

VII. MANAGEMENT ASPECTS OF THE USE OF ARTIFICIAL INTELLIGENCE

7.1. Conducting investment research and trading using artificial intelligence

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One of the priority factors of the current stage of development of the world economy is the progressive development of the information society, the strengthening of digitalization, the comprehensive penetration of artificial intelligence. Today, all industries are covered by the introduction of information and communication technologies, the use of various programs and networks, which allows processing a huge digital flow of information, without which it is impossible to imagine the functioning of modern investment, innovation, production and service. The special conditions of the global COVID-19 pandemic in 2020-2021 determine the use of advanced technologies and artificial intelligence, which will contribute to the development of high-tech sectors of Ukraine's economy as a whole. In such conditions, the functioning of financial and economic entities in terms of investment and financial activities using artificial intelligence, modern information technology, Internet trading, the development of which will contribute to a positive impact on achieving high socio-economic development of Ukraine. The use of modern digital technologies, computerization and the penetration of the Internet into all spheres of public life is a global trend. The International Economic Forum in Davos in 2016 marked the beginning of the

Fourth Industrial Revolution, the development of which was studied by the famous economist, founder and president of the World Economic Forum Klaus Schwab. He noted that “we are on the threshold of a technical revolution that will completely change our way of life, work and communication. The greatest transformation in the history of mankind awaits us - the greatest in scale and complexity. We do not yet know exactly how this coup will take place, but it is already clear: the answer to it must be appropriate to the scale of the revolution itself; all participants in global politics must change, all players, from the private to the public sector, both the academic world and society itself must change. [1].

Exploring the special features of the Fourth Technological Industrial Revolution (Industry 4.0), most scientists emphasize its connection with artificial intelligence, intelligent production, self-control, the Internet of Things, etc. [2, 3]. Industry 4.0 includes many technologies, the main purpose of which is to create a single space for data exchange and virtual visualization of processes and objects, as well as the creation of robotic systems in combination with Internet technologies in the format of "smart" enterprises. In particular, among the characteristic features of the Fourth Technological Revolution should be noted such as:

- increasing the share of high-tech products in GDP,
- changing the structure of the economy and the needs of society, focusing on meeting individual consumer demand;
- expanding the computing power of computer technology and strengthening the interaction between man, nature and technology ;
- Internet of Things: smart city, smart home, smart clothes;
- innovative renewal of transport infrastructure, which is manifested in the widespread use of electric vehicles, unmanned vehicles, etc .;
- use alternative sources of renewable energy and its wireless transmission;
- introduction of new technologies in the financial and credit system using Block chain technology, etc..

An important prerequisite for the development of the digital economy, the use of artificial intelligence in Ukraine approved a number of laws, including the Laws of Ukraine "On e-commerce", "On telecommunications", "On electronic digital signature", "On electronic documents and electronic document management", "On financial services and state regulation of financial services markets "approved" Strategy for the development of the information society in Ukraine ", " Concept of digital economy and society of Ukraine for 2018-2020 ", which states the basic principles of digitalization, directions of digital development, defines an action plan for its implementation [4, 5, 6, 7].

The development of the digital economy, which is based on artificial intelligence, is manifested in "creating market incentives, motivation, demand and needs for the use of digital technologies, products and services among Ukrainian sectors of industry, life, business and society for their efficiency, competitiveness and national development , growth of high-tech production and welfare of the population" [7].

According to reality, in Ukraine the main areas of use of digital technologies are e-business, e-commerce, information technology, telecommunications services. The spread of the Internet has helped to intensify the sphere of non-cash circulation, modern financial instruments, new markets related to network systems and telecommunications. The progressive development of Internet trading, the introduction of e-commerce are some of the most significant changes in modern business. Given the rapid development of Internet technologies, e-commerce increases its volume, attracts new customers, improves the financial results of e-commerce market participants and has many other advantages (Fig. 31).

