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## COMPARING THE E-COMMERCE APPEAL OF UKRAINE AND GERMANY

The subject of research is e-commerce and the conditions for its operation in different countries. One of the most problematic aspects is the lack of information about the attractiveness of countries in relation to this topic. To address this gap, the author's own experience of conducting e-commerce in Germany and Ukraine was used, along with an analysis of the main factors influencing the state and development of e-commerce. The research methods used include: theoretical generalization and classification; comparative analysis; expert evaluations; formalization; and multi-criteria analysis. As a result, a system of 13 criteria was proposed to assess the convenience and profitability of conducting e-commerce: infrastructure convenience level, healthcare, availability of private housing and the possibility of purchasing it, small business development, climatic conditions, consumer basket size, tax and fine rates, road quality and safety, internet quality, degrees of freedom, life safety, right to information, and the level of development and speed of delivery. Based on this system and with the help of experts, a comparative analysis of e-commerce conditions and prospects in Germany and Ukraine was conducted. A methodology for assessing the attractiveness of e-commerce in Ukraine and Germany was developed. This methodology allows obtaining comparable values of indicators for any countries, which was not possible before but is desirable with the researchers' practical experience, i. e., their long-term life and work in the countries being studied to ensure accurate results. Compared to other known systems for determining the attractiveness of countries, our methodology provides advantages such as: the availability of a specific mechanism for evaluating this indicator for e-commerce based on 13 criteria; the ability to involve different groups of experts to compare and adjust the results; and the construction of an integral criterion for the overall assessment of a country's attractiveness. In practice, a methodology for calculating the degree of convenience and attractiveness of conducting e-commerce in different countries was proposed, and the results obtained were applied to the example of e-commerce in Ukraine and Germany.

**Keywords:** Ukraine, Germany, appeal of countries, e-commerce, scales, expert evaluations, integral criterion, multi-criteria model, "weight" coefficients, weighted criteria aggregation method, natural normalization, complex assessment.

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### 1. Introduction

Researchers, as a rule, when analyzing the factors that contribute to the growth of e-commerce and the obstacles to it, note technical and non-technical conditions. Technical conditions include legislation, tax rates, Internet connection and network bandwidth, cybersecurity, the level of employee qualifications and education, etc. And non-technical conditions concern the quality of customer service, the quality of websites on e-commerce platforms, the use of innovations that attract consumers, etc.

However, there are other factors that affect the level of development of e-commerce, as it is possible to see from our own experience: geographical, climatic, internal, infrastructural, medical and others. These factors affect the speed and cost of delivering goods, health and working capacity, time spent on business activities, work efficiency, etc.

Until recently, Ukrainians had a limited idea of how e-commerce is developing in European countries. They could not know what conditions and what obstacles exist there, since they did not have the opportunity to travel abroad en masse and gain experience directly. Since the end of February 2022, due to the Russian attack, this opportunity has appeared for them.

In this article, based on scientific research and experience of living in European countries, let's present criteria that affect the conditions,

development and prospects of private e-commerce. After that, having compiled an integral criterion, let's provide an overall assessment of the attractiveness of conducting e-commerce in Ukraine and Germany. This analysis is relevant in the context of Ukraine's possible accession to the European Union and, accordingly, the acceptance or rejection of certain economic, legal, internal and other aspects.

Not many studies have been devoted to the development and analysis of the level of attractiveness of countries. Researchers usually assess the attractiveness of a particular country through the prism of various criteria: the degree of openness of the economy [1]; relevant factors included in the integral indicator of the overall rating score [2]. Others point to external informational influences [3] (let's also add the degree of self-promotion by the state); economic, political and social characteristics [2]; investment climate of the state and individual regions [4–7]. Sometimes added to this list: the attractiveness of outsourcing [8]; competitiveness index [3, 9]; global competitiveness index [1, 10]; level of economic freedom and index (degree) of external and internal threats [11] and others.

However, it was not found any studies that would assess the attractiveness of countries in terms of the convenience of conducting e-commerce. Most often, external indicators are compared, world leaders in the volume of e-commerce are determined, the pace of its development is analyzed,

various obstacles and measures to overcome them are studied. Our work is devoted to determining the “human factor” of e-commerce, the degree of convenience and the potential for its fastest growth.

The aim of this research is to create a set of everyday (human) criteria for assessing the attractiveness of countries for the development of e-commerce and conduct a comparative analysis of this system in relation to Ukraine and Germany.

## 2. Materials and Methods

The object of research is e-commerce in Ukraine and Germany.

The basis of research is the analysis of e-commerce markets in both countries, including popular platforms, sales volumes, availability of online stores, payment methods, logistics, level of technological development, legislative initiatives and consumer habits.

The hypotheses of research are two statements:

1. E-commerce in Germany is more developed and attractive compared to Ukraine, which is due to a high level of infrastructure, technological innovations and state support.

2. The opposite statement: e-commerce in Ukraine is more convenient and attractive compared to Germany, which is due to a number of household, legal, information and other factors.

Several scientific methods were used in the research process:

1) theoretical generalization and classification – for a detailed study of the conditions and factors affecting the development of e-commerce in both countries;

2) comparative analysis – to establish key aspects that determine the level of attractiveness for conducting e-commerce in Ukraine and Germany, such as infrastructure, tax legislation, the level of development of small and medium-sized businesses, the availability of high-quality logistics services, etc.;

3) the method of expert assessments – to assess the impact of each of the factors on the overall attractiveness of the markets of both countries;

4) formalization – to translate abstract and evaluative indicators into clear, measurable criteria, which makes the assessment more objective and understandable;

5) multi-criteria analysis – to evaluate several factors at the same time and find optimal solutions taking into account all important criteria.

The scientific novelty of the study lies in: compiling a rating system of criteria for assessing the conditions (convenience, speed, profitability, growth rates, etc.) of conducting e-commerce in different countries; developing an algorithm for obtaining an integral assessment to determine countries more suitable for e-commerce.

