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Educational and Research Institute “Karazin Business School”

Department of Management and Administration

BACHELOR’S QUALIFICATION WORK

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E-commerce Enterprise”

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**TASK**

**TO BACHELOR THESIS**

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1. Title: Analysis of Artificial Intelligence implementation in the activity of E-commerce enterprise

Supervisor: Andreieva Kateryna, Lecturer of the Department of Management and Administration

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#### 4. Work plan

№	Stages of work
1	Approval of the thesis content
2	Preparation of the thesis' first section
3	Completion of the first section according to the supervisor recommendations. Writing the thesis' second section
4	Completing of the second section according to the supervisor recommendations. Preparation of a report for a scientific conference with a presentation of the main results of the thesis
5	Writing of the introduction, conclusions of the thesis. Making references list
6	Submission of the thesis to the Department of Management and Administration

5. Date of assignment issue September 28, 2023

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## INTRODUCTION

The relevance of the research topic is based on the significant progress of the modern technology Artificial Intelligence (AI). Research and development in the field of AI have primarily focused on five components of human intelligence: learning, reasoning, problem-solving, perception, and language use. Nowadays, the vast majority of people is increasingly using this technology, and in the future, it will be difficult to imagine an industry that has not implemented this innovation in its daily activities. The rapid development of artificial intelligence is changing the conventional understanding of life and the way economic activities are conducted. Its tools perform various tasks and have been receiving increasing attention in recent times, playing a crucial role in enhancing operational efficiency and customer satisfaction in the e-commerce sector.

The concept of AI refers to the simulation of human intelligence processes by machines and software. AI plays a very important role in the modern economy, these systems are developed to perform tasks that, if performed by humans would require the use of intelligence, such as learning, decision-making, pattern recognition and problem solving. For example, the largest banks in the United States and global investment companies have been actively implementing AI technologies since 2017. This allows them to become industry leaders and remain competitive in the long term. On the other hand, there is an opinion that the widespread adoption of AI technologies could lead to the creation of monopolies, increase the gap between developed and developing countries, and raise global unemployment levels. It is clear that this topic is quite controversial but highly relevant in the current context of economic activity, both globally and in Ukrainian practice. Therefore, its comprehensive and thorough investigation is warranted.

The implementation and impact of AI in e-commerce were studied and researched by both Ukrainian and International scientists. Key aspects of this topic is explored by the Ukrainian scholars such as A. Kovalenko, I. Petrov,

M. Shevchenko, O. Petrovich and T. Ivanova. Theoretical and methodological approaches to AI into business strategies are highlighted by scientists including A.Ng, Adin Le chun, G. Hinton. Additionally, some of the contributions has been made by researchers like O. Bryndina, V. Kardash, L. Balabanova and others in the understanding AI's role in modern business practices [1].

Taking into account all the Practical and Theoretical works of scientists who devoted their research into of Artificial Intelligence, it is apparent that for the effective implementation of AI in e-commerce, the issues surrounding the development of AI strategies and the planning of AI integration within enterprises remain open and relevant.

The goal of the qualification work is a comprehensive analysis of Artificial Intelligence implementation at Rozetka E-store and the development of practical recommendations for improving of the managerial activities of this company.

To achieve this goal, the following tasks were set and implemented:

- the essence, principles and methods of AI implementation in enterprise's management system were determined;
- the peculiarities of E - commerce as modern approach in doing business were revealed;
- the global and national practice of AI implementation in business were examined;
- general situation at the E – commerce market in Ukraine was characterized;
- analysis of organizational system and economic activity of Rozetka was conducted;
- perspectives for implementation of AI in the business activity of Rozetka were defined.

The object of the study is the process of AI solutions implementation in the managerial activities of e-commerce enterprise (on the example of “Rozetka” E-store).

The subject of the study is the set of theoretical and methodic principles of managing the AI solutions in activity of the enterprise.

The main methods of research: the method of theoretical generalization - for the formation of a conceptual and categorical research; the method of logical analysis - for determining the problems and features of the Artificial Intelligence in the enterprise; system analysis - for forming directions and main elements of the e-commerce system; graphic analysis - for presenting an image of theoretical and practical provision of the work, as well as for visual schematic statistical material; statistical and economic – industry 5.0 - to study the organizational and AI implementation of the enterprise; abstract logical analysis - for generalization and formation of conclusions and recommendations.

The theoretical and information base of the study were the works of Ukrainian and world scientists, scientific publications in periodicals, laws and regulations of Ukraine, statistical materials and reference books.

The structure and content of the qualification work correspond to the settled tasks and consists of an Introduction, Two sections, Conclusions and a list of References. The total volume of work is 91 pages of computer text. The work contains 4 tables & 25 figures. The list of sources includes 54 items.

## SECTION I

### THEORETICAL BASICS FOR AI IMPLEMENTATION IN MANAGEMENT SYSTEM OF MODERN ENTERPRISE

#### 1.1 The Essence, Principles and Methods of AI implementation in enterprise's management system

The future of industries is currently more dependent upon its presence on online platforms. This online presence not only visualizes, promotes or advertise your brand but also helps in gaining huge customers. Also, customers are now gradually turning their interests towards online shopping which are easier, time-saving, and more personalized compared to the conventional practice of visiting physical stores. So one of the most popularizing and crucial tools used by e-commerce brands to attract people is through their artificial intelligence services. AI is constantly changing and updating the world of e-commerce in terms of its customer service and experiences.

Artificial Intelligence (AI) refers to the branch of computer science that enables machines to simulate human intelligence and perform tasks that typically require human cognitive abilities. It encompasses a wide range of technologies and techniques that enable machines to perceive, reason, learn, and make decisions in a manner similar to human intelligence.

AI systems are designed to analyze vast amounts of data, recognize patterns, and extract valuable insights to make informed predictions or take appropriate actions. Through machine learning algorithms, they can continuously refine their performance and improve their accuracy over time, without explicit programming.

AI is not limited to a single approach or methodology but encompasses various subfields such as machine learning, natural language processing, computer vision, and robotics. These different features of AI work in harmony,

enabling machines to perform tasks like image recognition, language translation, speech synthesis, and even autonomous decision-making.

In **1943** *Warren McCulloch* and *Walter Pitts* presented their model of artificial neurons, considered the first artificial intelligence, even though the term did not yet exist. Later, in **1950**, the British mathematician *Alan Turing* published an article entitled "Computing machinery and intelligence" in the magazine *Mind* where he asked the question: Can machines think? He proposed an experiment that came to be known as the Turing Test, which, according to the author, would make it possible to determine whether a machine could have intelligent behavior similar to or indistinguishable from that of a human being.

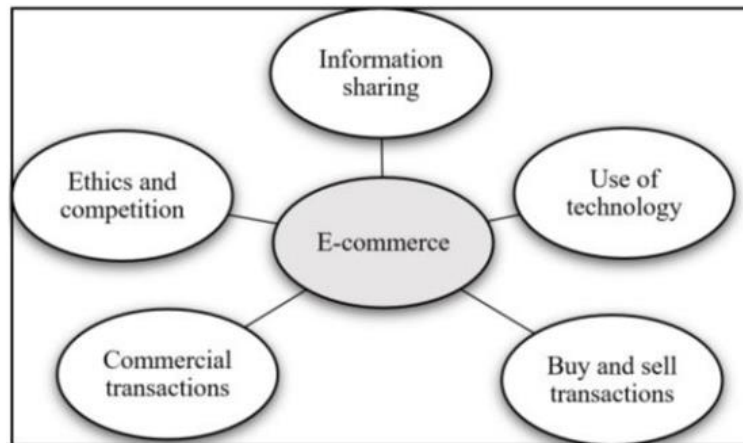
*John McCarthy* coined the term "**artificial intelligence**" in 1956 and drove the development of the first AI programming language, LISP, in the 1960s. Early AI systems were rule-centric, which led to the development of more complex systems in the 1970s and 1980s, along with a boost in funding. Now, AI is experiencing a regeneration thanks to advances in algorithms, hardware and machine learning techniques.

AI can play a significant role in identifying and mitigating risks. Machine learning algorithms can analyze vast amounts of data to detect anomalies, patterns, and potential fraud. This is especially crucial in sectors like finance, insurance, and cybersecurity, where timely identification and mitigation of risks are high.

Effective utilization of AI can aid in identifying concealed insights, trend forecasting, and beneficial financial decision making. AI has influenced the traditional way of replenishment and merchandising by simply using data analytics to indicate which product has to be replenished and which has to be discounted. According to a recent report of "Business Insider" predicts that about 85% of the customer services will be handled by AI-powered bots which can immediately respond to calls, chats, and emails with almost no human intervention. This research thesis encompasses the various AI tools empowered by the e-retail brands to attract their customers, the various ways by which AI influences both the retailer and the customer, and successful e-retail brands that

employed AI for their advancement. In addition, we can conclude by how AI is going to dominate the e-commerce venture in the near future.

E-commerce has grown significantly in recent years, both in terms of the number of users and the number of commercial websites. As shown below in (Figure 1.1) there can be various definitions and that must be defined in five main dimensions.



**Figure 1.1. E-commerce dimensions**

**Information Sharing:** e-commerce is the electronic capture, processing, storage, communication, and delivery of information using information and communication technologies.

**Use of Technology:** e-commerce refers to the exchange of goods, services, and information using computer networks, especially the Internet.

**Buy and Sell Transactions:** e-commerce is the term used to describe the buying, selling, and trading of products, services, and information over the Internet.

**Commercial Transactions:** it refers to the transfer of money in business transactions using an electronic network, especially the Internet.

**Ethics and Competition:** e-commerce involves using ethical practices when conducting business online and allocating resources to gain and keep a competitive advantage in virtual markets.

E-Marketer [1] estimated that the growth of e-commerce sales in 2020 over the previous year would be 27.6%, for a total of USD 4.28 trillion. Statista [2]

projected that e-retail sales would increase to USD 5.4 trillion by 2022. Despite the fact that the past few years have been difficult for retail, the COVID-19 pandemic is significantly affecting e-commerce due in major part to a shift in consumer behavior [3]. Essential commodities and necessities such as clothing, footwear, which fall under the non-essential or general merchandise category still diminished while on the other hand, food, consumables, and healthcare saw a rise in online shopping. The COVID-19 outbreak has disrupted international development patterns and prompted urgent changes in several sectors. AI has changed several fields in the past few decades, including the healthcare industry [7,8], manufacturing [9], transportation, and retail [10]. The use of AI is also starting to increase in e-commerce strategies [11–12]. Currently, many merchants already apply artificial intelligence (AI) opportunities as one of the stimuli for creating e-commerce in a highly competitive environment and with an increasing level of consumers' requirements. As an example, consider how e-commerce huge shops like Amazon, Alibaba, and eBay invest in research and development to integrate visual recognition techniques, develop algorithms to meet user content preferences, or adjust pricing based on in-the-moment comparisons of rival products. E-commerce makes more information available to both consumers and rival businesses. E-commerce retailers are compelled to take on new AI techniques due to fierce online market competition.

### **Basic Concepts of AI:**

- **Machine Learning:** This kind of technology supports artificial intelligence. It allows for learning back experiences and does not need to be coded manually. They include developing means and mechanisms for content automatic processing, its analysis with the subsequent making of conclusions or even forecasts without involvement of humans.
- **Supervised learning:** This type of learning is where an algorithm is trained by using training data that have been labelled. The input is fed into the machine which thus indicates the right output is achieved. The aim is to

look for a mapping function that can be used to predict the output for new and unseen inputs.

- **Unsupervised learning:** The process of training algorithms on data that has no labels attached to it with an aim of trying to find some structure in the data. In other words, unlike supervised learning in which correct data are predetermined and can oversee the learning process, the algorithm learns patterns that are, in fact, inherent in the data depending on its structure.
- **Reinforcement learning:** Another learning platform that enables an agent to learn how to act in an environment and select a sequence of actions where the total utility of the actions is optimal. It gets feedback with a mechanism that rewards or punishes the agent whenever he acts in some ways—thus always trying to condition this mechanism to find the optimal way to act.
- **Regression:** A basic method in machine learning to create an equation between dependent variable and at the end predict future observation from the input variables.
- **Clustering:** It is an unsupervised algorithm that clusters the data items based on some measure of similarity or based on the characteristic of the inherent features of the data items in a way such that there are no similar data items in different clusters. The purpose of clustering is to identify the inherent groups, or clusters, in the data. That would enable the understanding of the data structure and patterns in order to get insight useful for business.

IT is currently being revolutionized by technologies like AI and machine learning that are changing operational models in numerous ways. These are new technologies that are changing the face of organizations functioning as well as their competitive strategies in the current market. These include data-driven approaches and quick processing times, personalized for individual customers and better security measures.

Businesses have to embrace and harness the strength of these technologies to enhance productivity and innovation and ensure they sustain the competitiveness of their operations in this world.

### **The Purpose of Artificial Intelligence**

- ✓ AI helps organizations to understand data better and make smart decisions. By deploying AI-powered analytics and predictive modelling, businesses can optimize strategies, identify opportunities, and mitigate risks with *good accuracy* and *speed*.
- ✓ AI automates repetitive tasks to achieve higher levels of efficiency and productivity in the business.
- ✓ AI personalizes experiences for customers by learning from their data.
- ✓ AI improves operational processes like forecasting and quality control.
- ✓ AI inspires new ideas and business models, making retailers stand out.
- ✓ AI detects and prevents risks, especially in **Finance** and **Cybersecurity**.

### **Importance of Artificial Intelligence in Business:**

AI is a transformative tool for businesses, primarily because it can unlock new ways of working, competing, and creating value.

In the current world of globalization and availability of a plethora of information the businesses are more concerned with the economy and magnitude of data. AI makes it possible for an organization to analyze data of value, recognize a pattern, or decide on a course of action. With artificial intelligence usage in analytics and modelling, organizational strategies can be enhanced, potential investment areas and pitfalls determined more effectively and in lesser time.

What makes businesses realize improved efficiency and productivity is the fact that AI technology relieves tedious and mundane tasks. The implementation of AI in the organizations' operations is only helpful in automating generation of forms, processing of documents, responding to clients, and controlling the stocks while

relieving human resources for relatively more creative and challenging work. Automation also eliminates some of the mistakes that human beings may make, cuts on the expenses, and enhances functioning.

AI thus provides opportunities for businesses to be able to market and offer unique customer experiences. Using natural language processing and machine learning algorithms, these AI systems can analyze and understand customer data to provide recommendations or help them make a decision. This level of customization improves customer satisfaction and brand loyalty, and increases interaction and purchase rates.

In this way, AI can be beneficial for managing many aspects of the operational processes. For instance, AI-driven applications can predict customer requirements, manage inventory and shipping, perform quality assurance, and support preventive service. When applied in these areas, AI can bring benefits such as increased efficiency, lowered expense, minimized wastage, and enhanced performance. AI makes it easier to find other innovations and therefore, other forms of disruptive business models. That is, it enables organizations to think creatively on how to achieve the delivery of AI-enabled products, services and solutions that create new markets or redefine existing ones. Organizations that adopt AI technologies will benefit from market control through unique propositions, enhanced customers' satisfaction, and timely market offers. AI can play a significant role in identifying and mitigating risks. Machine learning algorithms can analyze vast amounts of data to detect anomalies, patterns, and potential fraud. This is especially important in sectors like finance, insurance, and cybersecurity where timely identification and mitigation of risks are important. AI systems scale perfectly towards vast data volumes and whether it's processing massive datasets, automating customer interactions, or analyzing market trends.

### **AI solutions in business:**

Quality data is the essence of any successful application of artificial intelligence. The data that needs to be gathered has to be accurate as well as relevant and useful for the particular problem under analysis in a business. However, when the data is accurate, the models developed can be used to make precise predictions and gain insights.

**Data Preprocessing** which is the first process before developing an AI model is initiated. It includes steps such as managing missing values, dealing with outliers, feature scaling or normalization, and categorization of qualitative variables. Data pre-processing makes the data more amenable to the analysis enhancing the performance and accuracy of the model. Machine Learning Algorithm Selection and selecting the appropriate machine learning method is vital in the process of creating an AI model. This choice depends on factors like; nature of the problem, data available, and expected results. Decision trees, support vector machines, neural networks, and ensemble methods are among the available algorithms. Every algorithm has its advantages and weaknesses and therefore, it should be chosen according to the specifications of the business problem to be solved.

**Feature engineering** amounts to identifying and extracting relevant features from the gathered data in order to improve the model's forecasting ability. It entails prior experience and a clear understanding of the problem under consideration. Feature engineering can entail transformations, computations, or extractions in creating other variables from the raw data. The former improves the performance of the model through well-engineered features. After the selection of algorithms and feature engineering is done, AI models is to be trained on the prepared data. In the training process, the model gains the information from the data to make the right decisions. Their performances can be evaluated depending on the chosen metrics, for example accuracy, precision, recall or mean squared error.

### **The future of Artificial Intelligence in business:**

Looking ahead, the future of AI in business could be very bright, with growth and innovative ideas coming to the fore. As their capabilities mature, the marketplace will benefit from advanced solutions that are more accurate, productive, and versatile. AI will continue to transform businesses by automatically revealing value inside their data and driving data-driven decisions.