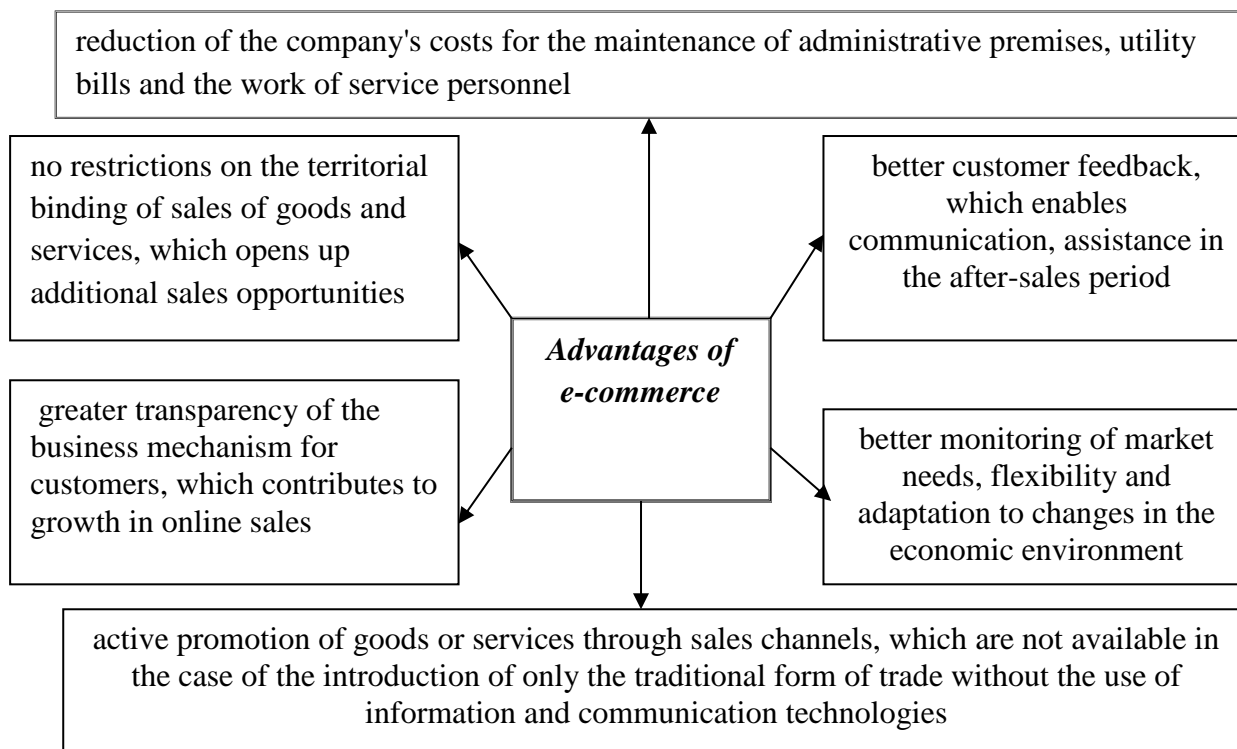


Figure 31. Characteristics of the advantages of Internet commerce

Source: Law of Ukraine "On e-commerce" (2015), Digital Agenda of Ukraine - 2020 (2016), The Concept of a "Digital Economy" (2015)

However, the functioning of enterprises in the field of e-commerce on the basis of e-commerce may have its drawbacks, including:

- consumer distrust of online shopping due to fraud and violation of deadlines, the quality of goods due to impossibility more detailed acquaintance with them before ordering;
- insufficiently formed culture of online purchases by customers, which requires the spread of advertising, modern forms of payment via the Internet, the introduction of bonus programs, etc .;
- additional costs for the consumer for the delivery of goods and its high cost;

- a high level of risk of loss of information, financial and economic security of business, etc.

According to statistics, in recent years there has been a general increase in e-commerce [8]. Thus, if in 2012 the penetration of e-commerce in the economy of Ukraine was 0.6%, then five years later this figure increased almost 6 times and reached in 2017 - 3.9%, in 2018 - 3.5% , In 2019 - 4.5%. The largest share of the volume of sold products (goods, services) received through e-commerce is observed in such activities as transport, warehousing, postal and courier activities; temporary accommodation and catering; wholesale and retail trade (Table 18).