## 3. Results and Discussion

Researchers identify several external factors that influence e-commerce:

- legal aspects that cover legislation and regulation;
- socio-economic factors that determine consumer habits and the economic situation;
- cultural influences that take into account the preferences and characteristics of different consumer groups;
- market conditions that include competition and product and service positioning strategies;
- natural factors and the level of digitalization.

Internal factors include:

- education of e-commerce employees;
- consumer orientation of the company;
- e-commerce platforms and marketplaces (their type, ease of use);
- ease of development;
- range of services and opportunities;
- availability of discount systems for purchases, etc.;
- electronic payments (integration with well-known payment systems, convenience and speed of payment processing) [12].

Without denying the importance of these factors, based on the experience of long-term trade on electronic platforms in America and Europe, let's build a system of 13 criteria. The proposed indicators are related to the quality and comfort of life, and therefore, to the simplification, profitability and convenience of conducting online and real e-commerce transactions (Table 1).

Table 1

System of criteria for assessing the convenience of e-commerce

No.	Criteria	Explanation
1	Level of infrastructure convenience	The proximity of shops, clinics, kindergartens and schools in each area of the city is crucial, as it reduces the time spent on daily needs, which certainly affects the quality and quantity of electronic transactions
2	Medical care	The availability, speed, proximity and cost of medical services, as well as the availability of medicines in pharmacies, equally affect a person's life and, accordingly, its ability to engage in e-commerce
3	Housing	The price of renting a home or office significantly increases the costs of e-commerce
4	Business	The presence of small service points, such as repair or rental workshops, facilitates and reduces the cost of living. E-commerce often requires repairs of laptops, phones and gadgets. If this function is poorly developed, the cost of e-commerce transactions increases significantly
5	Climate conditions	The weather significantly affects the speed and cost of delivery. For example, frequent rain can slow down delivery times and increase costs. There are also risks (flight delays, accidents, etc.)
6	Size of consumer basket	The higher the cost of food and household items, the lower the net profit from e-commerce
7	Taxes and fines	The size and frequency of taxes and fines significantly affect e-commerce revenue
8	Quality and safety of roads	The speed and reliability of cargo delivery significantly depend on the condition of the roads and the degree of safety on them
9	Quality of the Internet	The speed of the Internet connection, as well as its coverage area, affects many aspects of e-commerce: the purchase process (consumer aspect), the process of implementing e-commerce (business aspect), communication with customers (social aspect), training and retraining (educational aspect), etc.
10	Number of civil liberties and rights	Comfort, personal space, and the number of degrees of freedom, albeit implicitly, affect e-commerce, since it is engaged in by people, not robots
11	Safety of life	It is important for all people without exception, including e-merchants. Because without life, everything loses its meaning
12	Right to information	E-commerce requires constant market monitoring, scanning the environment, news updates and engagement with social networks to stay abreast of market fluctuations and new trends. If access to this information is limited, e-commerce may suffer
13	Degree of development and speed of delivery	Timely and reliable delivery of products and goods plays an important role in e-commerce (skillfully organized logistics, which depends on many factors)

This table presents the factors that influence the attractiveness of participating in e-commerce, taking into account the impact of everyday living conditions and the state of the business environment on overall productivity.

Let's apply the proposed system to two selected countries, providing advice on how Ukrainian refugees involved in e-commerce can better adapt to German conditions.

1. *Level of infrastructure convenience.* In Ukraine, it is standard practice to develop appropriate infrastructure for any construction project. This means that new residential buildings are usually located near the main institutions that enjoy maximum attendance (shop, pharmacy, kindergarten, school, clinic). In Germany, there is no such practice, so the infrastructure is not necessarily tied to residential areas. In large cities, this can create inconvenience, since institutions are located far from each other, which leads to unnecessary time wastage for residents. Of course, in small towns this problem is less pronounced. Conclusion: E-commerce is better in small cities where employees have more free time.

2. *Medical care.* In Germany, access to social health care through insurance involves a long wait, from 6 months to 1 year. In contrast, in Ukraine, medical services covered by insurance are available after 2–3 days. In addition, unlike in Germany, where most drugs are only available by prescription, it is possible to buy almost anything in Ukrainian pharmacies. Conclusion: To avoid discomfort related to health and costs, it is advisable to either take more Ukrainian medicines with you, or not get sick.

3. *Housing.* In Germany, the rent for a two-room apartment in large cities is 1,500–2,000 EUR per month, and the average salary is 2,665 EUR (56.2 % of the minimum). In Ukraine, respectively, it is 15–30 thousand UAH (300–600 EUR) with an average salary of 22,500 UAH or 516 EUR (57 % of the minimum). Thus, these amounts are approximately equivalent. However, in Ukraine, 95 % of residents own their own homes [13], while in Germany only about 43 % [14]. Conclusion: for e-commerce, it is worth choosing small cities.

4. *Business.* Ukrainian small and medium-sized private enterprises (SMEs) produce 55–75 % of gross domestic product (GDP), with the share of small businesses accounting for approximately 16 % of GDP [15]. In Germany, SMEs account for 46.7 % of GDP [16]. However, the very limited number or weak development of small repair services, maintenance of household appliances and small retail trade indicates that the role of small businesses is less noticeable compared to Ukraine. This is felt in e-commerce, where, for example, technical problems with equipment (laptops, mobile phones, tablets, computers) often require the purchase of new goods, which leads to large additional costs.

5. *Climatic conditions.* Germany is located in the temperate continental climate zone. However, the weather in the northern lands is significantly influenced by the Baltic and North Seas, which leads to frequent rains, especially in autumn and winter [17]. Ukraine is also located in the temperate zone, but it has much less precipitation and more sunshine [18]. Conclusion: for e-commerce, the location in Ukraine is less critical. In Germany, it is better to choose the southern states (Baden-Württemberg, Bavaria, southern Hesse), since in the northern states (Lower Saxony, Schleswig-Holstein, Mecklenburg-Vorpommern, Hamburg, Bremen) it constantly rains, which causes difficulties with cargo delivery.