Artificial intelligence is rapidly evolving with technologies such as explainable AI, federated learning, and automation of complex and special tasks using AI. It opens the scope for continuous learning, encourages agile and adaptive approaches, and stimulates interdisciplinary working to unlock the potential of AI. Staying in stride with AI will help businesses be successful in the digital environment, which is moving at a very rapid pace.

AI is no longer an abstract concept but a tool firms can use to compete, enhance customer experience, optimize operations, and innovate. Helping businesses to transform, grow, and succeed in the ever-evolving and competitive landscapes of the future requires understanding basic concepts of AI, strategically implementing AI solutions, taking considerations and challenges into account, and embracing the future of artificial intelligence.

### **Applications of AI in Business**

AI adoption must be done with IT and the entire business working together. It does not generally replace human intelligence but serves as a supporting tool. AI seems destined to profoundly impact all aspects of business. It is widely used in business applications such as marketing, finance, accounting, human resources, supply chain, automation, data analytics, and natural language processing. Some of these are explained as follows [11-14].

- **Marketing:** One of the most significant domains of AI application is marketing. It may determine what the next best advertising campaign is. AI assist in the formulation and implementation of marketing strategies. One more example of how AI is marketing products is chatbots: they can offer

solutions to some problems, propose products/services, and contribute to sales. Store owners will be able to use the AI technology in identifying customers in their stores and discourage theft. For instance, Walmart has been employing the use of HANA in order to analyze large volumes of transactional records.

- **Finance:** Financial AI is steadily rising as AI is gradually adopting use in financial organizations including banks and insurance firms. Different banks employ a range of technologies such as AI to help identify fraud. Loan applications are now processed by means of technology that can capture features such as credit standing, credit score, and even past criminal records. Another application of AI in financial systems is fraud detection because AI is capable of detecting fraud.
- **Accounting:** It is very obvious that AI is altering the descriptions of the roles of all sectors of professions. Accounting is a discipline that involves measurement, processing and communication of financial information regarding business transactions. AI has influenced the accounting industry significantly and has changed the roles of accountants. AI in accounting will decrease the number of mistakes and release accountants from routine work.
- **Automation:** The future is moving towards automation where AI is pulling the trigger to remove human error from business processes. AI has a great potential in making processes less time-consuming and less costly. This means that automation is the elimination of boring or risky tasks. The enhanced presence of AI and autonomous devices in many spheres of life contributes to the enhancement of productivity and reaction rates. For instance, robotic process automation can be very effective when used in accounting department. **Apptus eSales** is a tool that is aimed at automating merchandising using the knowledge about consumers and their needs. Interacting with the customers in business can also be eased through the use of online chats, emails and social media.

- **Human Resources:** AI can assist the HR departments because it will reduce the time that is required to screen candidates and recruitment. It will be useful to employ chatbots for responding to numerous inquiries concerning the company's mission, policies, and perks. AI vendors in the HR sector include **Entelo**, **Textio**, **Textkernel**, and **HiringSolved**, all of which provide AI solutions for sorting and matching potential workers and using bots to schedule interviews. Consequently, there is a significant effect from the use of AI in their staffing and talent management processes. Therefore, AI can be effective in the hiring process.
- **Intelligent Supply Chain:** As customer demands fluctuate and evolve, supply chains fail to deliver the right product, in the right location, at the right time without eroding the bottom line. AI leads to a self-learning and self-optimizing supply chain model that incorporates real-time analytics for precision.
- **Business Intelligence:** This can also be considered as the set of decision support technologies for enterprise that helps professionals to make better and faster decisions. In turn, the goal of business intelligence (BI) is to improve decision making in businesses. The use of AI and machine learning in BI is helping business enterprises to pull out actionable insights from complex data. Machine learning tools in business intelligence like the **HANA** will improve operational efficiency. BI chatbots are enabling decision making by analyzing business data. AI has merged with BI applications in manufacturing and industrial sectors.

Every new technology comes with risk. As an emerging technology, AI is changing at a fast pace and may present some unexpected challenges. Some of the challenges faced by many businesses, were due to when most people in business are not very familiar with artificial intelligence, what it is and what it can do for them. In spite of this AI is a technology that is transforming every walk of life. AI is misunderstood by many, especially by the mainstream media. The media has

overpraised AI for techniques that are not new and over – criticized it for overly optimistic promises. Everywhere you look, it seems AI is assisting and displacing human effort. There are plenty of doom and gloom predictions around. AI offers both promise and peril as it revolutionizes the workplace. There is a public fear around the world particularly in the business community that AI technology such as robots will overtake us and force humans into obsolescence. This fear is considered unfounded by some.

## **1.2 Peculiarities of E - commerce as modern approach in doing business**

E - commerce also known as 'electronic commerce' or 'internet commerce', refers to buying and selling goods using internet also by sharing information and money to execute these transactions. E- commerce also refers to use internet to do transactions and buying products.

**Inter-organizational information systems (IOSs)** allow routine transaction processing and information flow between two or more organizations.

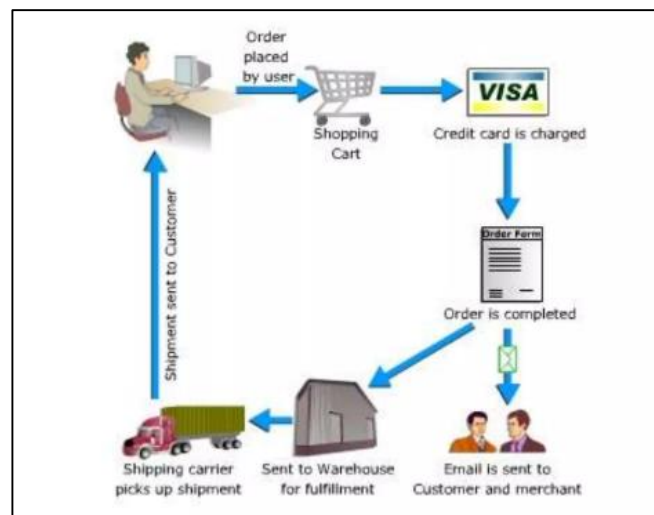
*“E-commerce is the activity of buying and selling of products over the internet”*

There are Three ways of E-commerce:

- **Online retailing:** It is the process of customers to allow searching, select and purchase the products, services and any kind of information over the internet.
- **Electronic markets:** Enabling purchases is the system of electronic market, through bids to buy, sales, through offer to sell; and short-term traders generally in the form of financial or obligation swaps.
- **Online auctions:** It is an auction which is held over the internet. The seller sells the product or service to the person who bids the higher price. For sellers, online auctions open up new sales channels for new products and offer buyers favorable purchasing conditions. It is supported by electronic business.

## How does an Internet Purchase works?

Let's assume this by the figure (1.2). First we select our favorite product, which then saves in the cart, when finalizing we enter our credit card details and get the shipping approval through e-mail. When the order is complete then this action goes to Merchant and Customer. The completed order then arrives at the warehouse to collect and send it to the shipping carrier as adjusted. After few days the product is received to the consumer.



*Figure 1.2. Process of Online shopping*

This is how easy e-commerce industry works. It creates benefit to the both the parties, which is for organization and consumers. Everything is what they believe is to provide ease and complete satisfaction to the consumers. Not only e-commerce sector is that easy to run, it has got pros and cons.

## Advantages and Disadvantages of E-commerce:

### Advantages of E-commerce:

1. **Low financial cost:** It has lower startup cost as physical retail stores have to pay good amount of money to rent one a store locations and physical structure for shop and view i.e. elevation and all cost a lot.
2. **24/7 potential income:** Online stores are always open for business. Most physical store has specific timings. By being available at all hours for a customer provides more sources of income.

3. **Sell Internationally:** Through e-commerce option to display products around the world becomes possible and to grow community.
4. **Customer experience:** Some may prefer online shopping as it can be a little invasive making it one of the best benefit of ecommerce. If a customer wants to contact store owner they can click on a *live chat feature*, email or send a message.
5. **Return policy:** In E-commerce customer can return their product in case of damage, can also exchange their product if they don't like it or also can cancel their products as well.
6. **High orders:** With ecommerce there's no waiting time. A customer can place orders on his or her own schedule with no delays allowing you to accept a high number of orders.
7. **Product varieties:** Another benefit here is that variety of product are available, customers can choose different products, whereas in retail shop only limited products are available for the moment.
8. **Comparison:** Customers can easily compare the price, color, quality of the product at the same page without any hassle.
9. **Product avail:** Most of the products which a customer demands of are available on a single platform so there is no to go different places for different products.
10. **Modes of payments:** Customers can pay through credit card, debit card, COD (cash on delivery), EMI etc.

#### **Disadvantages of E-commerce:**

1. **Site crashes:** No one can purchase during website crash. For ex: if someone is in process of online transaction and the site crashes, the transaction get declines until its fixed.
2. **No trials:** In E-commerce customers can't try on the product before purchasing. They don't know whether it will fulfill their expectations or not.

- 3. Shipment of product:** In e-commerce the seller needs to pack and ship every item the customer ordered whether it is of any size. There can be waiting time of working days.
- 4. Security:** There are many organizations who have fallen to the prey of hackers which has result in stolen customer information, bank details and personal information.
- 5. Customer impatience:** In most businesses, delay in responding to customer queries leads to customers dis-satisfaction which further leads them to shop from somewhere else.
- 6. Frauds and Phishing:** Anyone can set up an e-commerce website and it can also lead us to a fraud website where people can steal personal details and misuse them for their own purpose.
- 7. Guarantee and Warranty:** There is no complete guarantee and warranty of the product material and quality. Sometimes you find an image of the product attractive but when you receive the product it doesn't match the actual look as shown on the website.
- 8. Age difference:** Not every person can go online shopping which make them incapable to experience digital shopping.
- 9. Personal touch:** Lack of personal touch towards the product and feeling of the product.
- 10. Internet problem:** Internet access is still not cheaper and inconvenient to use for many potential customers like one living in remote villages.

Most of the people thinks E-commerce is a purchase of goods and services by the use of internet, but there are more specific ways to refer the type of online transaction by mentioning the which type of e-commerce the transaction falls under.

- **B2B (Business to Business):** This refers to the online transactions of goods and sales between two companies. This type of e-commerce happens

between the producers of the products and the wholesaler who advertise the products and make them sale in market to consumers. Sometimes it let the wholesaler to stay ahead in the competition.

- B2C (Business to Consumer): The most used form of electronic business is B2C that creates online transactions between businesses and consumers. Most of the people like this because it allows customers to find the best prices, reviews and to find different variety of products that they are not able to find in the retail world. This also enables businesses to create strong relationships with the customers.
- C2C (Consumer to Consumer): This type of e-commerce deals with the transactions that are made between consumers. Usually these kinds of transactions are made by online selling platforms or by the social media platforms or websites.
- C2B (Consumer to Business): It is not the most traditional form of e-commerce where consumers make their products available for the companies to purchase them. The example of C2B would be graphic designer or web designer who design a logo or a website for a company.
- B2A (Business to Administration): This refers to all the transactions made with company and administration. This area involves many services, particularly employment and legal document.
- C2A (Consumer to Administration): It is also a popular and most used e-commerce transaction that happens directly between the customers and organization's administration. For ex: health consultation from a doctor or filling taxes etc.

As above were the major categories of e-commerce. One of the finest method in e-commerce is **Digital marketing**, which is used in promoting products and services using digital distribution and social media channels to reach consumers in a timely, relevant, personal and cost-effective manner. Some of the effective tools of digital marketing as well as basic activities [Table 1.1] are discussed below:

***Important tools of digital marketing:***

- 1) SEO (search engine optimization)** is the optimization of a web site in search engines. It promotes a web site to the first page of queries at search engines.
- 2) SEM (search engine marketing)** is the search engine marketing activities, aimed at increasing the attendance of a web site.
- 3) SMM (social media marketing)** is the social media marketing, media marketing, advertising messages in the form of static or animated images, which are placed on pages of web sites to promote products.
- 4) SMO (social media optimization)** is the optimization for social networks, advertising on social networks, blogs, forums, diaries.
- 5) Contextual advertising** is the context based banners or text adv. announcements that are displayed directly below the search bar, or to the right of the search query results.
- 6) RTB (real time bidding)** is the real-time bidding, an auction of advertising announcements in real time.

**Table 1.1** *Basic activities in digital marketing*

Activity	Essence	Effect for customer
Web site optimization for search engines	A totally of actions that make it possible to move a web site to the top positions in a search engine and increase its attendance; <ul style="list-style-type: none"> <li>- Construction of a list of keywords;</li> <li>- audit of the web site</li> <li>- SEO</li> </ul>	<ul style="list-style-type: none"> <li>- comprehensive promotion of a web resource;</li> <li>- an increase in a web citation;</li> <li>- an increase in a web site's ranking in customers' search.</li> </ul>
Design of banner advertising	- graphical images related to advertising	<ul style="list-style-type: none"> <li>- an increase in the web site attendance;</li> <li>- an increase in the volume of sales</li> <li>- possibility to control advertising efficiency</li> </ul>

Design of contextual advertising	- Google – provided advertising	- an increase in the web site attendance; -an increase in sales
Direct marketing	- compilation of the client database and work with the database; - mail newsletters; - personalized personal sales	- personalization of interaction with customers
Electronic survey of visitors	- analysis of competitors, suppliers and potential clients, profiles of their web sites, products offered via the Internet; - analysis of statistics collected from the Internet databases, acquisition of data on the conducted market research	- acquisition of the primary marketing information
Comprehensive audit of a web site	- detection of errors in the operation of a website; - drawing up a plan for a web site promotion	- an increase in the attendance of a web site; - an increase in sales
Database support	- analysis of current needs of the customer; - managing the behavior of the customer in the future	- an increase in customer loyalty

*Source: developed by the author based in [13]*

Personalization with Artificial Intelligence involves the employment of complex algorithms driven by machine learning, data mining and predictive analysis to customization the e-commerce shopping experience for the individual customers.

AI systems can achieve this by gathering such data from multiple sources, like a shopper's order history, surfing activity, reviews they have posted, and fresh data. These profiles are a key factor in segmenting the customers and providing well targeted content about products, services, promotions, and complementary products.

### **Benefits of AI-enabled Personalization in E – Commerce:**

**Enhanced Customer Experience:** Experts say one of the advantages of AI-powered tailoring is that it makes a deeper connection with consumers through delivering tailored and interactive shopping. Clients are provided with recommendations on items that are often purchased together and the suggestions can be based on their interests. Hence, they have a personalized discovery experience and while they are quicker in making the shopping decision.

**Increased Conversion Rates:** AI-enabled personalization is a most productive method of sales-boosting because mostly provides users with the timely offers that raised their interest level. E-commerce platforms can grasp their consumer taste and purchase behavior. Tracking customers' preferences and buying behavior, they can introduce personalized offerings in the form of call-to-action, discounts, and incentives which trigger their purchase decisions

**Improved Customer Retention:** Personalized experience makes customers more likely to buy, frequent and stick to the brand, therefore leading to both repeat buys and just plain out familiarity. The AI-augmented personalization enables the companies to stay in contact with clients by means of specially designed content those include recommendations, and the available incentives, which lead to increase in client loyalty and reduced unwanted churn.

**Increased Revenue and ROI:** The capability to suggest buyers 1:1 marketing messages and services not only increases the audience but also pumps up the turnover. Through specifically presenting customers with products which they will most likely pay attention to, companies are able to up-sell, cross-sell and thereby

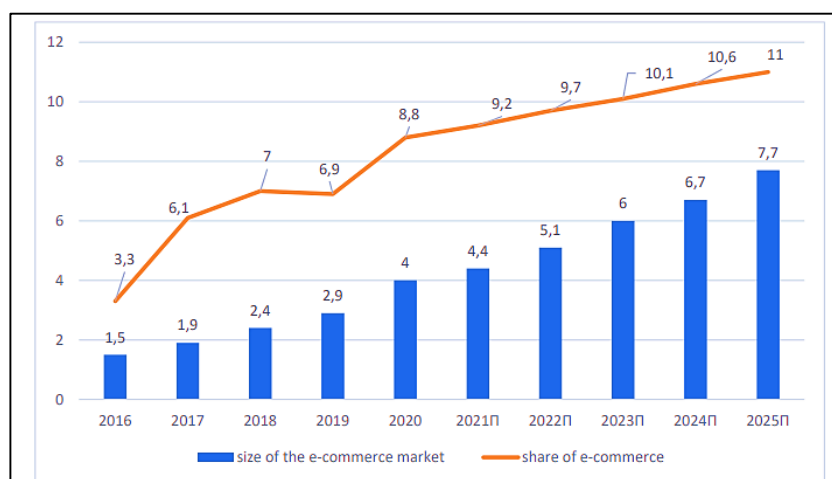
may raise the average order value. Finally, such reputation build-up allows businesses to increase their expected profit rates.

**Competitive Advantage:** In our current e-commerce market, the retailers who can offer personalized experiences have a huge edge over others in the industry. Innovation through the application of AI to personalization letter relationship positions the companies onto a new level: they get the chance to address their customers in a way that is both targeted, engaging, and important, which makes them unique and different from their competitors.

