needed to confirm this finding.

For the other regions included in the analysis (Aktobe, Almaty, East Kazakhstan, Karaganda, Kyzylorda, and Pavlodar), the odds ratios are extremely small and not statistically significant, indicating that there is no significant relationship between these regions and women's online shopping frequency. This could be due to the small

Table 4

Logistic regression results for shopping frequency and associated predictor variables

Outcome variable_variable_ Odds Ratio	Std. Err.	z-score	P-value	95% Conf. Interval		
shopfreq	Business from home	0.887	0.069	-1.54	0.124	0.762
shopfreq	Location type	0.000	0.000	-0.02	0.985	0
shopfreq	Post-pandemic period	0.442	0.090	-4.01	<0.001	0.297
shopfreq	Aktobe	0.000	0.000	-0.02	0.986	0
shopfreq	Almaty	0.000	0.000	-0.02	0.986	0
shopfreq	Almaty city	1.779	0.824	1.24	0.214	0.718
shopfreq	Atyrau	omitted	omitted	—	—	—
shopfreq	East Kazakhstan	0.000	0.000	-0.02	0.986	0
shopfreq	Karaganda	0.000	0.000	-0.02	0.986	0
shopfreq	Kyzylorda	0.000	0.001	-0.02	0.987	0
shopfreq	Astana city	omitted	omitted	—	—	—
shopfreq	Pavlodar	0.000	0.000	-0.02	0.986	0
shopfreq	Shymkent city	omitted	omitted	—	—	—
shopfreq	Turkestan	omitted	omitted	—	—	—
shopfreq	West Kazakhstan	omitted	omitted	—	—	—
shopfreq	Jambyl	omitted	omitted	—	—	—
shopfreq	_cons	1.25e+14	2.12e+17	0.02	0.985	0

Source: authors' elaboration from STATA

number of observations in these regions or other factors not accounted for in the model.

In conclusion, while the analysis suggests regional differences in women's online shopping behaviour in Kazakhstan, the results are inconclusive. Future research could benefit from collecting more data from different regions, as well as considering other factors that might influence online shopping behaviour, such as income levels, Internet access, and cultural preferences.

## 5. Discussion

This study focused on regional characteristics of online shopping among women in Kazakhstan. In this research, such indicators as home business, location, post-pandemic period, and region were taken as independent variables affecting online shopping frequency. The findings showed substantial differences in the distribution of Kazakhstani women by region in terms of the frequency of their shopping on the Internet. However, of course, this study can be continued with other factors. In addition, it can be concluded that the impact of the pandemic was significant. For example, it was found that the frequency of online shopping among women in general decreased after the pandemic. Indeed, this may be due to many factors, including the decline in women's incomes and changing tastes. Interestingly, such a tendency is evenly distributed over all the studied regions.

The analysis results showed that compared with other regions, the frequency of online shopping among women in Almaty is different. Although the data obtained from the study are not statistically significant, women in Almaty are more likely to make online purchases than in other regions. The reason for this, of course, is that residents of Almaty, as a rule, have broad access to the Internet, higher incomes, and the quality of life and daily routine that contribute to online shopping. At the same time, there was no significant correlation between the frequency of online purchases among women in the cities of Aktobe, Almaty, regions of East Kazakhstan, Karaganda, Kyzylorda, and Pavlodar. Other factors not considered in this study may influence women in these places, causing them to shop online more often, such as their level of trust, culture or preferences, etc.

By analysing the collected data, valuable information was obtained about the frequency of online shopping among women of Kazakhstan, primarily regional features, when considering rural and urban points of view. This study was carried out by testing the null hypothesis (H0) and the alternative hypothesis (H1). As a result, the null hypothesis was rejected. On the contrary, according

to the alternative hypothesis, there is a difference in the frequency of online shopping between urban and rural women in Kazakhstan.

That is, urban women are more likely to buy online than women living in rural areas. The main reason for this is the characteristics of urban areas, such as access to the Internet, speed of delivery, digital literacy, and high prevalence of online shopping. Although the results are statistically significant, this may not be the final and definitive answer. For that, further research is still required. For example, it is necessary to comprehensively consider such indicators as age, income, education, preferences, etc., of female online shoppers.

Therefore, it is taken into account that the proposed study has certain limitations. That is, the sample size may not be sufficient to fully reflect the results. This will undoubtedly open up a wide avenue for future research; for example, cross-sectional, causal research or experimental research methods would open up other aspects of this research.