6. *The size of the consumer basket.* In 2024, in Germany, the basket contained 650 goods and cost from 2,000 to 3,500 EUR per month, depending on the city of residence, lifestyle and number of family members [19, 20]. The minimum grocery basket in Ukraine, costing approximately 66.62 EUR, included about 400 goods and services [21]. Conclusion: the profits of Ukrainian refugees engaged in e-commerce in Germany are sharply reduced due to significantly higher costs for food and household items compared to Ukraine. Ad-

vice: take as many Ukrainian products as possible with you (canned goods, sugar, cereals, flour, pasta). And then shop not in German, but in Slavic or Turkish stores (where prices are much lower and the products are tastier).

7. *Taxes and fines.* Business taxes in Germany include a corporate tax of 15 %, dividends of 25 % and VAT of 19 % [22]. In total, 54 %. In Ukraine, there is a single tax of about 302.8 UAH (6.68 EUR) per month. Fines are also significantly higher in Germany [23]. Conclusion: to avoid reducing profits, it is possible to try:

a) find ways to completely avoid paying taxes (using minimization tax schemes);

b) be careful on the roads, anticipating a longer delivery time to avoid fines.

8. *Quality and safety of highways.* Central highways are safer due to the absence or remoteness of ditches, so when transporting goods, it is better not to use shorter intermediate roads, to which the ROAD LORDS GPS navigator constantly directs, but to take the autobahn, albeit in a detour.

9. *Quality of the Internet.* The quality of the Internet and mobile communications in Germany lags behind the Ukrainian one, which slows down electronic transactions and other online procedures. Therefore, it is more profitable and reliable to work on Ukrainian communication lines: operators Kyivstar, Vodafone Ukraine, lifecell.

10. *Number of civil liberties and rights.* Compared to Ukraine, Germany has a number of restrictions that have a significant impact on e-commerce.

11. *Safety of life.* It is believed that in Germany, safety is the highest in the EU for living and visiting any places. There is even such a phenomenon as a "silence regime" (from 13:00 to 15:00, from 22:00 to 7:00 in the morning), for its violation – a fine or, in case of constant non-compliance, eviction. But this applies to purely German areas, in areas with a significant share of immigrants, the number of violations is much higher, and safety of life is lower. When considering the issue of safety of life in Ukraine, one should distinguish between peacetime (until 2022) and wartime. Of course, in wartime, safety of life is much lower due to:

a) the threat of accidentally falling under Russian bombing or air defense work (applies to all segments of the population);

b) a high probability of being mobilized and dying in military operations (applies to men liable for military service);

c) the threat of worsening one's situation, and subsequently health, by moving to other countries or regions (applies to everyone).

According to Dnipro publicist Vitaly Portnikov, the value of life in Europe is supposedly much higher than in Ukraine, which is why Europeans do not want to die for any values, while Ukrainians can, and quite easily [24].

Moreover, the value of life in Ukraine should be further reduced. But he is being cunning, because he is comparing two different states: Ukrainian wartime and European peacetime. How the value of life in Europe will change under wartime conditions (and it will, of course), no one knows.

12. *Right to information.* In Germany, there are restrictions on the dissemination of information about negative events (e. g., fires, accidents, strikes) that can hinder e-commerce. For example, a long strike can close roads for a whole day, and due to a lack of information, vehicles carrying goods can get stuck in traffic or take longer routes, causing significant delays. Conclusion: in Germany, logistics should be planned taking into account unexpected events, since timely information may not always be available.

13. *Degree of development of delivery.* Since the German postal service and delivery service work much slower than the Ukrainian ones, it is better to use Ukrainian transit services.

For a better understanding of the advantages and disadvantages of the 13 criteria obtained, it is advisable to group them in Table 2.