The integration of marketing technologies implies the development of standards for data exchange. Which ensure a synergistic effect resulting from the harmonization of a variety of digital tools. “API” (application program interface) are made for interfaces of different software. Thus, a web site integrates with CRM and CRM integrates with a DMP-platform. Then when a customer fills out the purchase form at a website, he at the same time provides information to CRM while a DMP platforms determines where the customer came from, the cost of his attraction to the web site, what he was doing at the web site and how to optimize relationships with the customer.

According to a study conducted by **Soul Partners and Baker Tilly Ukraine**, the e-commerce market reached \$6 billion in 2023, which is 10.1% of the retail trade in our country. It is predicted that in 2024, the e-commerce market volume and share should increase to \$6.7 billion and 10.6%, (Figure 1.3) [13].

At the same time, while Ukrainian e-commerce grew by 42% during the pandemic, it fell sharply after the war began, it took four months for sales to

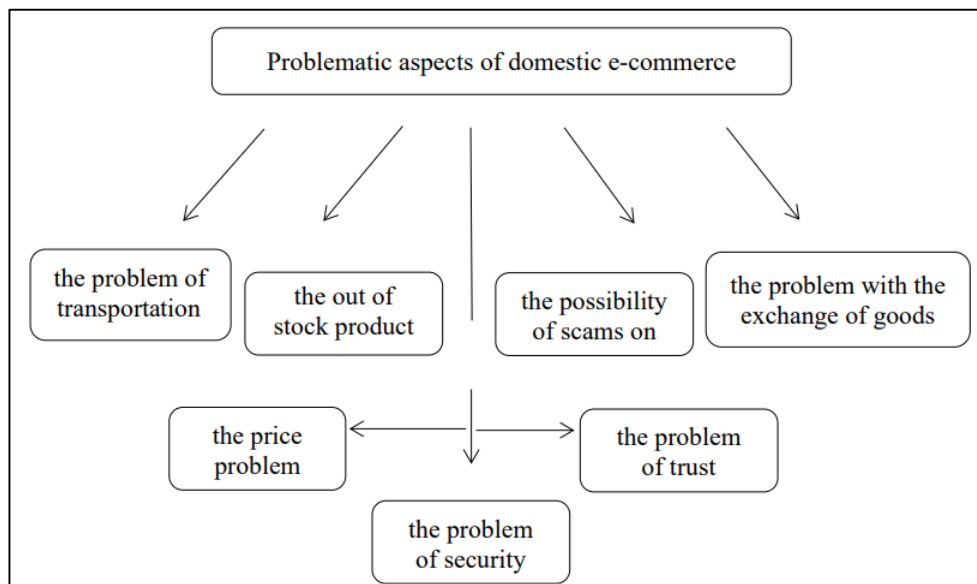


*Figure 1.3. Dynamics of the size of e-commerce market and its retail trade*

recover somewhat, but businesses had to rebuild everything the sales funnel, communication with customers, and new models of interaction.

According to Admitad's research, in 2022, there is a significant increase in the amount of online purchases. The average check in the e-commerce segment in Ukraine grew almost by a factor of two and amounted to \$33. Ukraine currently ranks **Fourth** in the top 10 European countries of average check size. In 2021, the average income of Ukrainian online sellers is \$3,790 per month, which is 6% more than a year ago. Statista predicts that in 2023 we will almost reach the level of 2020, and in 2024 we will reach the level of 2021. Then the subsequent increase in user spending and as a consequence, the growth of business revenues is predicted. Also, according to Ecommercedb research from 2020, Ukraine ranks 66th in the world ranking in terms of market size with a profit of \$838 million [13].

E-commerce has its problematic aspects. The main problems associated with online commerce can be highlighted using the example of online shopping in Figure 1.4. The role of AI in Retail industry cannot be underestimated, because it could dramatically change how organizations *Operate, Compete, and Innovate*.



**Figure 1.4. Problematic aspects of domestic e-commerce**

Today, there are many domestic and foreign online stores in Ukraine, which allows consumers to have a wide choice and find the best price for the right product.

However, as in any other country, there are issues related to the quality of service, delivery, return of goods, and other nuances. Overall, we can say that e-commerce in Ukraine is quite developed and has good potential for further growth. Like any other sector of the economy.

### 1.3 Global and national practice of AI implementation in business

Technology is slowly but surely becoming normal into everyday life and has made a significant impact to the global community across several forms in technology. Some key ways in which AI is influencing the world are on

- ❖ **Economic Growth and Innovation:** AI is creating new value and driving the economic growth through real increase in productivity per worker and more efficiency and innovative products or services. Current applications of AI technology in business include data usage, automation and more personalized customer services which has end into actualization of new products, service and markets.
- ❖ **Labor Market Disruption:** AI is pervasively integrating into various sectors of our society altering the labor market because of the ability to eliminate mundane tasks or enhance human abilities.

Pursuing the potential benefits of AI for its ability to underpin new economic sectors, foster innovation, and create new jobs, Davies notes, for example, that jobs related to data science and AI development open up, while some types of work become obsolete and need to be reclassified.

- ❖ **Global Competitiveness:** Thus, it can be established that those countries and companies that seek to unlock the AI potential invest in R&D, guaranteeing themselves a higher level of innovation, productivity, and market share.

This leads to global competition and encourages companies to further prioritize investments in artificial intelligence technologies to remain relevant in the digital economy.

- ❖ **Healthcare and Medicine:** Artificial intelligence has already begun to change the face of healthcare by bringing about significant improvements in targeted treatments, prognostics, and medical imaging.

In this context, applied artificial intelligence that enhances the diagnostic process, treatment planning, and even overall patient care, is likely to increase the overall quality of health care provision and reduce costs.

- ❖ **Environmental Sustainability:** Today, environmental issues can be solved through the help of AI to manage resources or predict natural disasters and to support Climate Change initiatives.

Advanced intelligent solutions can enhance energy use, drive optimization of transport networks, and enhance crops' fertilization, overall promoting sustainable use of resources and conservation.

- ❖ **Education and Skills Development:** Education and training is the area that lately underwent remarkable changes with the incorporation of Artificial Intelligence into the process of learning and gaining knowledge as well as developing skills.

Technology has been greatly incorporated in education through artificial intelligence tools to make the learning experience more personalized and innovative, which integrates feedback, data insights, and recognition of individual learner's needs, making education more effective and efficient.

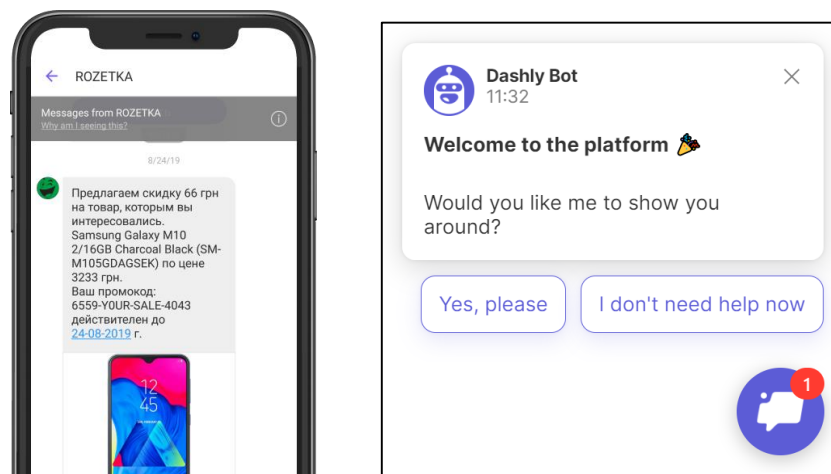
- ❖ **Ethical and Social Implications:** The use of artificial intelligence is progressively becoming prevalent in society – and with this comes questions about privacy, preconception, responsibility, and disclosure.

Some of the critics have raised concerns on whether AI will reduce human autonomy, equality, and democracy or can cause the society unintended consequences.

- ❖ **International Regulations:** Technology by extension specifically artificial intelligence is steadily influencing international relations and security systems in the sphere of geopolitics, defense and warfare and conflict settlement.

### **Major AI tools equipped by E-commerce industry:**

**CHATBOTS:** This is one of the most common AI technology used by almost all E-commerce brands. This is cost-effective and efficient way for customer service and are available 24/7 for immediate assistance [14]. Chatbots are programmed as if to respond to queries similar to a customer care employee. These chatbots are believed to provide the fastest results. As an example shown in (Fig.1.5). These are essential in business sector as it has 24/7 working ability and it is cost efficient.



*Figure 1.5. E-commerce CHATBOTS*

**VOICE CHAT & VIRTUAL ASSISTANCE:** Retailers are now using voice optimization services to reach their customers every day through AI home assistants such as Alexa, Google Home, and Apple Home Pod, display shown in (fig. 1.6). It provides users with real-time voice assistance [15] thus improving the user experience accessibility which in turn makes it easy for users to interact with the service providers. Artificial Intelligence is used to create a virtual buying

assistant that helps consumers decide which products or services to purchase or choose [15].



*Figure 1.6. Amazon Alexa, Google Home & Apple Home Pod*

**CUSTOMER CENTRIC SEARCH:** The e-commerce sector had already begun using artificial intelligence through the use of visual search engines, as it provides improved search accuracy and higher conversion rates. Traditional search engines like **Google** and **Yahoo** have been using algorithms that throw up a string of keywords which it feels that is closest to what the searcher is looking for. With AI, searches are made more intelligent by making it capable of not only making keyword searches but also image searches. Click a photograph of what one prefers and toss that on the search bar. The search engine then looks for all the similar products for the user which subsequently improves the keyword search.

**PRODUCT RECOMMENDATIONS:** Product recommendation engine helps out people to find the best of what they are actually looking for and these are generally brought to the customers through e-mails, app notifications etc. It helps businesses with boost in their sales. These engines analyze the past experiences, activities, searches, preferences of color, brands and previous purchases of the customers on the site and recommend products respectively. For example, **Netflix** recommends customers based on their previous preference of genres of series and films [16].

**MARKETING:** Automated e-mails, notifications and display ads play prominent role in e-commerce marketing. AI-enabled digital marketing sends marketing emails to recipients for product and services that are of one's interest. As AI helps

in better understanding of the consumer, businesses get targeted campaigns and performance analytics.

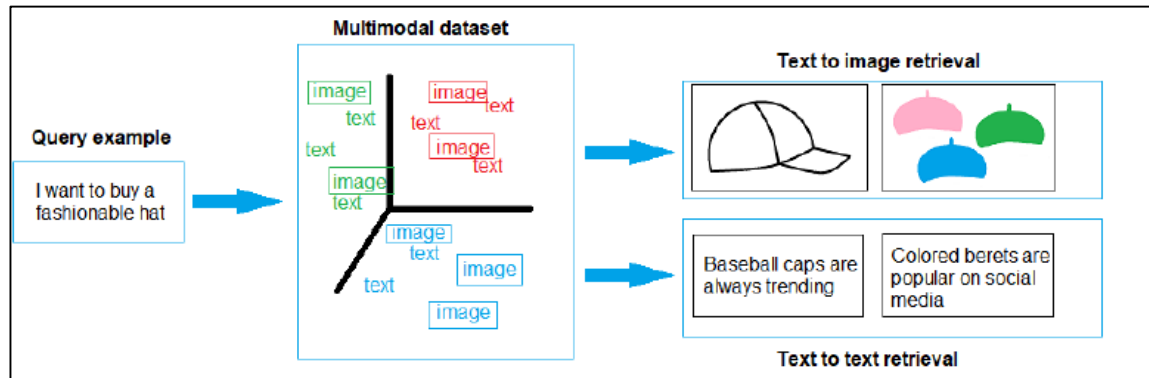
**AUTOMATION:** It is the one wherein machines are reinforced instead of labors. Almost all the processes in e-commerce sites are becoming more automated. The automation in e-commerce sites include automated inventory management, automated invoice, automated customer services using bots [13]. Utilization of automated e-commerce fulfillment tools saves a lot of money and time. These fulfillment tools are capable of sending tracking details, scan and print shipping labels and streamline the return details.

**SALES FORECASTING & INVENTORY MANAGEMENT:** The sales forecasting is done based on the varying trends in previous years and projected or foreseen variations in product requirements and using this knowledge e-retailers can prevent additional stocking of unsold items, avoid storage costs and demand prediction. By analyzing which product has got listed in large number of wish list we can understand the products demand and further by determining the sales of the product, optimized inventory.

**ANALYZING BIG DATA ANALYTICS:** In the e-commerce sector, an AI-based data analytics tool provides a variety of benefits such as business analytics, consumer data, and internet sales interpretation. Initially, Customer Relationship Management (CRM) used to rely on people to collect huge amount of data in order serve for the future recommendation and services. But AI has made it possible to predict which customer is engaging in the buying process and how the company can better engage with them [7]. It creates an informed decision making and customer insights.

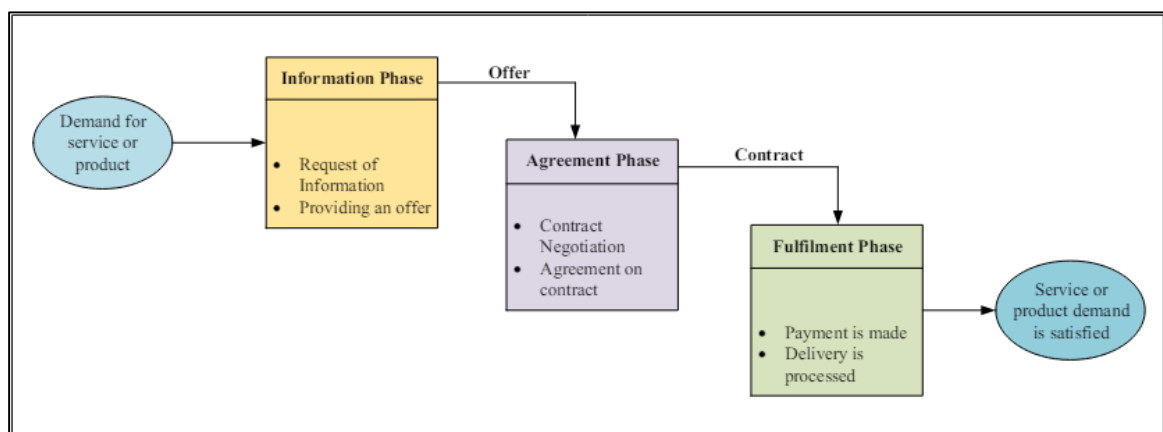
**MULTIMODAL SYSTEMS:** Combining various approaches is a very active topic of AI research. When information from many modalities is included in a

research problem such as text–image, video–audio, or another combination, it is referred to as multimodal research. In particular, a cross modal system, shown in (Fig.1.7), is the process of using one modality to gain information in another modality. It builds enhanced interaction and broader accessibility.



*Figure 1.7. Example scheme of a Multimodal and Cross modal*

When people buy things, it's not just one simple step. It's more like a journey with different stages. First, there's the **"Information phase"** where people gather information about what they want to buy. This includes checking out different products, comparing prices, and seeing where they can get what they want. Once they have all the info they need, they move to the **"Agreement phase."** Here, they talk to the seller and agree on things like the price, delivery, and payment method. Once both the buyer and seller agree on everything, they make a deal, and that's when the contract is made. Then comes the **"Fulfilment phase."** (Fig.1.8). This is where everything gets sorted out, like delivering the product, packaging it up, and making sure payment goes through. Once this is all done, the transaction is complete.



*Figure 1.8. The e-commerce transaction phases model.*

On the whole, the role of AI in the global context defines it as economy multiple, which concerns such important parameters as social, environmental, and geopolitical ones. The application of AI has a beneficial effect on both the Consumer and Retailer perspective. The following information below will show how AI has enhanced the consumer buying journey and also how the adoption of these technologies helps retailers to increase their sales.

**CONSUMER PERSPECTIVE:** According to customer experience the introduction of all these technology helps them to enrich their shopping experience. Customized AI driven notifications regarding sale, offer, and price drop helps them to save their money and utilize all the opportunities to grab their desired product at the lowest price possible. Also product recommendation option helps the customer to easily pair up their attire. Chabot's immediate responses to the customer queries help them to get clarified within a short period of time. Advanced search systems such as visual search helps people to easily search and shop the products of which they were not even known before. Product comparisons, demonstrations, reviews and feedbacks help consumers to better understand the product. Also ease of shopping from home is one major benefit of e-commerce sites.

**RETAILER PERSPECTIVE:** The exploitation of AI in online sites helps the retailers to better understand their customers and thereby attracting them by showing and recommending what they love. This in turn increases their sales. Also by knowing the product's presence in customer wish lists and bags, it is easy for them to easily forecast the demands of the product and plan their further stocks. By providing offers stock clearance are made easier. Retailers can now closely watch every move of the customers and can easily take them from the landing to the checkout page. Better AI tools can enhance the customer experience and consequently make them buy more often from you.

## **Current Regulations in Artificial Intelligence (AI) across different regions**

The fulfillment of AI regulations is far from base. Countries and regions are taking vastly different approaches, with some being much more proactive than others.