To summarise, first of all, this research introduces some insights into the scientific environment about the frequency and regional features of the behaviour of women in Kazakhstan buying on the Internet. It was also found that women in Almaty shop online significantly more frequently than women in other regions. Moreover, the place of residence is crucial in online shopping among Kazakh women. Specifically, there is a significant difference in online shopping frequency between women living in urban and rural areas. These obtained results can be the reason for making effective decisions known to many stakeholders, considering the characteristics, preferences, and intricacies of online shopping in Kazakhstan.

For example, knowing the regional features of online shopping, developing products specific to the region, increasing access to the Internet, developing delivery services, etc., can increase the feasibility of strategies to attract investment to improve local infrastructure. Thus, it would be a great reason to develop online shopping services in Kazakhstan further and join the e-commerce ecosystem. This, in turn, can drive economic growth, create new jobs, and bridge the digital divide across the country, benefiting businesses and consumers alike.

## 6. Conclusions

This study significantly deepens the understanding of regional differences in women's online shopping behaviour in Kazakhstan. Analysis of such factors as work from home, type of location (urban or rural), changes in online shopping after the COVID-19 pandemic, and region of residence

provides valuable information. In general, the following important conclusions were obtained.

The literature review has shown various perspectives on understanding online shopping behaviour, but it has also highlighted the lack of academic research dedicated to regional differences among women in Kazakhstan. Although there are some studies that have identified key factors influencing online purchases, such as ease of use, trust, and security, how these factors vary across different regions remains underexplored. Furthermore, existing research emphasises the impact of the COVID-19 pandemic on changing consumer preferences and behaviours, underscoring the importance of regional analysis. Based on this review, the most significant variables for further analysis in this study have been selected.

Logistic regression analysis was used as a methodological basis for this study to examine regional differences in women's behaviour when shopping online in Kazakhstan. The improbability sampling method was used; the study participants (women) voluntarily agreed to participate. The dependent variable was the frequency of purchases classified as "Often" or "Rarely". In contrast, the independent variables included business from home, type of location (urban or rural), post-pandemic period, and regions within Kazakhstan. Descriptive statistical data (averages, standard deviations, frequencies, and percentages) were generated. Data analysis, including model diagnostics, interpretation of the results in terms of probability coefficients and marginal effects, as well as reliability testing, provided a comprehensive understanding of regional differences in women's behaviour when shopping online in Kazakhstan.

The research identifies a significant reduction in online shopping frequency post-pandemic (OR = 0.441, 95 % CI: 0.299 – 0.649,  $p < 0.001$ ). Furthermore, it underscores that urban women are more inclined to shop online more frequently than their rural counterparts (OR = 0.504, 95 % CI: 0.292 – 0.870,  $p = 0.014$ ). Although the OR

for those women who shop online is greater in Almaty city than in other regions of Kazakhstan (1.779,  $p = 0.214$ ), it does not reach the statistical significance level. The data also show that working at home has no significant impact on the frequency of buying in online stores (OR = 0.897,  $p = 0.139$ ). The results of the regional analysis confirm that online shopping behaviours are diverse across different regions in Kazakhstan. Higher Internet penetration rates in urban areas translate into higher online shopping activities amongst women.

The study found that developing regions such as Atyrau, Kyzylorda, and Mangystau have modest Internet penetration levels, resulting in relatively infrequent online activity. The analysis also showed that women living in urban areas and those who reported an increase in online shopping frequency after the COVID-19 pandemic were significantly more likely to shop online. Intra-regional differences also manifested; for example, people in East Kazakhstan enjoy better Internet coverage and make more online purchases than people living in remote areas. The intra-regional variation highlights the need for well-targeted policies to address digital divides among regions and within them. The clear message for policymakers and businesses is that driving e-commerce to reach its full potential will require targeted measures to improve Internet access in rural, underserved regions while investing in digital literacy.

Furthermore, this study contributes significantly to the existing literature on women's behaviour in Kazakhstan when making online purchases, depending on the region. Further research is needed to keep up with the changes in this digital ecosystem and take advantage of the widespread spread of electronic communications. We hope that by focusing on regional differences and available opportunities, stakeholders can create a dynamic e-commerce ecosystem in other countries, not only in Kazakhstan.

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The authors declare no conflicts of interest.

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