Table 2

## Comparative characteristics of the convenience of e-commerce

Indicator	Germany	Ukraine
1	2	3
Level of infrastructure convenience	Disadvantages: – lack of connection of residential buildings to infrastructure; – as a result, institutions are located far from each other and from citizens' homes, which leads to additional costs, time and effort. Advantages: – this problem is less pronounced in smaller cities	Advantages: – according to architectural practices enshrined in legislation, institutions necessary for everyday life, characterized by increased attendance (shop, pharmacy, kindergarten, school, clinic, transport hubs), must be located within walking distance of each building; – if something is missing, the developer must include it in the project, otherwise it will not be approved
Medical care	Advantages: – high quality of medical services. Disadvantages: – long waiting times: medical services (doctor's appointment, tests, operations) can last from six months to a year due to social insurance; – high prices: 200 EUR – 1 appointment with a private doctor; – most medicines are dispensed in pharmacies only by prescription	Advantages: – medical services are available in 1–3 days under insurance; – medicines can be purchased at a pharmacy without a prescription (self-medication is a component of freedom); – low prices: a visit to a private doctor costs 500–650 UAH (10–15 EUR). Disadvantages: – incomplete medical reform; – reduction in the number of polyclinics, rehabilitation institutions and the volume of services provided in them
Housing	According to EURtат, in 2023, homeowners accounted for 49 % (according to other estimates 43 %) [13]. Renting a three-room apartment (1 room and a combined kitchen) in large cities costs 1,500–2,000 EUR per month with an average income of 2,665 EUR (56.28 % of the minimum income). However, finding the right housing is very difficult: as they say, it is not people who are looking for housing here, but housing – they are happy to find it	Ukraine occupies a leading position among European countries in terms of the percentage of homeowners: 95 % [14]. Prices for renting apartments in large cities range from 15,000 to 30,000 UAH (300,000 to 600,000 EUR) with an average income of 22,500 UAH or 516 EUR (57 % of the minimum income). However, there are significantly fewer tenants compared to Germany
Business	Small and medium-sized businesses account for 46.7 % of GDP [16]. However, the absence or very weak development of small repairs, technical maintenance, repair of household appliances, and small retail trade indicates that the role of small businesses is significantly smaller compared to Ukraine	Small and medium-sized businesses collectively generate 50–70 % of GDP. Small enterprises account for about 16 % of GDP [15]. This is evidenced by the large number of workshops, car washes, repair points for everything from shoes to household appliances and gadgets, as well as roadside hotels, cafes, etc.
Climate conditions	The climate is mostly temperate. However, in the central and northern regions, due to the influence of the Baltic (or East) and North Seas, it rains constantly [17]	Here, the temperate continental climate is drier, so precipitation is much less frequent [18]
Size of consumer basket	The average consumer basket of 650 items in 2024 cost between 2,000 and 3,500 EUR, depending on where you live [18, 20]. Yes, refugees who receive 570 EUR, unemployed people who earn 400 EUR, pensioners with pensions of 451–563 EUR cannot afford the average basket	The 2024 grocery basket, worth 66.62 EUR (3,028 UAH), contained about 400 goods and services [21]. But not because people are poorer here, but because life is much cheaper (in terms of price, not in essence)
Taxes and fines	Taxes on business activities include: corporate tax – 15 %, dividends – 25 %; VAT – 19 % [22]. In total, 54 %	The business tax consists of a single tax of 6.68 EUR (no more than 10 % of the minimum wage for employed individuals). Therefore, opening and developing a business (including e-commerce) is much easier here
Quality and safety of roads	Advantages: – good condition of roads and footpaths (with few exceptions); – numerous special rest areas along the autobahns for drivers with toilets (not always), tables, sometimes mini-cafeterias. Disadvantages: – lack of places to stop vehicles on secondary intercity roads, which means that drivers have to drive for 2–3 hours without even being able to set up the navigation system; – there are not enough hotels and cafes along major routes (mainly snack bars at gas stations); – deep ditches (ditches), dug on both sides of autobahns and narrow intercity roads to drain water, from time to time become the cause of accidents	Advantages: – good condition of main roads (except for some secondary ones); – on intercity and international routes, it is possible to stop almost anywhere; – along the autobahns at gas stations there are many cafes, restaurants, snack bars, as well as hotels with restaurants; – autobahns and secondary roads are safer, as they are wider and have no ditches, which reduces the risk of accidents. Disadvantages: – lack of specialized parking areas for vehicles and drivers, such areas are often created spontaneously in forests without any landscaping; – pedestrian paths in many cities, unlike in Germany, are in poor condition
Quality of the Internet	The lag in the quality and speed of the mobile network and the Internet becomes an obstacle to online procedures, especially in e-commerce, electronic documents and government applications, such as the Ukrainian "Diya". This causes many inconveniences during online payments, and the execution of legal or any other acts [13]	The Internet reaches more cities and is faster, and banking services are much more developed
Number of civil liberties and rights	There are many restrictions (disadvantages): – on the size (rather small) of summer houses; – on the right to spend the night in them under threat of a fine; – on the installation of satellite dishes, air conditioners, glazing of balconies; – on the planting of fruit trees or vegetable gardens in private houses – only non-cultivated plants and grass cover are allowed to be planted. Advantages (according to Germans): – the beautiful appearance of the streets is preserved; – there is no competition for monopolistic companies	Advantages. There are no such restrictions in Ukraine. This means: – summer houses can be built with any area and number of floors (according to the approved project); – it is possible to stay in them for the night and even live there permanently; – it is possible to install satellite dishes and air conditioners anywhere; – it is possible to glaze loggias and balconies; – it is possible to grow anything the owner wants on the plots, except for narcotic or hallucinogenic plants



Continuation of Table 2

1	2	3
Safety of life	It is ensured by police officers (there are a lot of them in Germany), as well as fines and the constant response of ordinary residents to any troubles or suspicions about the behavior of their neighbors	In Ukraine, this criterion should be considered in two planes: in peacetime and in wartime (2022–2025). In the first case, the norm (degree) of life safety was practically no different from the European one (the same rights, obligations, punishments), except that the system of fines for violating public life worked poorly. In wartime, of course, the priority of values changed. But this was temporary
Right to information	Disadvantages: – there are restrictions on media reporting on negative events in the country, such as fires, murders, accidents, strikes, etc.; – a fine is imposed for taking photos or using mobile phones of fires, the aftermath of explosions, road accidents, and other emergencies, as well as posting these photos on social networks. Advantages: – the country’s positive image is not damaged; – recruiting dissenters is impossible (due to fines)	In Ukraine, there are no such restrictions, so it is allowed to freely cover any events in the media and on social networks. Advantages: – greater freedom of speech; – more truthful information. Disadvantages: – the possibility of agents recruited by foreign services
Degree of development and speed of delivery	The postal service is much slower than the Ukrainian one. Due to this and other factors, the delivery of goods is much slower compared to Ukraine, and is not always of high quality and reliable [13]	Ukrposhta and Nova Poshta work much faster than German. In addition, Ukraine, unlike Germany, is a member of the international express delivery service EMS

So, a multi-criteria model of 13 factors was developed for a comprehensive assessment of the attractiveness of a country for engaging in e-commerce. Since the criteria often have different units of measurement, they need to be normalized to a common dimensionless scale using expert evaluation methods. The following algorithm was applied:

1. Obtaining expert evaluations of the proposed criteria for two countries in the range from 0 to 10 and calculating group (average) expert evaluations.

2. Normalizing expert evaluations (i. e., converting them to dimensionless values).

3. Obtaining from experts the degrees of significance of the criteria (assigning them weight coefficients).

4. Determining group (average) weights of the criteria and normalizing them.

5. Constructing an integral criterion that takes into account the obtained normalized evaluations and weight coefficients.