↳ **European Union (EU):** EU has proposed the Artificial Intelligence Act which is a comprehensive set of regulations that is supposed to serve as the comprehensive regulatory model of the deployment of artificial intelligence in the EU.

The proposed rule seeks to categorize AI systems into different classes of risk and insists on parties such as transparency, accountability and human supervision. While GDPR is a regulation designed for data protection in general it does not focus on AI systems but the principles laid out in GDPR are applicable when personal data is processed by the AI systems.

↳ **United States:** The United States currently does not have a federal law to govern AI and innovative devices that is holistic. However, reports and guidance documents containing information on topics such as fairness, transparency and accountability of AI technologies have been issued by the Federal Trade Commission (FTC) and others such as the National Institute of Standards and Technology (NIST).

↳ **Canada:** The federal stated has launched Pan-Canadian Artificial Intelligence Strategy that aimed to increase the AI research and innovation in Canada. The method consists of the following activities: Government investments in AI research and development, in industries to establish a talent pool for artificial intelligence, in data analytics and commercialization of AI and the measures being taken to address the ethical implications of AI.

↳ **China:** Existing provisions are the principles governing AI development; these principles include AI ethics or the principles governing the utilization of AI, data security, and the industry standards. The Chinese government has also employed the following rules governing the usage of AI in finance, healthcare, and transport

↪ **Accountability and Liability:** In September 2018, the United Kingdom created the Centre for Data Ethics and Innovation (CDEI), an impartial advisory body that was supposed to help with the deployment of AI and other data-driven technologies when it comes to ethical and legal questions.

The CDEI helps the government in strategizing and decision-making regarding issues like Bias in AI, Data Protection and management of AI technologies.

↪ **International Organizations:** These guidelines and principles for AI are provided by equally international organizations such as the Organization for Economic Cooperation and Development (OECD) and the United Nations (UN).

For instance, Organizations for Economic Cooperation and Development (OECD) has published the Guidelines on Artificial Intelligence, which contain some guidelines for using the artificial intelligence technologies

↪ **Global Coordination and Harmonization:** AI regulation must be a collective effort and coordinated in a way that shares common barriers. International cooperation can strengthen the formulation of optimal goal model, best practice and regulation for AI application and deployment across different countries.

### **A roadmap of AI regulation in Ukraine**

The Expert Committee on the development of artificial intelligence, which was working in close cooperation with the *Ministry of Digital Transformation of Ukraine*, came up with a roadmap for the regulation of artificial intelligence in Ukraine.

The Committee's working group had a number of meetings in order to talk about the AI regulation strategy, which included the participation of the business representatives, the education, the science, the NGOs, and the parliament. After the investigation of several strategies, taking into account the global trends mainly the ones of the European Union, where the AI Act is expected to be

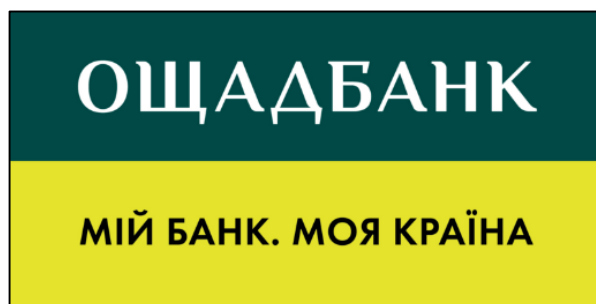
adopted next year, the Committee worked out a roadmap for AI regulation. A bottom-up approach that entails gives a major task to business and public organizations representatives to introduce self-regulation is the basis of this. Therefore, Ukraine's businesses that are creating and implementing AI technologies will be more competitive and will be able to penetrate the global market.

A big aspect of the road map is the respect of the rights of Ukrainians in the cyber space and the personal data of Ukrainian citizens.

- Service function: The purpose of the first steps towards the introduction of legally binding regulation is to equip businesses with the means to be ready for the future Ukrainian law and for easy entry into the EU market.
- Balance: We do not want to be the pioneers of regulation, rather we want to learn from the mistakes of other countries (we are the students of the other countries) before introducing any regulation.
- Partnership and self-regulation: The actions of the state and business in collaboration. We are creating a self-regulatory environment along with the private sector.
- Global perspective: The while creating the law, we pay special attention to the global realities, first of all, the extraterritorial effect of the EU AI Act and the Brussels Effect, and also the country's domestic interests.

A crucial case regarding banking sector in Ukraine optimized with the usage of Artificial Intelligence technologies has to say how the AI role plays in Ukrainian financial institutions. One of the famous Ukrainian Bank “**Oschadbank**” (fig 1.9) says ‘The banking sector plays a crucial role in the development of a country's economy. Especially when the country is at war’. With the outbreak of the great war, it became clear that Ukrainian financial institutions are in need of urgent

innovative solutions as never before. The constant threat of cyberattacks, customer outflow, a decline in the number of banking services users, and the country's low



*Figure 1.9. State Savings Bank of Ukraine*

economic activity are exactly the conditions in which the introduction of artificial intelligence technologies has become a real necessity. The development of these technologies in the banking sector promises revolutionary changes in customer service and optimization of internal processes. And these changes are already taking place.

The main task of **Oschadbank** is to develop for the comfort of its customers. Therefore, at the earliest opportunity, we started implementing digital transformation in the bank's operations. They introduced and improved chatbots and significantly improved the quality of customer service, as they perform various functions 24/7, answering inquiries, conducting financial transactions, and even providing advice.

The result of their work is **Sofia**, a voice assistant that advises customers on a wide range of issues, such as making appointments at branches and redirecting customers to the appropriate specialists depending on their requests, 75% of customer requests were automated, processing time decreased, and the overall level of customer satisfaction improved.

Other Ukrainian banks also have cases of successful integration of artificial intelligence. These include optimizing the loan portfolio by analyzing customer behavioral factors, developing personalized financial products, and monitoring customer transactions to improve cybersecurity. The introduction of online platforms, voice assistants, and chatbots allows customers to use banking services

24/7 without leaving their homes. This saves time, simplifies communication with the bank, and meets the needs of the modern user.

Financial market regulators are considering using AI-based models to prevent fraud and money laundering. The development of fintech, the popularity of contactless payments, the proliferation of mobile devices, and the introduction of digital technologies in public services are growing rapidly every day.

Everything indicates that Ukrainian banks need to adapt to changes, invest in the latest technologies, and develop strategies to effectively integrate digital tools into their operations. However, first they need to ensure a high level of digital security and privacy, as well as enlist the support of the government.

It is important to understand that the integration of AI into the work of Ukrainian banks requires coordinated efforts of the government, regulators, banking institutions, and the scientific community.

To address the growing demand for financial technology and digitalization, in July 2020, the **National Bank of Ukraine** approved the Strategy for the Development of Fintech in Ukraine until 2025.

The main objectives of the strategy are to introduce new financial products, ensure consumer protection, reduce transaction costs, and create competitive market conditions for financial service operators.

These important steps show the readiness of the Ukrainian banking sector to innovate. This makes it possible to consider the integration of artificial intelligence into various areas of the sector.

### **Areas of AI development in the Ukrainian banking sector**

- Digitalization of the Ukrainian banking sector opens new horizons for the development of financial services. And these horizons are numerous.
- Creation of deeply individualized banking offers, the first step is an automatic analysis of the client's financial behavior. Then - the selection of products and services that meet the specific needs of a particular client at a certain stage of their life.

- Predicting financial risks and improving the efficiency of asset management. AI allows collecting and analyzing large amounts of data, revealing patterns that are not always obvious to the human eye.
- Preventing fraud and maintaining the security of banking operations. The need to protect confidential data has become especially urgent in the face of growing cyber threats. AI identifies cybercrimes (hacker) in real time by analyzing system behavior patterns that may indicate fraud attempts.
- Credit scoring which is the process of assessing the creditworthiness of customers and predicting their ability to repay the loan on time can also be made automatic.
- Particular attention is paid to innovations in the insurance sector, where artificial intelligence can make a significant contribution to the development of personalized services, mobile applications, the use of block chain and smart contracts, and ensuring a high level of data protection.
- Despite all the benefits, banks need to implement development strategies that strike a balance between innovation and customer protection. Otherwise, the situation may get out of hand.

As due to the situation running behind the war crisis in Ukraine, AI has taken an effective bounce in Ukrainian Military power. As Ukraine develops intelligence system based on AI. The artificial intelligence-based system called **Griselda**, which collects intelligence from various sources, has been developed for the Ukrainian military (fig.1.10). **Griselda** allows for processing a large flow of intelligence information coming from various sources, such as satellites, drones, social networks, media, and even hacked enemy databases. It is noted that “it takes 28 seconds from the time the information appears in the system to the time it is received. “According to the Minister, this technology has already been integrated into the Delta situational awareness system. It has also been integrated into the Armor, Kropyva, Ukrop, and GisArta applications already used by Ukrainian

soldiers. Other units of the Defense Forces of Ukraine will use the system in the future.

Griselda's developers claim that their system specializes in high-speed and high-quality processing of large data flows, secure storage, as well as automation of data entry and transfer processes. The quality of information is ensured by 4 levels of verification. Automatic analysis modules and neural network are involved in the processing of information. Griselda's development team consists of volunteers, mobilized military personnel, veterans, military personnel, sociologists, programmers and military experts.



*Figure 1.10. Ukrainian soldier working with Griselda.*

As the Minister of Digital Transformation Mykhailo Fedorov notes, "Today we are a kind of training ground for the use of artificial intelligence. It is actively used for recognition and decoding of satellite images, recognition of targets on the battlefield, development of target capture technologies for drones, face recognition, and prediction of means by which certain targets can be hit."

A key role of AI in Ukraine's service is the integration of target and object recognition with satellite imagery, prompting Western commentators to note that Ukraine has an edge in geospatial intelligence. AI is used to geolocate and analyze open-source data such as social media content to identify Russian soldiers, weapons, systems, units or their movements.

## **Conclusions for Section I**

E-commerce in Ukraine is developing steadily and is in line with the economic situation in the country, and has a really good potential for growth. However, there are a large number of obstacles that can hinder positive changes in the process of e-commerce's establishment in the market. The main areas of stimulating the development include harmonization of legal norms, ensuring legal protection of e-commerce entities, removing barriers to the development of international e-business, and building the infrastructure of the e-commerce market. The E-commerce sectors are turning extensively competitive due to their peer pressures. Letting the brands know the customer pain points and enhancing their services in the respective areas can lead to increased sales.

Also not only e-commerce brands are benefitted by these AI strategies but also the brick & mortar stores with improved AI powered technological installations in their stores. Companies using AI extensively for a number of scenarios such as product assortment, fraud detection, predictive analytics, marketing optimization, etc. experienced the benefits of improved customer loyalty and satisfaction, while reducing forgery and ending up setting objectives that add to their bottom line. When AI is integrated with digital technologies like analytics, machine-learning, robotics and IOT it has the potential to drive transformation across the global supply chain of retailers. And the transition will materialize before one feels it will. Apart from all these advancements one of the major drawbacks is the end of traditional brick & mortar. One of the major reasons why people opt for online stores is the option to compare, read the reviews of the product.

Nowadays people have more commonly started accepting the procedure of believing upon other's statements, checking the product quality by themselves. This shows that e-commerce has made people lazier. At the end there is a threat that we human society get detached from the real world and stay interconnected within the virtual world.

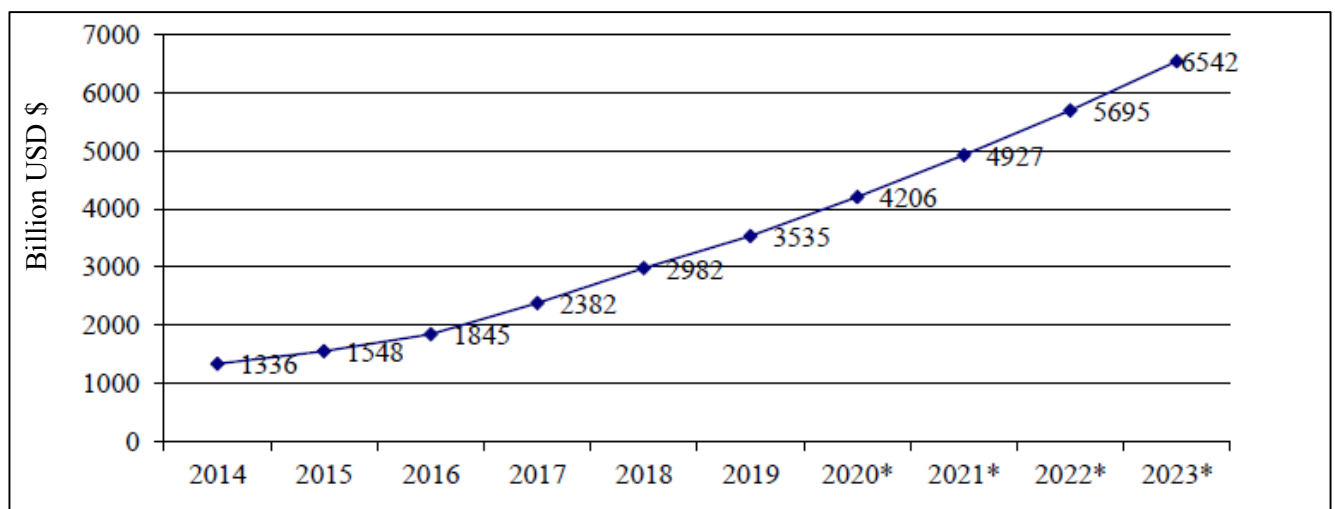
## SECTION II

### ANALYSIS OF AI IMPLEMENTATION IN KEY ACTIVITIES OF E-COMMERCE ENTERPRISE

#### 2.1 General characteristics of the E – commerce market in Ukraine

It has been established that today all types of consumers actively use the Internet when purchasing the goods, they need. The conducted analysis shows that the volumes of the Internet trade in Ukraine in 2019 increased almost 1.5 times compared to the previous year, the largest share of them was held by the spheres of transport, warehousing, postal and courier activities, wholesale and retail trade and processing industry. The paper analyses the peculiarities of entering some marketplaces of Ukraine (The most promising model in this field) and trading on them [17].

Presentation of the main material of the study with a full justification of the obtained scientific results. The growth of Internet trade is in line with global trends. According to the data of The Statistical Portal for 2014-2023, the volume of international retail electronic trade increased by more than 2.6 times (Fig. 2.1).



*Figure 2.1 – Dynamics of global retail e-commerce sales for 2014-2019 and forecast for 2020/2023*

The annual growth of global retail e-commerce during 2014-2019 was from 15.9% in 2015 to 29.2% in 2017 and so on.

In Ukraine, sites related to e-commerce are visited by approximately 67% of Internet users. In the table 2.1 shows the dynamics of retail trade in general and Internet trade in Ukraine during 2012-2023.

**Table 2.1**

<b>Years</b>	<b>Retail Trade Billion UAH</b>	<b>Internet Trade Billion UAH</b>	<b>E-commerce penetration</b>
2012	767.0	4.6	0.6
2013	838.2	7.0	0.8
2014	901.9	12.3	1.4
2015	1018.8	25.5	2.5
2016	1175.3	38.4	3.3
2017	815.3	48.0	5.9
2018	930.6	65.0	7.0
2019	1094.1	97.4	8.9
2020	1522.2	112.2	10.2
2021	1983.5	132.5	11.3
2022	2058.6	139.2	11.9
2023	2757.2	140.1	12.4

*Source: developed by the author on the basis of [3, p. 129, 7-9] trade in Ukraine*

As the e-commerce market in Ukraine has experienced significant growth and development over the past decade. According to a study by Olshevska (2022), Ukraine's e-commerce market is expected to continue expanding, driven by technological advancements and changing consumer behaviors. Looking into some particular characteristics like growth rate and behavior, their methods etc. can show the exact opportunity of e-commerce constant growth.

### **Characteristics of E-commerce Ukrainian market:**

- **Growth Rate:** E-commerce market UA, has been expanding over the years in consumption of internet and believe as well as comfort in online purchases.
- **Consumer Behavior:** Ukrainian consumers are getting more relaxed about buying products and services online, as they receive variety and better deals.
- **Payment Methods:** Some of them are COD (cash on delivery), bank transfers such as Privat24, LIQPAY and digital wallets.
- **Logistics and Delivery:** Accessibility and speed of demand and supply has greatly determined the growth of e-commerce.
- **Smartphones commerce:** It is on high level, as more consumers use their cell phones to fetch and shop for products on the internet.

### **Stages of E-commerce development:**

#### **1. Early Stage (1990s – early 2000s):**

- Insufficient access to the Internet and low awareness and low confidence of consumers in online buying & selling.
- There are still limited numbers of the online stores which are mainly based on electronics and IT products.

#### **2. Growth Stage (mid-2000s – 2010s)**

- Increase in the use of internet connection and e-commerce technology.
- Market entry by international players and local marketplaces.
- Innovative advancement in payment structures and transportation methods.


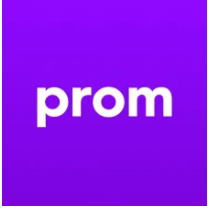

### 3. Maturation stage (2010s – present)




- Further increase in the frequency of clients accessing the internet for shopping and sales.
- Product differentiation including branded apparel and textiles, services, groceries and electronics.
- Improve the experience of their customers with better websites mobile apps as well as customer service.