6. Calculating the numerical value of the integral criterion for Ukraine and Germany.

Step 1. To evaluate the criteria of the proposed “e-commerce attractiveness model”, let’s involve experts from three different groups:

1) Ukrainians who have been citizens of Germany for over 20 years;

2) Ukrainians with refugee status who moved to Germany due to the war and returned home two years later;

3) refugees who still live in Germany.

It makes no sense to involve purely German experts, since they, having no experience of living and working in Ukraine, cannot compare its conditions with German standards. Let’s consider separately peacetime and wartime, which is reflected in the experts’ assessment of the level of life safety.

The group assessment of experts is calculated by the formula:

$$f_j = \frac{1}{p} \sum_{k=1}^p f_{jk}, \quad (1)$$

where  $f_{jk}$  – score given by the  $k$ -th expert for the  $j$ -th criterion  $f_j$ ,  $j=1, n$ ;  $k=1, p$ ,  $n$  – number of criteria and  $p$  – number of experts.

Step 2. The second step is to normalize the scores (i. e., convert them into dimensionless values). The most common types of normalization are absolute, relative, and natural. It is assumed that the first  $l$  criteria  $f_j, (j=1, l)$  are maximized, and the remaining  $(n-l)$  criteria  $f_j, (j=l+1, n)$  are minimized. According to the principle of maximum efficiency, the normalized criteria  $\hat{f}_j$  are defined as follows [25].

Absolute normalization:

$$\hat{f}_j = f_j - f_j^{\min}, j=1, l; \quad \hat{f}_j = f_j^{\max} - f_j, j=l+1, n. \quad (2)$$

Relative normalization:

$$\hat{f}_j = \frac{f_j}{f_j^{\max}}, j=1, l; \quad \hat{f}_j = 1 - \frac{f_j}{f_j^{\max}}, j=l+1, n. \quad (3)$$

Natural normalization:

$$\hat{f}_j = \frac{f_j - f_j^{\min}}{f_j^{\max} - f_j^{\min}}, j=1, l; \quad \hat{f}_j = \frac{f_j^{\max} - f_j}{f_j^{\max} - f_j^{\min}}, j=l+1, n, \quad (4)$$

where  $f_j, (j=1, n)$  – criteria values;  $f_j^{\max}, f_j^{\min}, (j=1, n)$  – maximum and minimum criteria values.

Normalization according to formulas (4) is known as Savage normalization. Absolute normalization allows to preserve the units of measurement for the criteria. The disadvantage of relative normalization is that it depends significantly on the largest possible value of the criterion, which is determined by the conditions of the problem [25].

If the decision-making process determines (more or less subjectively) the optimal quality levels by setting fixed values  $f_j^{\phi}, (j=1, n)$ , then in formulas (3) – (4) the values  $f_j^{\max}$  are replaced by  $f_j^{\phi}, (j=1, n)$ . A significant disadvantage of this normalization method is the subjectivity and complexity of determining these fixed values  $f_j^{\phi}, (j=1, n)$ .

Normalized values according to natural normalization  $\hat{f}_j$  are within the range [0; 1]. They are dimensionless, which explains their wide practical use.

In our case  $f_j^{\max} = 10, f_j^{\min} = 0$ , that is, the assessment interval is from 0 to 10. Since all criteria are maximized, the first formula (4) is used, which for normalizing expert assessments takes the form:

$$\hat{f}_j = \frac{f_j}{10}, j=1, \dots, n. \quad (5)$$

The obtained values of group (average) normalized scores, which are calculated by formulas (1), (5), are given in Table 3.

The diagrams (Fig. 1–3) constructed according to Table 3 illustrate the distribution of the values of the attractiveness criteria for e-commerce in Ukraine and Germany. As can be seen, it is more uniform for our country (in peacetime and wartime) and more scattered for Germany, which implicitly indicates a less comfortable life in this country.

Table 3

Group normalized expert assessments of criteria are of the form

Criteria/Countries	Convenience of infrastructure	Medical service	Housing	Business	Climatic conditions	Size of the consumer basket	Taxes and fines	Road quality and safety	Internet quality	Number of civil liberties	Security (peace/wartime)	Right to information	Delivery
Germany	0.35	0.57	0.42	0.61	0.46	1.00	0.28	0.21	1.00	0.68	0.95	0.22	0.56
Ukraine	0.90	0.83	0.93	0.95	0.88	0.46	0.91	0.85	0.73	1.00	0.82/0.4	0.88	0.90

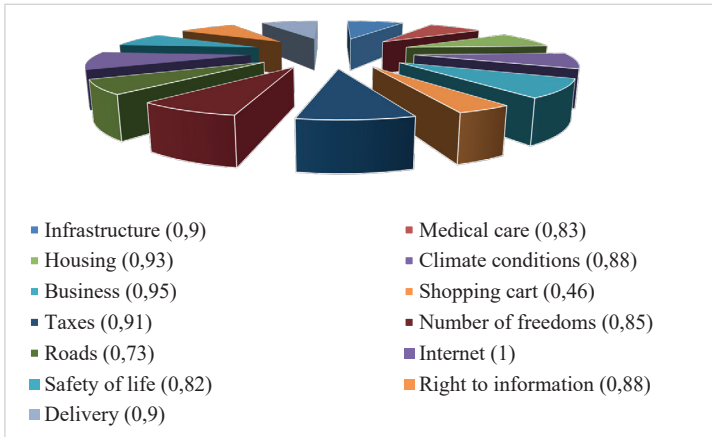


Fig. 1. Attractiveness of e-commerce in Ukraine according to criteria under peaceful conditions

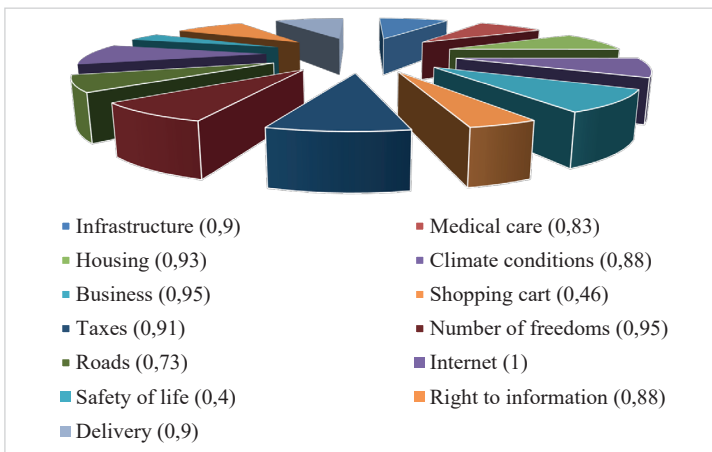


Fig. 2. Attractiveness of e-commerce in Ukraine according to criteria under wartime conditions with a reduced level of life safety (2022–2025)

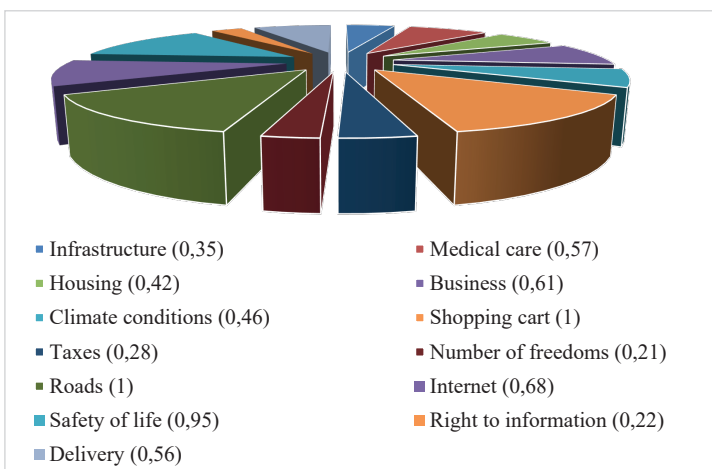


Fig. 3. E-commerce attractiveness in Germany based on criteria

Step 3. It is necessary to assign weights (degree of importance) to the criteria. In our list, the weights correspond to the ranks (order places) that experts assign to the criteria from 1 to 13. The experts we consulted assigned the following weights to the criteria (Table 4).

Table 4

Non-normalized weights of criteria

No.	Criteria (fj)	I expert	II expert	III expert
1	Level of infrastructure convenience	8	6	10
2	Medical care	9	8	8
3	Housing	10	1	3
4	Business	4	10	5
5	Climate conditions	5	5	7
6	Size of consumer basket	3	3	2
7	Taxes and fines	6	2	1
8	Quality and safety of roads	2	9	4
9	Quality of the Internet	11	13	12
10	Number of civil liberties and rights	13	12	11
11	Safety of life	7	7	9
12	Right to information	1	4	6
13	Degree of development and speed of delivery	12	11	13

Working with different expert samples, it is possible to notice that the experts of the second group (Ukrainians who returned home) were most interested in: business, the number of civil liberties and rights, the right to information. The experts of the third group (refugees who continue to live in Germany) considered factors 1, 2, 5, 11, as well as social assistance to be key. They did not care about German taxes (factor 7), since they paid them in Ukraine. The experts of the first group (Germans of Ukrainian origin) preferred their own housing, taxes and fines, business, and medical care.

Step 4. It is necessary to calculate the group "weight" coefficients using the formula  $\alpha_j^0 = \frac{1}{p} \sum_{k=1}^p \alpha_{jk}^0 = \frac{1}{3} \sum_{k=1}^3 \alpha_{jk}^0$  and obtain 13 average expert unnormalized weight coefficients (Table 5, column 3).

The normalization of the weight coefficients of the criteria is carried out according to the formula:

$$\alpha_j = \frac{\alpha_j^0}{\sum_{j=1}^n \alpha_j^0}, j = \overline{1, n}, \left( \sum_{j=1}^n \alpha_j = 1 \right). \tag{6}$$

In our case  $n=13, \sum_{j=1}^{13} \alpha_j^0 = 91$ .

After calculations, let's obtain normalized weight coefficients (Table 5, column 4).

Table 5

Average expert unnormalized and normalized weight coefficients

No.	Criteria (f <sub>j</sub> )	Group weights of criteria (α <sub>j</sub> <sup>0</sup> )	Normalized weights of criteria (α <sub>j</sub> )
1	Level of infrastructure convenience	8	0.087912
2	Medical care	8.(3)	0.091575
3	Housing	4.(6)	0.051282
4	Business	6.(3)	0.069597
5	Climate conditions	5.(6)	0.062271
6	Size of consumer basket	2.(6)	0.029304
7	Taxes and fines	3	0.032967
8	Quality and safety of roads	5	0.054945
9	Quality of the Internet	12	0.131868
10	Number of civil liberties and rights	12	0.131868
11	Safety of life	7.(6)	0.084249
12	Right to information	3.(6)	0.040293
13	Degree of development and speed of delivery	12	0.131868

Step 5. Let's build an integral quality criterion based on the method of weighted aggregation of criteria. This is expressed as:

$$F = \sum_{j=1}^n \hat{f}_j \cdot \alpha_j, \quad (7)$$

where  $n$  – number of criteria (in this case  $n=13$ );  $\alpha_j$  – normalized weights of criteria taken from Table 5 (column 4);  $\hat{f}_j$  – normalized expert assessments of criteria taken from Table 3.