#### **Key Players of e-commerce in the country:**

Ukrainian market in online shopping has contained some of the very fast growing popularity and has stand to become most used fields in retailing. These key enterprises have not only gained consumers but also growth in various fields in the (table 2.2).

*Table 2.2. List of Key enterprise of e-commerce in Ukraine*

E-commerce enterprise	Description
<p><b>Rozetka</b></p> 	<p>The largest and famous source for online shopping in Ukraine with convenient search for products and service, electronics and home appliances.</p>
<p><b>Prom.ua</b></p> 	<p>An online market place where people with the intention to purchase, come in contact with the sellers and individuals intending to sell various products starting from the apparels to electronics and home products and services.</p>
<p><b>Allo.ua</b></p> 	<p>Consumer electronics and home appliances retailer, which is also venturing into other categories.</p>

<p><b>Citrus.ua</b></p> 	<p>Focused electronics and gadgets with functional accessories fast-growing online and offline store.</p>
<p><b>Epicentrk.ua</b></p> 	<p>A major company that operates as a chain store and has a vast online store where it sells products ranging from construction resources to home requirements.</p>
<p><b>Eldorado.ua</b></p> 	<p>Being a consumer electronics products company, the firm has significant involvement in E- commerce and physical stores.</p>

### **E-Market specialization in different categories:**

As the above key players are dominant in their field, we also look into what all categories they fall and how much Ukrainian consumers search off to in which all platforms to purchase any goods or service.

- ✓ **Electronics and IT products:** Competition is mostly dominant here and key players such as Rozetka, Citrus and Allo allocate much emphasis on this specific sector.
- ✓ **Fashion and Apparel:** It is growing at a fast pace with more local as well as global companies setting up a powerful and influential web presence.
- ✓ **Groceries and Household Goods:** Getting more and more used, with opportunities such as **Zakaz.ua**, it aims to enhance online grocery shopping and delivery.
- ✓ **Health and Beauty:** Developing niche with more targeted uses for specialized platforms and marketplaces where a variety of goods are sold.
- ✓ **Home and Furniture:** Getting more attention as businesses that sell products online have all the options available for delivery.

### **Trends and Future Prospects:**

- **Digital Transformation:** Future prospects for growth are also strong due to future developments in the processes of digitalization of retail and consumer behavior.
- **Omni channel Strategies:** To improve the consumer satisfaction it is possible to combine the online and offline shopping experiences.
- **Local Marketplaces:** Localized e-commerce platforms which supports the regional market demands and trends.
- **Cross-border E-commerce:** The consumption of international products and brands by Ukrainian consumers is another factor that has gained market flow in recent years.
- **Regulatory Environment:** Regarding the changes in the legal framework to accommodate and facilitate the conduct of e-commerce operations

This is because e-commerce enterprises do have the greatest opportunity but actually comes up with challenges and opportunities in the implementing process of AI.

### **Challenges**

#### **1. TECHNOLOGICAL INFRASTRUCTURE:**

- **Limited IT Infrastructure:** The majority of the Ukrainian e-commerce companies still have rather primitive IT environments that may not be suitable for proper and efficient usage of AI solutions. This involves lack of computing facilities, absence of sufficient data storage resources and the lack of internet bandwidth.
- **Data Quality and Management:** For proper execution of AI, the system needs a significant amount of data of premium quality. Since the analysis of datasets is a common problem, Ukrainian e-commerce enterprises face such challenges as the low quality of data, their incompleteness, and ineffective management.

## 2. ECONOMIC FACTORS:

- **High Implementation Costs:** The cost required to acquire AI technology is quite significant, involving the cost of purchasing from developers, hiring skilled personnel for the job, and the cost of the systems which could be very expensive for e-commerce companies in Ukraine, especially SMEs.

- **Return on Investment (ROI):** Currently, particularly with the increasing adoption of emerging technologies, business organizations are reluctant to implement AI because of the unknown returns. This is compounded by the problem of limited number of success stories as well as examples of market players from the Ukrainian context.

## 3. SKILL SHORTAGES:

- **Lack of Skilled Professionals:** The problem is that nation lacks sufficiently qualified professionals in the field of AI and machine learning. This talent gap raises challenges for e-commerce companies.

- **Training and Development:** A significant number of regular workers, for example, is insufficiently prepared to work with AI technologies, and companies very often do not have the means or special programs to bring their employees up.

## 4. REGULATORY AND ETHICAL CONCERNS:

- **Data Privacy Regulations:** AI integration entails dealing with personal information thus a case of privacy violation. Some key issues that e-businesses in Ukraine need to overcome include the GDPR regulation for customers in the EU region could be problematic to meet with sometimes extremely high costs involved.

- **Ethical Issues:** Concerns are also raised regarding ethical issues in the application of advanced artificial intelligence, including issues like biased algorithms and misuse of AI applications.

## 5. MARKET AND CONSUMER READINESS:

- **Consumer Trust and Adoptions:** This is attributed to privacy concerns and the level of awareness and trust that consumers in Ukraine have regarding the functioning of AI technologies. The process of developing consumer's trusts and promoting the use of AI-based services remains a top priority in the present days.

- **Market Maturity:** All in all, the market maturity of AI technologies in Ukraine is still relatively low and there are many organizations and customers that are not aware of the possible advantages of utilizing AI technologies. This leads to slow take-up rates and less support to AI systems.

Possible options for improving Artificial Intelligence in Ukrainian e-commerce market. These opportunities are capable of upskilling growth, productivity, competitiveness and innovation for those organizations that are ready and willing to embrace and adopt AI technologies.

### Opportunities

#### 1. INVESTMENT IN TECHNOLOGICAL INFRASTRUCTURE

- **Government and Private Sector Initiatives:** The adoption of AI in e-commerce businesses can be improved through, government and private sector support in upgrading the IT structure. This has involved boosting internet access, computer data storing and retrieval systems as well as hosting services.
- **Partnership with Tech Companies:** Partnership with tech firms allows access to superior AI applications and tools for e-commerce enterprises.

#### 2. EDUCATION AND SKILL DEVELOPMENT

- **AI Training Programs:** It is necessary to conduct training programs and workshops for AI tools. The institutions that can provide courses in AI, machine learning, and data science are the universities, technical school, and private training centers.

- **Upskilling the Workforce:** There are opportunities to enhance the e-commerce enterprises to improve the training and development opportunities of incumbent employees that shall be devoted towards familiarizing with the AI technologies and its implications.

### 3. MANAGING AND UTILIZING DATA

- **Improving Data Collection and Analysis:** The application of AI technology in modern business can mean the improvement of data collection and decision-making. Creating strong data management systems will provide the accurate data needed for artificial applications.
- **Adopting AI-driven Analytics:** AI for predictive analytics can be a powerful tool in avoiding changes in planning future inventory needs and managing supply chains.

### 4. ENHANCING CUSTOMER EXPERIENCE

- **Personalized Marketing and Recommendations:** Using patterns in data about customers, AI can provide advertising and promotions for the target customers, thereby improving customer interaction and sales.
- **AI-powered Customer Service:** The combination of AI chatbots and virtual assistants is an effective solution for a quick and high-quality answer to customers' requests, enhancing the level of customers' satisfaction and loyalty.

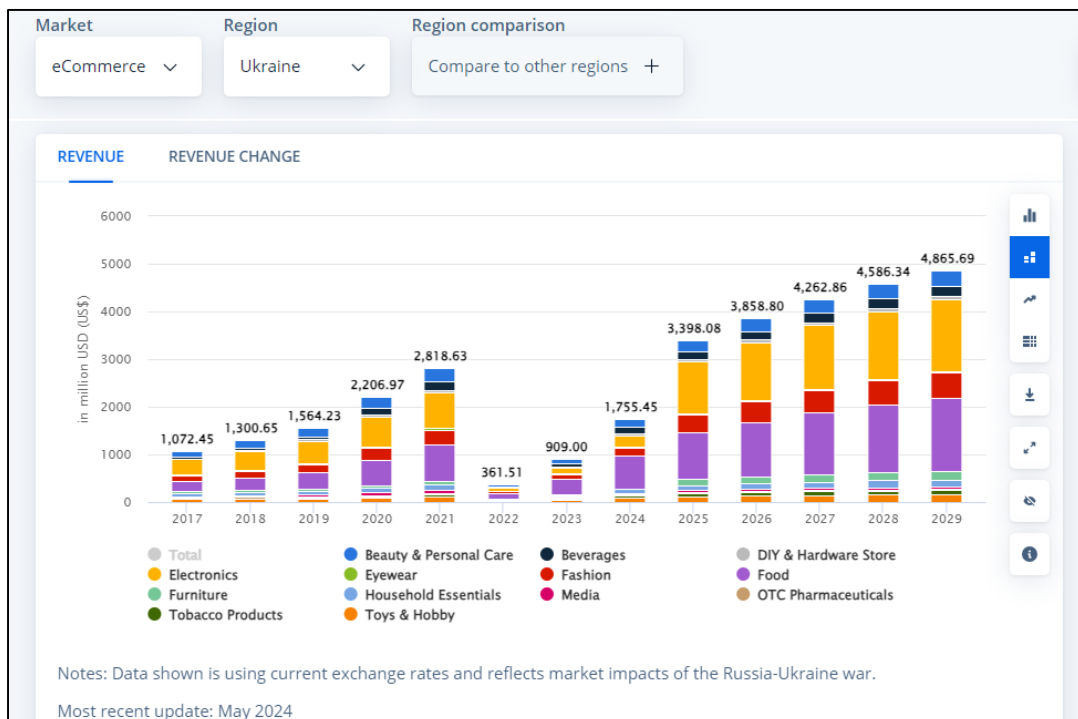
### 5. RULES AND REGULATIONS SUPPORT

- **Proactive Engagement with Regulators:** Policies set by the regulators can in turn help the businesses to avoid legal constraints which are likely to surround certain activities such as e-commerce in the near future due to increase use of AI in the market.

- **Establishing Ethical Standards:** Since AI can be sensitive to cultural and power differences, ethical benchmarks for the practical application of artificial intelligence can solve problems such as bias and openness to produce informed confidence among consumers.

### **Statista graph of E-commerce in Ukraine (War – due)**

Recent graph (Fig.2.2) shows the usage earning revenue in the E-commerce market to reach US \$1,755.00 million in 2024. With revenue expected to show an annual growth rate (CAGR 2024-2029) of 22.62%, resulting in a market volume of US \$4.865.00 million by 2029.



**Figure 2.2. Source: (Statista) Data of markets revenue in Ukraine**

In the E-commerce market, the number of users is expected to hit an amount to 9.8m users by 2029. User penetration will be 22.1% in 2024 and is expected to reach 26.0% by 2029. The average revenue per user (ARPU) is expected to amount to US\$213.60.

## 2.2 Analysis of organizational system and economic activity of Rozetka

“**Rozetka**” founded in 2005 by Ukrainian Entrepreneur *Vladislav Chechetkin*. It started as an online electronics store but has expanded its products offerings to include categories such as appliances, home goods, beauty products, fashion items, groceries and more. They have established itself as a dominant player in the Ukrainian e-commerce market, with millions of customers and a vast variety of products available for purchase. They operate primarily in Ukraine but also serves customers in neighboring countries such as **Belarus** and **Moldova**.



*Figure 2.3. Company Logo*

**Rozetka’s Goal:** We believe that things exist to make life easier, more pleasant and kinder. Therefore, the search for the same thing should be fast, convenient and pleasant. We don’t just sell home appliances, electronics, jewelry or wine. We help you find exactly what you need in one place and without unnecessary worries, so that you don’t waste your life searching, but just live happily. Rozetka is a universal answer to any query, the beginning of the search and its final stop, a real assistant. We forever free our customers from unpleasant compromises, fulfill their wished and enable them to dream more boldly. With smart search and honest service, we’re making our customers lives a little better right now [18].

*“We want to have the best service in the world, so we train employees not only in the technical part of the business, but also in working the client”.*

# 3.9 million

*Goods available for purchase*

# 789 million

*Users visited Rozetka in 2018*

# 81%

*Our customers return*

# 2.5 million

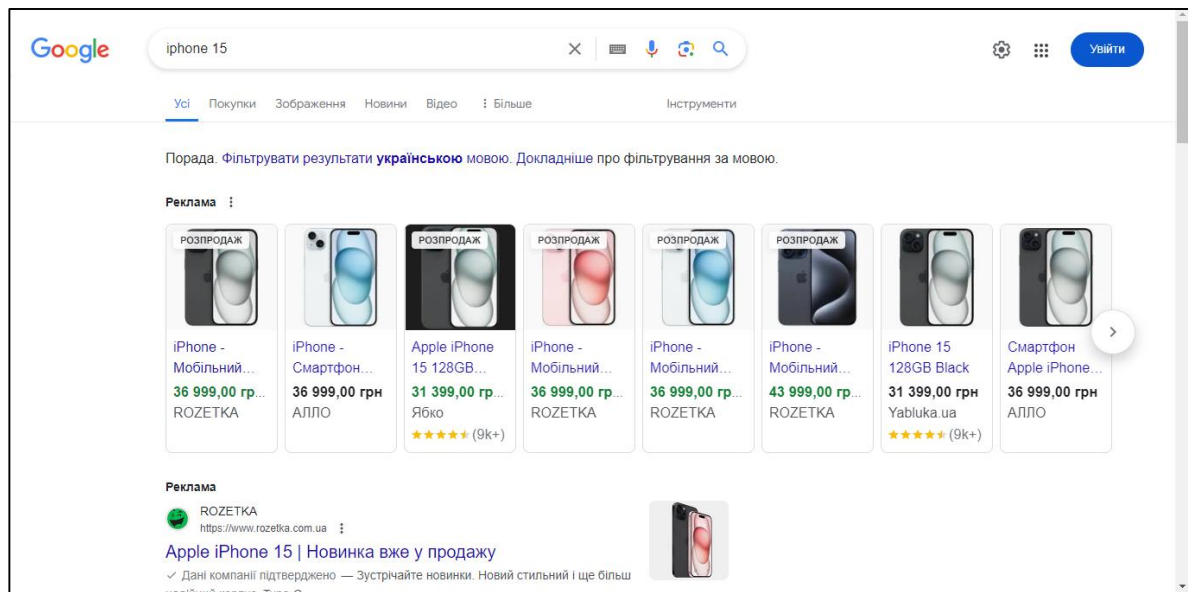
*Visitors per day*

**Rozetka's Vision:** Someone will start their first business with us (or expand an existing one), and someone will bring products to Ukraine that are not yet available. This is beneficial for everyone: both buyers and sellers, and even us - because this way we help more people become a little happier.

**Table 2.3 - General Information about the Enterprise "Rozetka"**

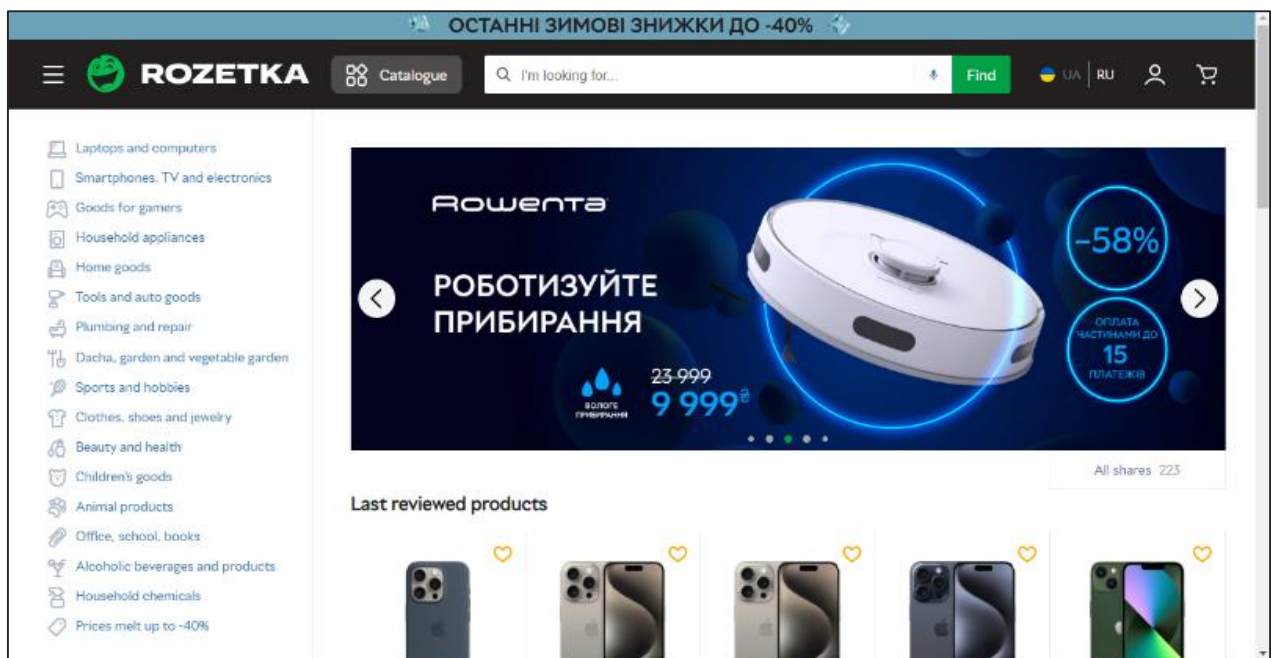
<b>1. Legal entity's full name</b>	ROZETKA LIMITED LIABILITY COMPANY. UA
<b>2. Short name</b>	LLC "ROZETKA. UA"
<b>3. Legal entity's status</b>	Not in the process of dissolution
<b>4. USREOU code</b>	37193071
<b>5. Registration date</b>	24.06.2010 (13 years 7 months)
<b>6. Valid VAT certificate</b>	371930726554   06.07.2010
<b>7. Authorized person</b>	Oleksiy Oleksandrovich Galchenko
<b>8. The size of the authorized capital</b>	1000.00 UAH
<b>9. Type of business entity</b>	Limited Liability Company
<b>10. Location of the legal entity</b>	Kyiv city, 01103, Mykola Mikhnovsky building 8a, Ukraine
<b>11. Mail</b>	inbox@rozetka.com.ua
<b>12. Phone number</b>	+380 (44) 502 99 31

Rozetka still ranks on top search results for smartphones (fig.2.4), which shows the most populated site used by consumers. As continued with Rozetka which



**Figure 2.4. Search results for the key queries "Smartphone iPhone 15", "buy a smartphone" in Google search service in Ukraine as of (May 2024)**

maintains strong online presence through various marketing channels. A snap of Rozetka website (fig.2.5) shows its various categories with offers going on and latest smartphone models, there prices and reviews. Everything needed for a consumer as its ease.