Then for Germany (rounded to millions):

$$F_1 = 0.087912 \cdot 0.35 + 0.091575 \cdot 0.57 + 0.051282 \cdot 0.42 + 0.069597 \cdot 0.61 + 0.062271 \cdot 0.46 + 0.029304 \cdot 1.00 + 0.032967 \cdot 0.28 + 0.054945 \cdot 0.21 + 0.131868 \cdot 1.00 + 0.131868 \cdot 0.68 + 0.084249 \cdot 0.95 + 0.040293 \cdot 0.22 + 0.131868 \cdot 0.56 + 0.030769 + 0.052198 + 0.021538 + 0.042454 + 0.028645 + 0.029304 + 0.009231 + 0.011538 + 0.131868 + 0.089670 + 0.080037 + 0.008864 + 0.073846 = 0.609963.$$

And for Ukraine in peacetime (rounded to the nearest million):

$$F_2 = 0.087912 \cdot 0.90 + 0.091575 \cdot 0.83 + 0.051282 \cdot 0.93 + 0.069597 \cdot 0.95 + 0.062271 \cdot 0.88 + 0.029304 \cdot 0.46 + 0.032967 \cdot 0.91 + 0.054945 \cdot 0.85 + 0.131868 \cdot 0.73 + 0.131868 \cdot 1.00 + 0.084249 \cdot 0.82 + 0.040293 \cdot 0.88 + 0.131868 \cdot 0.90 + 0.079121 + 0.076007 + 0.047692 + 0.066117 + 0.054798 + 0.013480 + 0.030000 + 0.046703 + 0.096264 + 0.131868 + 0.069084 + 0.035458 + 0.118681 = 0.865275.$$

In wartime:

$$F_3 = 0.087912 \cdot 0.90 + 0.091575 \cdot 0.83 + 0.051282 \cdot 0.93 + 0.069597 \cdot 0.95 + 0.062271 \cdot 0.88 + 0.029304 \cdot 0.46 + 0.032967 \cdot 0.91 + 0.054945 \cdot 0.85 + 0.131868 \cdot 0.73 + 0.131868 \cdot 1.00 + 0.084249 \cdot 0.40 + 0.040293 \cdot 0.88 + 0.131868 \cdot 0.90 + 0.079121 + 0.076007 + 0.047692 + 0.066117 + 0.054798 + 0.013480 + 0.030000 + 0.046703 + 0.096264 + 0.131868 + 0.033700 + 0.035458 + 0.118681 = 0.82989.$$

Thus, the integral criterion of quality (attractiveness) for e-commerce in Ukraine turned out to be significantly higher compared to Germany even under wartime conditions. Similarly, a higher attractive-

ness rating for our country as a whole, according to other indicators and other experts, was obtained in [13]. At the same time, for any spread of expert assessments on individual criteria in different samples, the value of the integral criterion for both countries changed, but not their final ratio.

This is at odds with generally accepted views. According to Statista, in 2022–2023, Ukraine was not among the TOP-10 countries with the highest percentage of revenue from retail e-commerce [26]. In addition, according to the ranking of the richest countries (which also takes into account the prospects of e-commerce), Ukraine in 2024 ranked 105th (Germany in 22nd place) [27].

As the results of the calculations show, this is not true. And the low ratings are explained by the fact that they are based on criteria that do not take into account a number of circumstances and conditions important for a comfortable life and doing business.

In our opinion, the main reasons for errors when comparing living conditions in different countries lie in five areas:

1. *In the abstraction of concepts.* Thus, countries are usually compared by the degree of democratic reforms, judicial system, government corruption, GDP size, etc. These concepts have different meanings and understandings, and they affect the lives of ordinary citizens indirectly.

2. *In an incorrect comparison.* Usually, researchers (politicians, public figures, political scientists, economists) compare two different states of life. Namely, everyday (inherent in their native country) with festive (carnival) ones, in which they are temporarily in another country (vacation, tourist trip, conference, symposium, tour, etc.). The festive mood is attractive in any country, including your own, but unlike everyday life, it is short-lived. As an old joke says, the main thing is not to confuse tourism with emigration.

3. *Ignorance of living conditions in other countries.* Thus, the misconception about the “paradise” life in EU countries is caused by the fact that no one lived there for a long time without the appropriate citizenship until 2022.

4. Substitution of the main indicators for secondary ones when assessing the attractiveness of countries. The first include: income-loss, medical services, availability of one's own housing or the ability to purchase it, the degree of public freedoms, etc. The second include the ability to travel around Europe, the cleanliness of the streets and the beauty of buildings, the ability to drink champagne in Paris or Courchevel, buy something beautiful and lacy, etc. Meanwhile, the latter indicators are far from the first place in the list of criteria for the quality of life. Of course, the cleanliness of the streets and the beauty of the buildings are important, but, in essence, this is a gloss that can be implemented quite quickly through a series of actions (Table 6). Life success consists of other components: career (what a person has achieved in life and what are its prospects), external attributes (title, apartment or house, car, etc.), family and its condition, health, etc.5.

5. *Mythology.* Ukrainians were instilled with the idea that real success can only be achieved in the West. And all you have to do is go abroad and all your dreams will come true. A typical scene from many films: a hero who once went abroad (to Europe or America) visits its native homeland a few years later, and its former friends see a respectable rich man whom they are madly jealous of. In the 1990s, there were more films with similar plots, as migration to the West and the opportunity to get rich with the help of Western experience became the most popular themes (a typical example is Dmitry Astrakhan's films of the first half of the 1990s “You Are the Only One in Me” and “Everything Will Be Fine”). In fact, this is not at all true.

In our opinion, an immigrant can count on success abroad in three cases:

- 1) when the country is just being rebuilt (emigrants to America in the 16th–17th centuries took advantage of this chance);
- 2) when he/she is invited to work or serve in a country on particularly attractive terms;

3) when he/she has married a wealthy native of the country where he/she is planning to go.

In addition to these three scenarios, success can also come from taking advantage of new opportunities in fast-growing industries or emerging sectors in other countries. For example, technological advances or financial markets can offer people unique chances to prosper if they are in the right place at the right time. Another opportunity arises when an individual has unique skills or knowledge that allow them to stand out in competitive foreign markets. Some people can achieve success by establishing strong personal networks or connections in a foreign country, which can open doors to business ventures, investments, or career advancement. Finally, the lumpen – individuals who had nothing in their homeland and will not acquire anything in Germany – have nothing to lose, but they also have nothing to gain.

In all other cases, living and, accordingly, doing e-commerce in Ukraine is better than in Europe.

Finally, let's note the areas through which, in our opinion, a country like Germany can improve its external image (Table 6).

It is important to note the number of boundaries that indicate the boundaries between and the minds of the stagnation of the results being rejected. The main axis is:

1. *Geographical boundaries.* The study compares the electronic commerce of two countries – Ukraine and Germany, so the results may be specific to these countries. The stench may not necessarily remain stagnant to other extremes, especially quiet ones, which may have important economic, cultural and technological minds. However, the methodology itself for expanding the level of profitability of e-commerce may, therefore, be stagnant.

2. *Change the hour.* The results of the investigation may not be relevant for up to an hour after it has been carried out. Changes in technology, economic thinking, legislation or social trends may cause policies to become less relevant or change in the future.

3. *Political and legal aspects.* Legislative and political relations between Ukraine and Germany can also significantly influence the results of the investigation. For example, various regulations regarding data storage, tax regimes and support for electronic commerce on the side of the country can be changed and will significantly contribute to the increase in the market for entrepreneurs and living companions.

4. *Subjective boundaries.* Different experts can give different assessments to the designated criteria, which can influence the final result, and not the final result, which has been verified in practice. Thus, the integral criterion of cost for Ukraine will still be greater, lower for Germany, some of the main indicators that influence the ease and efficiency of e-commerce (the consumer infrastructure has been upgraded, climate, supply system, housing, medical care, sinks for other business, etc.) are more stable and cannot be changed easily or changed in the sun. Also, the final step to the level of profitability of e-commerce in these countries will be lost without changes. If war begins in Ukraine, the values of the integral criterion for the growth rate will be even more different from the integral criterion for the growth rate for Germany. The method of aggregating the integral criterion of a rich-criteria model can effectively be used for both simple and multi-criteria criteria, or for their combination. Evaluations of clear performances are made with the help of experts. And the values of these indicators correspond to real values.

Therefore, the results and methodology for comparing the attractiveness of e-commerce in different countries can be useful for e-merchants, government strategies, and business planning, but it is necessary to take into account the mentioned limitations and market specificities in other regions.

Therefore, for further development of this topic, it is recommended to extend the comparative analysis to other Western European countries using the proposed system of criteria. This will allow a broader understanding of the e-commerce landscape in different countries and will allow to identify best practices and trends that can be applied in different regions. By assessing countries according to the same criteria, researchers can obtain valuable information about the factors that contribute to the success of e-commerce in the selected economies. This comparative approach will provide a better understanding of the attractiveness of the e-commerce environment in Europe and will facilitate the development of individual strategies for different markets.

For greater objectivity, it is extremely important that researchers spend some time in these countries (i. e., be integrated into their environment). This will allow to better understand how well a country meets people's needs and expectations regarding living conditions and business transactions, including e-commerce. Alternatively, it may still be better to stay in Ukraine, where it is easier and faster to create and develop an e-commerce business and where conditions for employees are better.

Table 6

Directions for improving Ukraine's external image

No.	Event	Characteristics	Comment
1	Good condition of houses	This is a tourist (for foreigners) and aesthetic (for local citizens) attraction, but it greatly affects the overall impression of the country	The Germans transferred their responsibility for the budget to the housing estates (private households, private households, cooperatives). Behind the camp of the houses there are special commissions and drones that will cover their sides. Fines are imposed for non-compliance with the standards. In Ukraine, for the camp of houses, there are high-quality housing offices, which do not interfere with the assignments
2	Good condition of pedestrian paths	This event follows from the first point	Utilities installed as a result of public works (upgrades, repairs, re-equipment, etc.) become occupied only by roads (and municipal buildings). It's true that in Ukrainian places the footpaths are much wider than European ones, so laying them with tiles is much more expensive and more expensive, just like that
3	Limited right to negative information	In Germany, you can't even inform about road accidents and other extraordinary events, not to mention World War II, Nazism, Hitler and other related topics. In Ukraine, it is possible to discuss anything and in any way	Perhaps, not at the same level as at Germany, but without the introduction of fines for riveting and unconstructive or unprimed husky edges are fully respected. This contributed to the current image of the region, the income of the state, and the level of population
4	Increase in social benefits	This event will definitely improve the image of the country and attract people who want to work, but cannot be realized in their own country	Help for the unemployed, immigrants, people with limited incomes, war veterans, those in need, fathers looking after their children, and may be promoted for increased donations from possible individuals
5	Improvement of conditions for people with disabilities	This event is especially relevant for post-war Ukraine	This includes: the provision of special ramps in stores, buildings, warehouses and passages; eliminating curbs at intersections; I'll buy "squat shoes" on bus bars; advance in front of the walking "zebras" of vocal sounds – advance for the blind



#### 4. Conclusions

The study provides a deeper understanding of the attractiveness of different countries for e-commerce. Analysis of the criteria system revealed that Ukraine's place in the global e-commerce lists is underestimated due to incomplete consideration of all aspects of its convenience. The study shows that e-commerce in Ukraine, compared to Germany at least, is more profitable and convenient. Both due to direct factors (greater freedom, lower taxes, faster delivery, better mobile communications), and indirect ones, such as the growth of the number of tech-savvy consumers, increasing Internet penetration and relatively low labor costs. This can significantly reduce operating costs for e-commerce companies. Thus, hypothesis 2 was confirmed.

The results indicate that, despite certain challenges, such as political instability and limited infrastructure in some regions, Ukraine is a highly competitive environment for the growth of e-commerce. The authors argue that with further investments in logistics and digital infrastructure, Ukraine can significantly rise in the global e-commerce rankings, becoming an increasingly attractive center for both local entrepreneurs and international e-commerce giants.

#### Conflict of Interest

The authors declare that they have no conflict of interest with respect to this study, including financial, personal, authorship or other, that could influence the study and its results presented in this article.

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The manuscript has no related data.

#### Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies in the creation of the current work.

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