**Figure 2.5. Source: Rozetka website (online platform) <https://rozetka.com.ua/>**

Moreover, Rozetka's ads are displayed on different websites as this the theory of machine learning which comes under artificial intelligence where they learn what consumer wants and displays them on different websites (fig. 2.6) whichever they visit to. It is prominent and easy eye catchy for consumers to click on as also it attracts potential customers.

The screenshot shows a website interface with a navigation bar at the top containing links like 'GST', 'Customs', 'DGFT', 'Central Excise', 'Notifications', 'Service Tax', 'RBI', 'Trade Resources', 'About Us', and 'Contact Us'. Below the navigation bar, there is a section titled 'Customs Duty Chapters' with a sub-heading 'India Custom Tariff of Chapter 30: Pharmaceutical Products'. A table below this section lists 'Total: 1 Customs Duty Chapters'. In the center, there is a red-bordered advertisement for Rozetka, featuring four iPhone products with 'На сайті' (On site) buttons. To the right of the ad is a 'Get Sample Now' form with options for 'Export Data', 'Import Data', 'Buyers', 'Suppliers', and 'Exim Help', along with input fields for 'Name\*', 'Email\*', 'Phone:(include Country Code)\*', 'My Product/HS Code\*', and 'Company Name'. At the bottom, there is a 'Custom Duty Sub Heading' table with columns for 'Sub Heading Code' and 'Sub Heading Description'.

Sub Heading Code	Sub Heading Description
3001	Customs Duty of Glands And Other Organs For Organo- Therapeutic Uses, Dried,whether Or Not Powdered; Extracts Of Glands Or Other Organs Or Of Their Secretions For Organo-

**Figure 2.6.** The red highlighted shows Rozetka ads running on pages

Their effective e-mail marketing campaigns keeps their targeted customers alert on every new offers/deals and any new product Rozetka introduces (fig. 2.7). It helps enterprise to manage their customers due to enhancing engagement and loyalty.

The screenshot shows an email interface with a header bar containing 'Primary', 'Promotions', and 'Social' tabs. Below the header, there is a navigation bar with 'ROZETKA' and a search bar. The main content area displays a grid of badminton racket sets. Each set is shown with an image and a price in UAH. The email also includes a 'Delete' button and a 'Save to Inbox' button.

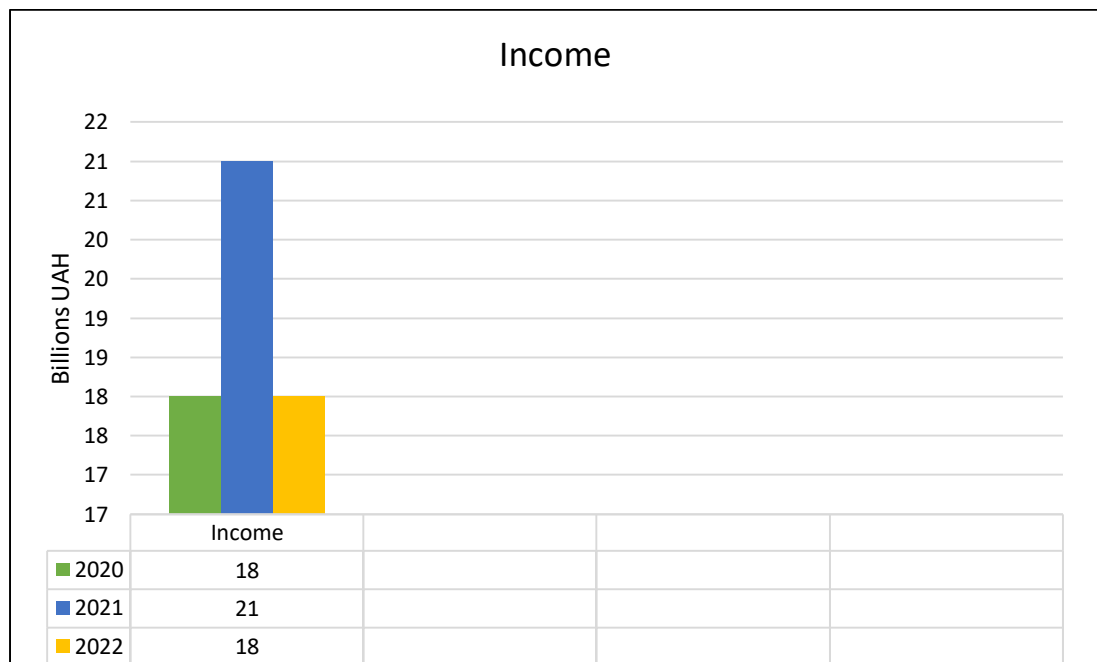
Product Name	Price (UAH)
Набір для швидкісного бадмінтону Talbot Torro...	3 249 UAH
Набір для швидкісного бадмінтону Talbot Torro...	1 349 UAH
Набір Speedminton Start Set (400051). Бадмінтон,...	1 503 UAH

**Figure 2.7.** Rozetkas e-mail marketing

## FINANCIAL STATEMENTS

Leading enterprise in the country has gave the results of their financial flows since the year 2020, 2021 and 2022 which has right and observed. Starting with the Income sheet (fig.2.8), Rozetka has shown a significant financial performance over the past three years. In 2020, the company has made an income of 18 billion UAH, with the following year 2021, where Rozetka enterprise has started using Artificial Intelligence (AI) technology made a growth of 21 billion UAH. However, in 2022 their income declined a bit due to the challenges in market.

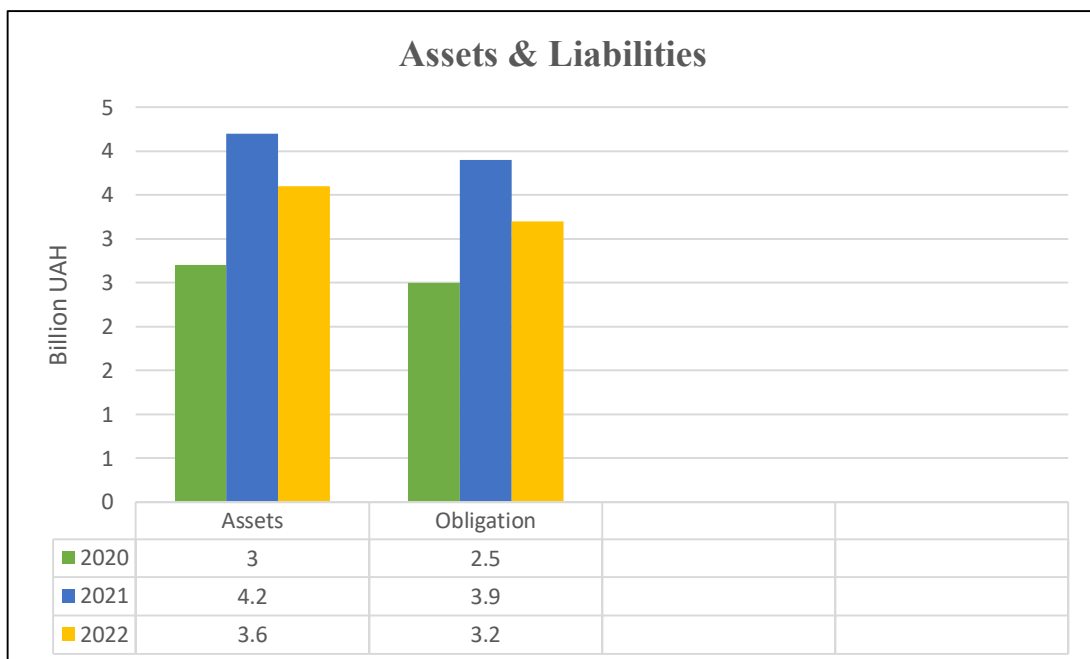
The COVID-19 pandemic had a major impact on global business around the world, thanks to Rozetka market which was e-commerce site helped various consumers to still purchase their demands. This shift boosted Rozetka's sales in 2020 and 2021 to the income growth observed in 2021.



**Figure 2.8. Income for the past three years of Rozetka in Billions UAH**

Observations on handling Assets and Liabilities, the enterprise has seen fluctuating since the last three years from 2020 to 2022 (fig 2.9). In the FY 2020 Rozetka's total assets were values at 3 billion UAH. This increased to 4.2 billion UAH in 2021 and reflected in company's expansion and investment in technology and

infrastructure. By the FY 2022, the total assets slightly decreased to 3.6 billion UAH. On the Liabilities side, Rozetka had obligations amounting to 2.5 billion UAH in the FY 2020. This rose in 2021 to 3.9 billion UAH, according to the company's growth and the financial commitments with expanding their operations and accessing new technologies. In the FY 2022, the obligations decreased to 3.2 billion UAH showing Rozetka's efforts to manage and reduce its debt while maintaining good financial stability.

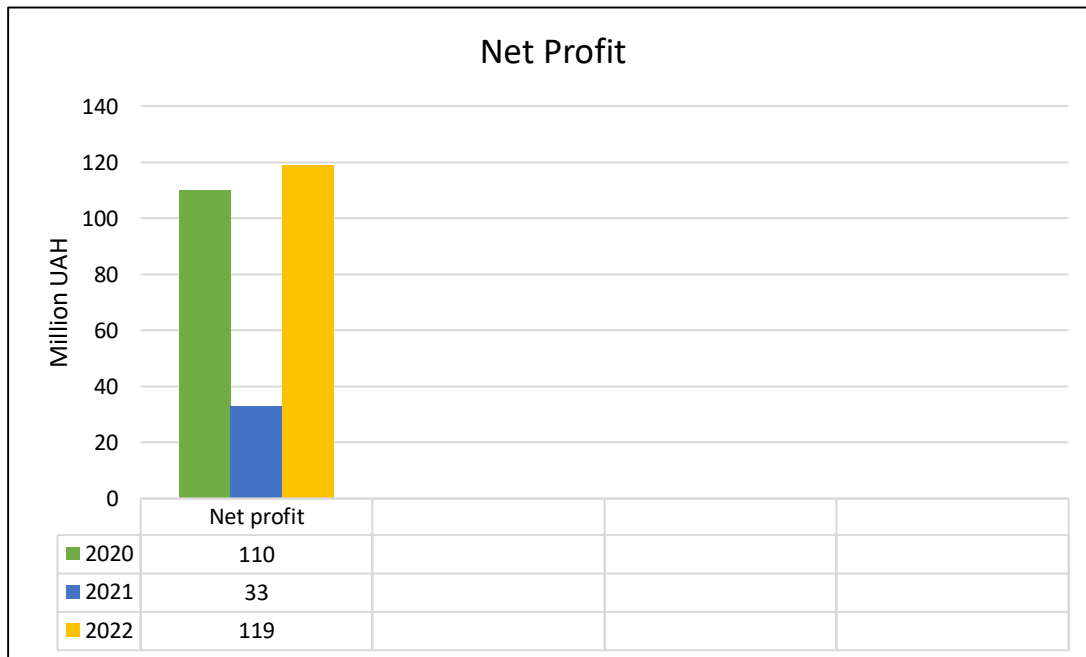


**Figure 2.9. Assets and Liabilities of Rozetka enterprise in Billion UAH**

**Source:** <https://opendatabot.ua/c/37193071> [19]

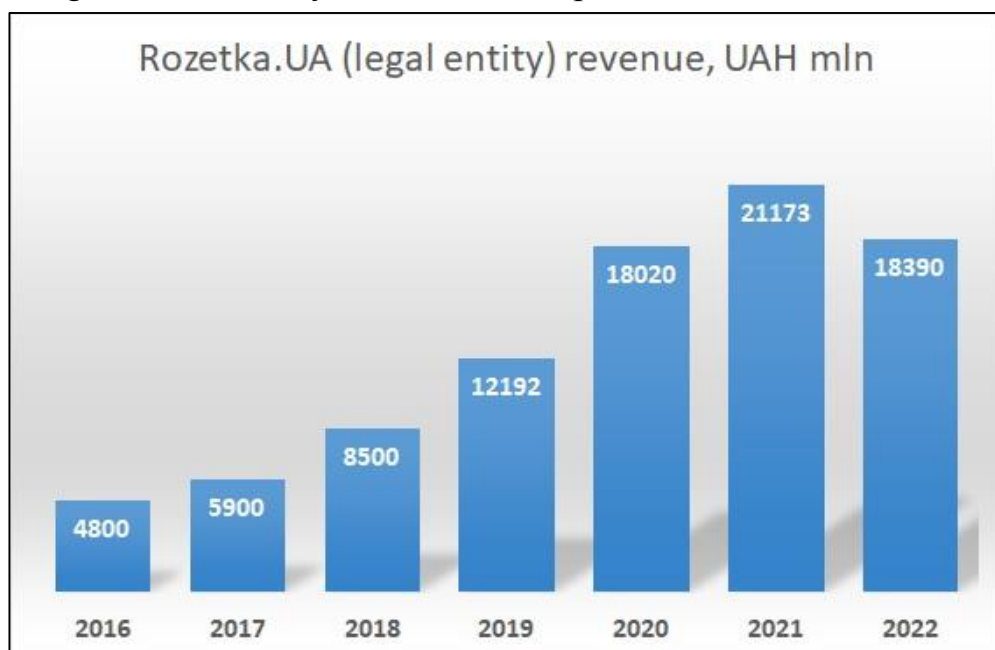
Rozetka's net profit has now shown and major growth in the FY 2022, as reflecting the nature of the e-commerce market and the impact of external factors like the COVID-19 pandemic (fig 2.10). In the FY 2020, enterprise reported a net profit of 110 million UAH. This year was marked by load in online shopping due to pandemic, which boosted the sales and contributed in high profit. However, in the FY 2021, Rozetka's net profit had a fall to 33 million UAH. This decline can be due to increase operational costs, investment in various high pit technologies and infrastructure. By the FY 2022, their net profit jumped 12% which made to 119 million UAH. This increase was due to improvement in their business model,

including their effective use of AI technologies which enhanced customer experience,



*Figure 2.10. Net profit subsequently high in the year 2022 in hundred million UAH*

Withstanding the difficulties of this year, the Ukrainian e-commerce Rozetka which was on grow since 2016 declined in 2022 (fig. 2.11) where they managed to re-expand its distribution network almost two times in 2022. Since the beginning of the full-scale Russian invasion on February 24th 2022, company has already established more than 200 delivery points in different parts of Ukraine. Rozetka now has **246** points across 73 Ukrainian cities which makes it easier for online users throughout the country to reach the shop.

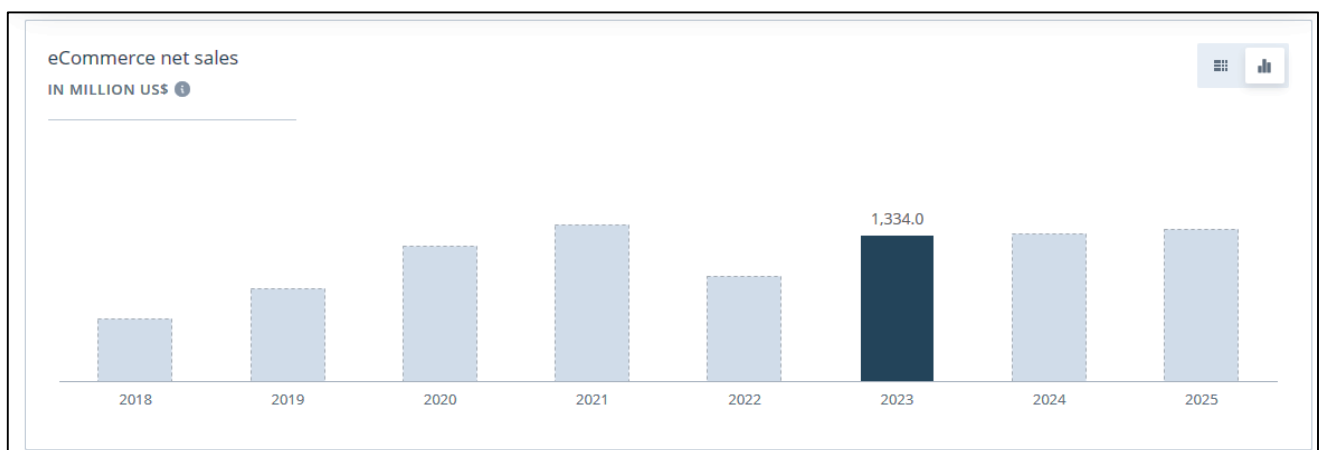


*Figure 2.11. The revenue of Rozetka.UA decreased by 13% in the Yr. 2022*

**Financial Performance and Impact of the War:** Justice and fairness are another essential element of ethics in technology today with the upgrade in AI. Rozetka is an example of this happening of this part by their branching out increased but the war impacted their finance. Compared to the revenues in 2021, which stood at UAH 21bn, the decline in 2022 was 13% overall, and the year-end revenue for 2022 was UAH 18.4bln. This must have been a result of the war due to its effects such as interruptions in the supply line, destruction of facilities, and alteration of the demand.

### **Understanding company's Financial Flow:**

Rozetka's business health can be reviewed through its sales channels and the cost structure. Their main source of income is product sales (fig. 2.12) they may also get some sub-income in the future through renting advertisement spaces on the platform, commission from marketplace sellers and providing additional services such as extended warranties and faster delivery. On the spending side, there are product acquisition cost, marketing and advertising cost, employee salaries, warehouse and delivery network maintenance costs, and technology infrastructure maintenance costs.



***Figure 2.12. First Party Net sales generated by Rozetka enterprise.***

### **Areas for Increasing Revenue:**

In spite of the war, Rozetka can suggest some highly efficient marketing methods to boost sales. Providing products that become relevant through the development phases of war like household supply, power backups, or safety products can be a strategic move for the company. Furthermore, developing competitive pricing together with loyalty schemes and special promotions would help customers to choose you and return again.

### **Optimizing Costs and Ensuring Sustainability:**

Although aiming at the increase in revenue, cost control will maintain relevance. Dealmaker with suppliers, on delivery operations, and marketing skill; the result is all that lowering expenses. Moreover, alternative sourcing possibilities are complex while the employing automation to operate procedures helps in enhancing efficiency and savings.

**BUSINESS MODEL:** Its business model was simple – the buyer placed an order, the online store immediately buy the goods from the wholesaler and deliver them to the buyer. In such a way online stores moved away from creating their own inventory. At the same time, they paid distributors practically upon receipt of goods and without any deferment, while offline networks worked with a payment deferment of 60-90 days. Also, online stores saved 6-10% of the cost of goods, which traditionally chains spend on renting stored and salaried for personnel.

In 2018, **Rozetka** and **EVO group** completed the formalities for merging the companies [21]. At that time, EVO group owned the market places like Prom.ua, Tiu.ru, Satu.kz, Deal.by, Bigl.ua, the online service for ordering services Kabanchik.us.

*The outlet has branches in Kyiv, Odesa, Lviv, Kharkiv, Zaporizhzhia, Brovary and other large cities of Ukraine.*

### CHARACTERISTICS OF THE ENTERPRISE:

- More than 12 million people visit every month. Sellers pay a monthly contribution of UAH 100, and a commission for each product sold.
- The size of the commission depends on the type of goods. In particular, the minimum percentage for the sales of Apple products (2%) and the maximum - for watches, gifts and holiday goods (25% each).
- It has a delivery period of 1-3 days, self-pickup from stores, mini-departments, mobile delivery points with the help of **Nova Poshta**, Justin, **Ukrposhta** delivery services, delivery by their own courier or Nova Poshta, Justin, Meest courier services. Payments according to the tariffs of delivery services (Fig 2.13).



Мобільні точки видачі  
Безкоштовна доставка  
замовлень



*Figure 2.13. Rozetkas Delivery Options*

- Payments can be made through online, card online, Google pay, Masterpass, Cashless payments are possible for legal entities and individuals PrivatPay. Also possibility of credit and payment in installments.
- Monitoring capabilities through a personal account, by order number, in your mobile application.

Having all this general information shown above of Rozetka makes it complete understanding about the outer and inner of the enterprise. Company makes functions in for business and marketing which is incredible and that too in Million UAH of sales. Company is constantly improving and developing in order to provide the best services and meet the needs of its customers. They are working

on improving their infrastructure and technology to provide the best conditions for online shopping and the best selection of products.



*Figure 2.14. Rozetkas Interior*

Rozetka has a conversion rate of 1%, while its closest competitors such as citrus.ua, allo.ua and prom.ua respectively have [22]:

- Citrus.ua level = 0.8%
- Allo.ua level = 0.7%
- Prom.ua level = 0.9%

Performing an **ETOP** analysis (environmental threat and opportunity profile) on Rozetka to determine the sustained success and growth in the enterprise.

## THREAT FACTORS

**1. Competition from E-commerce stores:** Rozetka might have a concrete see off from Amazon and Alibaba, among traditional opponents of Ukraine and online competitors. The list of such competitors counts great resources, brand recognition and loyal customers that in turn puts the market share and growth sustainability of Rozetka in question.

**2. Cybersecurity Risks:** The owner of an online platform sort plenty of particular customer's personal information as well as financial transactions that are exposed to cyber threats such as data leaks, hacking attempts, and phishing scams. Security incidents such as data breaches, theft of Intellectual Property are among such risks that contains risks of bringing a company's name to disrepute, causing customers to lose trust and ultimately result in financial loss.

**3. Supply Chain Disruptions:** Rozetka is based on the complex supplier chain that allows it to ship their products from suppliers and accomplish next day deliveries. In case there is any impediment in the supply chain such as shipping delays, raw material shortages, or production stops, the product can be stock-out, become in transit, and customers get disappointed.

**4. Regulatory Compliance:** Nevertheless, there are moments when the company, although it can recognize potential innovation areas, has a problem with implementing change and legal obligations in the context of e-commerce, such as data protection, consumer rights and taxes. Lack of these controls may result in legal consequences, these are potential fines and the company may lose its reputation.

## NEW OPPORTUNITES

**1. Expansion into New Markets:** Rozetka could go further and even try to conquer foreign markets together with the region, which has an investment potential and a high rate of development. With Rozetka as a diversification plan and focus on emerging markets the customer base can expand revenue growth and limit the risk of saturating the market.

**2. Innovation in Technology:** The ability to put more emphasis into developing higher technologies such as AI, AR, and block chain technologies can help you to stand out and be unique in the e-commerce industry. These technological tools assist clients in making individual acquisition experiences, decrease durations of operations, and increase security with facial recognition as well as fingerprinting, which are also appealing and keeping the customers.

**3. Vertical Integration:** Rozetka may develop position in the sector of vertical integration by bringing alternative businesses into the area of her activity, for example, logistics, payment processing and digital services. Utilizing these services in their platform enables Rozetka to provide its customers with full services and capture additional value with it.

**4. Customer Experience Enhancement:** The goal of our customer experience strategy lies in exploiting all techniques that will allow with website usability improvements, fast delivery options and great customer support team. With these competencies we will surely distinguish ourselves from the competition and gain loyalty of our customers. Ultimately, the technologies shall be deployed with investments in integration of online and offline channels, which is the main customer engagement tool.

**5. Sustainability Initiatives:** Not only will the green undertakings, such as recyclable packaging, low carbon emissions, and ethical sourcing campaigns will directly appeal to the environmental awareness consumer but will also make Rozetka stand out as a responsible corporate citizen. If Rozetka company will use a compass to a sustainable principle, it will be able to become more preferable in the long run to get more loyal customers and brand loyalty as a result.

On the same note, threat factors exist in the competitive e-commerce markets where Rozetka operates but the opportunities are numerous in exploring the new trends, advanced technologies, and strategic implementations. If it is

capable of effectively managing threats and capitalizing on opportunities, Rozetka will be in a position to consolidate its market presence, grow profitably, and create value for the stakeholders.

## 2.3 Perspectives for implementation of AI in the activity of Rozetka

**AI implementation in Rozetka's enterprise:** Artificial Intelligence plays a significant role in various aspects of Rozetka's operations, contribution to its success in the competitive e-commerce market all over Ukraine. Till now updated I have found bunch of implementations which Rozetka utilizes advanced technology and AI algorithms to make an easy shopping experience for their customers. They are: Personalized product recommendations, Targeted Market campaigns, Dynamic pricing strategies and efficient inventory management systems.

### I. PERSONALIZATION

**1. Personalized Recommendations:** It means that it is the process of providing personalized recommendations of products or content to a specific user in consideration of their usage and engagement with a particular platform or service. Businesses use recommendation systems to improve the users' experience, increase their level of interaction and sales through offering related content/product to users as depicted in (Fig.2.15). Now Rozetka's AI algorithms

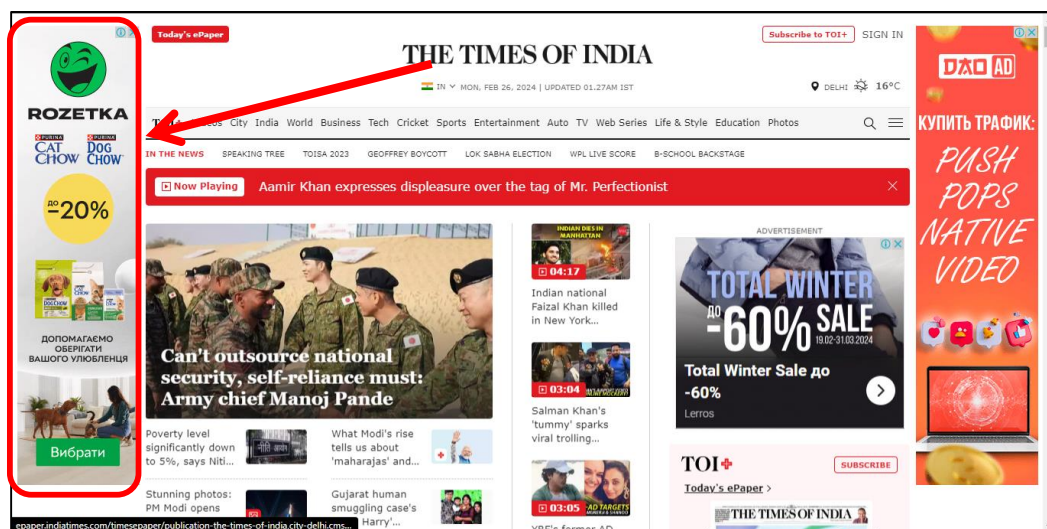


Figure 2.15. Left side of the image arrowed red is an example of PR in AI used by recommended websites

analyze vast amounts of customer data to understand individual preferences and behaviors. Thus, they can recommend the products that are relevant to each customer's preferences, recent activity, and previous purchases using machine learning algorithms. These recommendations make the overall shopping experience more enjoyable, thus improving customer satisfaction in a bid to make purchases.

**2. Search and Discovery:** It is the act of assisting users locate appropriate information, items, or services within a specific site or application. Some of them include giving users features and tools to help them search or browse content of data or products.

The use of advanced search options also improves the efficiency of search in Rozetka with the use of artificial intelligence. By using natural language processing and semantic analysis, the search engine can provide a better understanding of the queries used by the user in order to offer better results. This helps the customers to locate the products in an easy and efficient manner, leading to better customers' interactions and sales.

**3. Dynamic Pricing:** It involves the process of changing in price in real-time depending on the factors such as demands, supplies, competitor's price, time of day, customers' characteristics, and any other conditions that may be prevailing in the market. This type of pricing can help the organization to get the maximum amount of revenues and increase the level of profitability through adjusting prices according to market conditions and consumers' behavior patterns.

Businesses undertake A/B testing or price experiments in a bid to assess the relevance of different price strategies and identify suitable price levels. Through experimenting at various price levels, organizations can gain insights about the effect of dynamic pricing strategies and adjust them in the future.

## **II. Operational Efficiency**

**1. Fraud Detection and Prevention:** Fraud detection involves the identification of measures that enable organization minimize instances of fraud and non-authorized transactions. This includes activities such as

*payment fraud, identity theft, account takeover*, and other forms of fraudulent behavior that can result in financial losses or reputational damage for the organization.

There are AI set up to help identify and minimize fraud in Rozetka shopping website. AI has the ability to recognize potential fraudulent activities and other unlawful attempts at accessing an account and other related transactional activities. Such a strategy in fraud prevention does not allow customers or the company to lose their money.

**2. Image Recognition & Product Tagging:** It means the method in which the products or objects within images are recognized and classified by utilizing the AI techniques. This technology helps organizations to manage the cataloging of products, increase the efficiency of visual search and improve the experience in using the organizations' services for the consumers.

This AI algorithm ensures that it facilitates automatic identification of images and product tagging on Rozetka. AI can also analyze product images to extract features and automatically tag and sort them based on a client's needs and preferences. This image recognition technology also enhances the company's visual search in a way that most customers usually search products using images instead of keywords.

### **III. Logistics and Supply Chain**

**1. Supply chain optimization:** It is defined as the means of increasing the functional and optimal functionality of a supply chain within an organization. This is done in an effort to optimize efforts, cut costs, shorten cycle time, and ultimately satisfy customers.

- **Demand Forecasting:** With the help of companies focusing of historical sales data, market trends and customer demands, organizations are able to predict the future demands for certain products.

- **Inventory Management:** This paper talks more on simple inventory models, JIT inventory, EOQ models and ABC analysis which can enable organizations manage and control inventory effectively.
- **Supplier Relationship Management:** Companies build long standing relationships, bargain for good deals, and jointly work for better outcomes in supply-chain networks.
- **Logistics and Transportation Optimization:** Firms find availability of best route, transportation mode and carrier which will entail least cost, lowest time in transit and highest reliability.
- **Warehouse Management:** Organization of warehouse layout, slotting of locations/warehouses, and warehouse automation enable efficient order fulfillment strategy, fast tracking of pick and pack operations and proper manipulation of space cost within a warehouse.

Since supply chain is one of the most important elements of a company's functioning, it is important that AI helps Rozetka manage it effectively. Applying historical records of sales, other retail markets and factors that impacts consumer buying behavior such as weather or economic factors, it is possible to accurately predict demand through AI algorithms. They also help Rozetka to forecast demand and manage the inventory levels to avoid stock outs and to improve efficiencies through effective supply chain and logistics management.

**2. Customer Service Automation:** It pertains to the application of technology, particularly AI and Chatbot systems, to different aspects of customer support and service engagement. This automation is to increase efficiency, decrease response time, and ultimately benefit the customer experience.

To handle customer interactions, Rozetka implements the use of AI in Chatbots and Virtual Assistants. These intelligent chatbots are useful for answering customers' questions related to products, orders, tracking information, and returns. AI customer service automation offers immediate, 24/7 support, improving the clients' satisfaction levels and allowing the human operators to address higher-level issues [22].

The conflict in war in Ukraine has undoubtedly affected Rozetka's operations in terms of logistics, supply chain issues and shifts in demand. Yet, the presence of the company remains active to this day as an online retailer that has been able to survive and continue catering for the Ukrainians despite all the aforementioned difficulties.

## CONSIDERATIONS

On the e-commerce market in Ukraine Rozetka is the leader. AI becomes an integral part of Rozetka to personalize recommendations, optimize logistics, and improve user experience. As such, trust and transparency gain growing importance.

Data security comes first and therefore robust security measures are paramount. Rozetka needs to apply advanced security technology and follow stringent Ukrainian data protection rules such as the General Data Protection Regulation (GDPR). Furthermore, customers should be able to be notified through plain and clear privacy policies, such as how data is collected, used, and protected. This builds trust and enables buyers to make wise decisions.

### ***Transparency in AI-Driven Decisions:***

Given this, people should understand AI algorithms and their impact on customer experiences by explain ability. Rozetka has to create AI models which will be able to give reasons of recommendation of some goods. This gives an opportunity to the user to understand the Suggestion Logic which ultimately breeds trust in the AI. Also, providing the explanation to stakeholders on AI-driven decision-making processes, besides others, like how product recommendations are being generated, becomes an essential element for creating transparency in the organization.

AI provides its efficiency but human cognition is still priceless. Rozetka shall integrate human review and oversight mechanisms into AI decision-making processes, for instance, for high-stakes decisions, like order fulfilment or fraud detection. This guarantees that AI recommendations and actions comply with the

ethical requirements and customer satisfaction. Moreover, providing alternatives for manual review or appeal of AI-based decisions is another way of doing this and also showing the commitment to fairness.

AI algorithms are just as good as the data they are fed with. Biases from training data sets may result in discrimination or even unfair outcomes. Rozetka should take the initiative to find out and to fight biases in their data. These may involve methods such as data augmentation or associating with various data providers. Periodically verifying and observing AI systems for possible bias in the decision making is equally important to guarantee everyone the fairness and inclusivity.

AI can give the best results if it uses data that is flexible enough to represent the diverse demographics of Rozetka's customers. This way we make sure that customers get the best services and custom made recommendations based on their needs and tastes. By using the information obtained from different user categories, Rozetka will not be biased and will take care of various shopping habits of Ukrainian market.

Ethical guidelines and frameworks creation for accountable AI design and deployment is vital to be built. These frameworks will establish guidelines like fairness, accountability, and transparency involving AI usage. Through observance of ethical AI principles, Rozetka proves to be a trustworthy company that can be leaned on by its customers.

Trust, however, extends beyond policies and procedures. Rozetka must ensure a culture of ethical AI usage within the company. This can include trainings for employees on responsible AI as well as facilitating open conversations among them about the possible pitfalls and advantages.

### **Addressing Ukrainian Consumer Concerns:**

One should take into account the particular worries of Ukrainian online customers about AI and work them out, which is very important. The research may include a customer survey or a focus group to evaluate the customer attitude to AI in e-commerce. Heading of these challenges off and demonstrating a willingness to use

AI responsibly, Rozetka would be able to establish trust and confidence in its AI-driven solutions.

Transparency and trust in AI, which is the way towards a more personalized and fulfilling customer experience. Employing AI for activities such as product recommendations, tailored promotions and chatbots which address customers' problems swiftly, Rozetka increases consumer satisfaction and loyalty. On the other side, this should not be carried out by neglecting the user privacy and moral principles.

The field of AI like any other science is always changing. They must be dedicated to ongoing progress in terms of knowledge of the latest responsible AI technologies. Particularly communicating the advancement of AI and how it is being used to enhance customer experience creates enough trust and transparency, which help Rozetka continue having a leadership in a dynamic e-commerce environment in Ukraine.

### **Recommendations of e-commerce market & Suggestions of AI strategies for the enterprise**

Based on the output from the econometric model and the analysis of the Ukrainian e-commerce market, the following recommendations for the business leads are:

1. Taking into consideration the accelerated growth of the market and the growth of the consumers ready to make online purchases, the transition to online is undeniable for the retail industry. The retail markets of any size and business models are now forced to think about any possible way to be present via the online channels. On top of that, they should complete the transition to online as soon as possible, since the timing becomes critical factor in this case.
2. A strong emphasis should be placed on targeting the consumer segments, that have now been penetrated to the least extent – older people, less educated, with low-income levels and who spend little time via the Internet. Marketing strategies

should be adjusted in order to reach these segments.

3. The less penetrated consumer segments should be notified about the online presence of the brands or retail shops they regularly buy offline. Then, they should be made aware of the benefits of buying via the Internet.

4. Online retailers should make considerations about the options that should allow buyers to try the product on, touch or compare with a similar one before the final purchase.

5. Marketers should work on persuading the buyers that buying online provides them with the opportunity to save money. They can somehow show the comparison of the price for a particular good presented in an offline shop with the price via the online channel. Emphasis could be placed on the total amount saved in case of the decision to buy online.

Indeed, as the leading Ukrainian online commerce retailer, e-Rozetka implements AI to personalize suggestions, optimize logistics, and improve customer experience.

### ***1. Alignment with Rozetka's Vision and Values:***

Implementing AI must not be a sole-sided initiative. However, it should be coordinated with Rozetka therefore it should be in congruence with the company's main values and mission. This can manifest in various ways, be it customer satisfaction focusing, ethical factors prioritizing, and at last the promotion of innovation that should align with Rozetka's market standards in Ukraine. Not just for AI applications that are used in the "quick profit" or money saving at the expense of ethical issues. Only that way AI can be treated as a tool that serves for long term good which is made in accordance with the Rozetka key values.

### ***2. Investing in Responsible AI Development:***

Building a responsible AI driven growth involves a need dedicated to a just and balanced advancement. Rozetka must orient the wider personnel (from board level downwards) to act responsibly with regards to AI and ensure they fully grasp the

playbook which is the ethical use of AI. This is encompassing the identification of ethical considerations, the understanding of biases and the determination and implementation of best practices for data collection and use.

### ***3. Staying Informed on AI Regulations:***

AI sphere is in a state of perpetual motion. This means that laws and regulations are being continuously created in order to make AI use proper and ethical. Rozetka should keep informed about emerging regulations and what are the best practice of AI use in the field of responsibility. This could be through an active follow-up of the industry publications, participation in conferences or incorporate the legal professionals specializing AI regulations into the legal teams. Being relevant is of the utmost importance for Rozetka, that means AI products are given due consideration for all possible regulations, to ensure that the loyalty of its customers and entire Ukrainian society is maintained.

### ***4. Engaging Stakeholders in Dialogue:***

Trust is a fundamental of the success of e-commerce. So, they should be thinking more about build awareness among stakeholders, employees, customers, and wider community, discussing the AI implementation plans and consequences. It might cover town hall meetings, surveys or online forums for the purpose of having stakeholders to give their views and sentiments to be addressed. A tight integration among the company and its stakeholders is what Rozetka should strive for to prove that it is worth people's trust and to work in collaboration with everyone.

### ***5. Overcoming limitations of traditional recommenders:***

AI-driven e-commerce recommender systems have advanced capabilities that can help the Ukrainian e-market. Traditional systems usually work only with simple purchase history data. On the other hand, AI is able to interpret a wider range of user activity signals, such as search queries and social media activity, thus enabling more precision and personalization. Which meets the constantly changing demand

of the Ukrainian online shoppers and provides them with a more capturing and entertaining shopping experience. This has the effect of increasing brand loyalty and trust.

#### ***6. Addressing Bias in AI recommendations:***

Yet, the gap in performance of AI algorithms is due to the data they trained on which only as effective as itself. There is a pressing need to balance representation and ensure that the training data sets don't lead to biased recommendations. By collaborating with the versatile data providers active control of the bias and with all this Rozetka can ensure the inclusiveness, fairness of the recommendations that were made due to the fact of AI.

#### ***7. AI for efficiency and personalization:***

AI can boost operational efficiencies through the automation of routine processes like product categorization, warehouse management and logistic efficiency. Through this approach Rozetka is able to focus on financial sources in the segments that have the biggest impact on customer interface. In the second place, AI can customize marketing campaigns and promotions, considering often each client desire. This creates a more attractive, versatile and convenient shopping platform for the Ukrainian customers on the Rozetka's website.

#### ***8. Transparency and User Control:***

AI not only provides customized shopping experience but it is also necessary to ensure user control and transparency. Rozetka should make customers aware of the fact when AI is applied to generate recommendations and provide different ways to adjust or stop the AI-driven suggestions. This hence generates users who trust the AI practice in the platform.

***9. Continuous improvement and communication:***

The technology of AI is continuously changing. Rozetka should show that it values constant improvement. The open communication of these efforts and how AI helps to enhance Rozetka will create a trustful brand image and will allow them to maintain a leadership position in the Ukrainian e-commerce market that is full of competition.

***10. A sustainable future for Ukrainian E-commerce:***

Through the adoption of responsible AI practices into its core processes, Rozetka will be able to safeguard its business and the Ukrainian e-commerce in the long run. This righteous approach strengthens the relationship with customers, introduces ethical issues and finally, results in the more pleasant and effective on-line shopping for the Ukrainian consumers.

The role of AI-driven techniques in recommender systems for e-commerce is to provide more accurate and personalized recommendations to customers and improve the efficiency of the recommendation process. The use of AI-driven techniques can also address the limitations of traditional recommender systems and provide new insights into user preferences and behavior.

## Conclusions for Section II

Thus, it can be concluded that as the e-commerce market in Ukraine has experienced significant growth and development over the past decade, market is expected to continue expanding, driven by technological advancements and changing consumer behaviors. Even considering the seen circumstances (war), still e-commerce can be run and be leveled up towards its goal.

One of the leading e-commerce enterprise 'Rozetka' successfully addresses to continue delivering its services to the customers. Still, having faced such challenges as logistic barriers and supply chain issues, Rozetka remains customer-oriented and ready to adjust its work according to the market fluctuations. In future work, Rozetka must remain trustworthy and transparent in applying AI techniques to provide strong data protection, post-group understanding models, and human supervision. By setting long-term goals for AI usage increasing the responsibility of AI development and involving stakeholders in the discussion Rozetka can proceed in unpredictable conditions yet maintain the ethical principles and deliver worth to the consumers and the community as a whole.

Rozetka, one of the leaders among Ukrainian e-commerce companies, purposefully applies AI to optimize diverse aspects of its operations, and it is this application of AI which contributes to the brand's competitive advantage in the market.

By effectively navigating these challenges and implementing AI responsibly, Rozetka can solidify its position as a leader in the Ukrainian e-commerce landscape while fostering trust and ethical practices. Building trust has a central role in consumer acceptance of the use of artificial intelligence in online shopping. If consumers do not trust in an AI-powered web shop/app, they tend to consider it less useful and form a negative attitude towards it, which will result in less online traffic. Also, AI must provide online consumers with tailor-made offerings to grab the best deals, i.e. products with the highest value; and it is expected to shorten the product search time to enhance shopping effectiveness.

## CONCLUSIONS

The objective of this qualification paper is to determine and conceptualize the AI factors that interact systemically in the management of E-commerce in the industry, for which the research was divided into two sections.

In the first phase of the section the study and prospects for further development in both the sections have individualized the matter from discussing the E-commerce, it's modern usage and importance for our consumers and ease with the help of Artificial Intelligence which has now provided all over for business in every segment this direction has led the enterprise and community to succeed their core values and goals with their products and service. The share of e-commerce is steadily growing in Ukraine. Leading online stores remain the leaders in online commerce, moving to online commerce in order to develop additional sales channels. Thus, e-commerce has every reason for active implementation in the domestic market. But there are a number of problems, although the forecasts are positive and e-commerce with a certain change in the behavioral factor will take a worthy place in the structure of the national economy and people's consciousness. Thus, e-commerce has every reason for active implementation in the domestic market. But there are a number of problems that hinder the development of e-commerce. Although the forecasts, as world experience shows, are positive and e-commerce with a certain change in the behavioral factor will take a worthy place in the structure of the national economy and people's consciousness. Listing the definitions of E-commerce in various ways till expressing the implementation of AI in the E-commerce enterprise of Ukraine known as "Rozetka". All of them has subdivided into rational categories giving importance to know the benefit of each and every AI tools and activities with those analyses. The current stage of economic development is characterized by the active implementation of Internet technologies, which significantly simplify the problem of sales and promotion of domestic enterprises. In Ukraine, sites related to electronic commerce are visited by approximately 67% of Internet users, which indicates significant prospects for

the development of Internet commerce in Ukraine. Based on the analysis of statistical data, it was established that the annual growth index of Internet trade in Ukraine in 2019 was 49.8% (at the same time, retail trade was only 17.6%). In 2019, the largest share of the Internet trade market was held by the spheres of transport, warehousing, postal and courier activities (40%), wholesale and retail trade (36%) and processing industry (19%). Conducted studies show that the Ukrainian market of Internet trade is mainly operated by companies that use such business models as an electronic store (supermarket), bulletin board, marketplace and price aggregator or their combinations. In recent years, bulletin boards and marketplaces have made the most progress. Based on the analysis of the traffic sources of TOP-20 of the largest online stores of Ukraine, which include direct traffic, referrals, keyword search, social networks, mail and media advertising, it was determined that the largest share in it is taken by direct traffic and keyword search. In order to increase the volume of purchases of goods and increase the number of visits by users, it is advisable for domestic Internet stores to focus on increasing direct traffic and forming the optimal structure of other types of traffic, taking into account their impact on brand recognition, costs of provisioning and the direction of the enterprise, which will be the direction of further research. The share of e-commerce is steadily growing in Ukraine. Leading online stores remain the leaders in online commerce, moving to online commerce in order to develop additional sales channels. Thus, e-commerce has every reason for active implementation in the domestic market. But there are a number of problems, although the forecasts are positive and e-commerce with a certain change in the behavioral factor will take a worthy place in the structure of the national economy and people's consciousness. Thus, e-commerce has every reason for active implementation in the domestic market. But there are a number of problems that hinder the development of e-commerce. Although the forecasts, as world experience shows, are positive and e-commerce with a certain change in the behavioral factor will take a worthy place in the structure of the national economy and people's consciousness.

In the second phase Rozetka a dominant player in the Ukrainian e-commerce market, leverages AI to personalize the shopping experience, optimize operations, and enhance its supply chain.

Personalization: Recommends products, improves search, and personalizes pricing.

Operations: Detects fraud, automates tasks, and optimizes inventory management.

Logistics & Supply Chain: Optimizes delivery routes, forecasts demand, and automates customer service.

Data privacy: Ensuring data security and obtaining user consent for AI applications.

Transparency and explain ability: Communicating AI decision-making processes.

Ethical considerations: Mitigating bias in AI algorithms and ensuring ethical use.

Build trust and transparency through data security, clear communication, and explainable AI models.

Mitigate bias by ensuring data diversity and human oversight in AI decision-making.

Align AI strategy with business goals and invest in responsible AI development.

Engage stakeholders in dialogue to address concerns and incorporate feedback.

Despite the ongoing war's impact, Rozetka's continued operations demonstrate its adaptability and commitment to Ukrainian consumers. By prioritizing responsible AI use, Rozetka can ensure its long-term success and contribute positively to the Ukrainian economy. Continuously invests in responsible AI development, aligning their AI strategy with overall business goals and values. They engage in dialogue with stakeholders to address concerns and incorporate feedback into their AI implementation.

The transformative power of AI in e-commerce, even amidst challenging circumstances. In addition, it is crucial for Rozetka to focus on building trust and transparency in its AI implementation by ensuring data quality and diversity, promoting human oversight, and accountability, and fostering a culture of ethical AI usage within the organization. Moreover, aligning AI strategy with overall

business goals, investing in responsible AI development, and engaging stakeholders in dialogue will be instrumental in navigating through uncertainties and maintaining resilience in the face of challenges. By adhering to these principles and adopting a proactive approach to responsible AI use, Rozetka can not only mitigate risks but also capitalize on emerging opportunities, driving sustainable growth and delivering value to its stakeholders in the long run. Furthermore, as Rozetka navigates through the ongoing war situation in Ukraine, it's imperative for the company to remain adaptable and flexible, prioritizing resilience in its operations. This involves maintaining a focus on meeting the fundamental needs of customers, adapting strategies to address urgent demands, and establishing robust crisis contingency plans. By proactively addressing challenges and leveraging its strengths, Rozetka can continue to serve Ukrainian consumers effectively, contributing to the country's recovery and demonstrating its commitment to supporting the community during difficult times.

The application of AI in e-commerce stands to expand in the future, as businesses are appreciating their role in influencing consumer demands. The rapid development of research technology and increased access to the internet present e-commerce businesses with an opportunity to expand their various platforms. Notably, the influence of AI in e-commerce spills over to customer retention and satisfaction. The customers are at the center of the changes and adoption of AI in e-commerce. Hence, e-commerce can further develop contact with customers and establish developed customer relationship management systems.

Of course, Rozetka's response to tough economic circumstances should be investigated, but it is also important to look into the meaning behind the fact that industry 5.0 is the future and its ramifications for the e-commerce sector. Industry 5.0 refers to the Internet of Things where advanced forms of technology such as artificial intelligence, Internet of Things (IoT), and robotics are employed not only to upgrade humans but also to embed humanity with regard to human-centered approaches. Whereas the previous industries, centering around a role of automation and efficiency, the feature of Industry 5.0 is collaborative work

between humans and machines, augmenting the roles of productivity, creativity, and innovation where the humans are considered to be part of the system. In the digital domain of trade, Industry 5.0 offers promising solutions which directly lead to optimization of the customer experience and process wisdom. Through the AI-powered personalization, automating smart, and the collaboration of human and machines Rozetka e-commerce can provide more customized and productive shopping experiences and the more pace each business has in their operations.

On any example, Industry 5.0 make use of AI-powered chatbots and virtual assistants which can replace routine customer service jobs but also work together with human agents to support more complicated queries and to bring exceptional service. These systems equipped with AI capabilities act as a bridge between human skills and the use of AI, so that e-commerce companies can provide speedier, sympathetic and close support service, and customers can be sure that they will feel the attention and increase their loyalty to the brand.

Further, e-Commerce platforms capitalize on Industry 5.0 generosity for the purpose of incorporating sensors of IoT, predictive analytics, as well as the use of collaborative robots (cobots). Many of these technologies allow the forward-looking provision of inventories of goods, avoid deferred maintenance of equipment with logistic function, or spur the intelligent routing of vehicles, as such these contribute to the development of more efficient and sustainable supply chain.

Rozetka has already shown flexibility and constantly implement the latest techniques. The 5th industrial revolution has made the path even better for increasing the competitive power of the company due to the fundamental shift from the staff-oriented organization to customer service. With human machine collaboration, using superior technologies, and backing a creative culture they form the base for this scenario to realize. They can continue to lead the e-commerce industry and drive positive change in the digital economy.

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## **ANNEXES**