Table 18

Sectoral features of the use of information and communication technologies at enterprises in Ukraine

Type of economic activity	Number of legal entities, units		Use of information and communication technologies at enterprises,%			
	2018	2019	had access to the Internet, %		bought cloud computing services, %	
			2018	2019	2018	2019
Processing industry	63309	67078	90,0	89,5	9,3	10,0
Agriculture, forestry and fisheries	65185	67906	86,3	84,4	8,6	8,9
Supply of electricity, gas, steam and conditioned air	4015	5318	93,2	92,3	9,7	11,6
Wholesale and retail trade; repair of vehicles, vehicles and motorcycles	210534	242334	88,1	86,1	11,3	11,5
Transportation, warehousing , postal and courier activities	26604	29099	87,8	87,9	7,5	8,1
Information and telecommunications	25468	28185	90,0	89,2	15,4	17,5
Professional, scientific and technical activities	57875	62833	88,4	87,2	13,1	13,6

Source: State Statistics Committee of Ukraine

Since Internet trading is directly connected to the Internet, the possibility of its development is directly proportional to its availability, accessibility, geographical features, etc. The ability to use Internet devices in online commerce is determined by the presence of Internet communication, which includes cable communication, mobile Internet, Internet via radio, satellite Internet [9]. During the period 2018-2020, Ukraine has significantly increased access to high-quality and high-speed Internet, including the introduction of mobile 4G Internet, and the number of mobile users far exceeds the total population, due to the presence of several mobile devices. [8].

The International Organization for Economic Cooperation and Development (OECD) identifies only three key components of the digital economy: infrastructure (hardware and software, telecommunications, networks, etc.); e-

commerce (distribution of goods via the Internet); e-business (doing business and other business processes through computer networks) [10]. Considering e-commerce, it is worth emphasizing the growth of its pace in all countries. The number of e-commerce users increased to 2.8 billion in 2019. [11] If we compare e-commerce figures with GDP per capita, we should take the example of China, where consumers of goods and services spend about 7% of this figure on the Internet, which is almost twice the rate of the United States (3.3%).

The dynamic development of today continues to dictate more and more opportunities for intelligent technologies - Internet - trading as a way to invest and increase their capital, because at this stage of development of our country this service has become the best alternative to bank deposits, buying real estate to save and increase personal capital [1]. Internet trading (internet trading) is an opportunity to make transactions on all classes of assets and currencies via the Internet. Although in recent decades this method of trading has become very widespread, on the Ukrainian stock market this concept has been used recently and has become quite popular in the investment sphere. In Ukraine, the official launch date of Internet trading is March 26, 2009 and the decisive role belongs to JSC "Ukrainian Exchange", and the penetration of the Internet in almost all areas has led to the reality of access to trading on the exchange of anyone [12]. Among the most important arguments that emphasize the positive trends in the stock market, including Internet trading itself, is the adoption of the Law of Ukraine "On Joint Stock Companies", which provides a number of important changes: undocumented form of securities in Ukraine; closer work of all companies established in Ukraine with stock exchanges; division of all joint-stock companies into public and private, etc.

Online trading includes: trading in goods through auctions, trading in services, online trading in financial instruments such as currency or securities. Internet trading in the stock market provides direct access of the investor to trading in securities on the stock exchange (direct market access) via the Internet. Also, online trading is also called: online brokerage, online investing, online trading, trading in securities (stocks) via the Internet, online trading, etc.

In modern conditions, the stock exchange is a financial institution that creates special conditions for investment and is an indicator of the economic situation in the country. The largest trading platforms are located in New York, where the shares of the world's most famous corporations are quoted. Also in the top ten are organizations from China, Japan, India and the United Kingdom. Unfortunately, Ukraine is still far behind such giants and ranks only 59th in the world rankings. There are more than 10 stock exchanges in Ukraine, located in Kyiv, Dnipro and Mykolayiv. Among them, the leading positions as the largest bidders are held by PFTS, Prospect, and the Ukrainian Stock Exchange, which constantly compete for the title of the first in the country. Most investment operations are carried out on the PFTS platform, and the PFTS Index is considered an indicator of the financial situation of the state. The direct competitor of PFTS is

the Ukrainian Exchange, which is actively developing online trading among domestic investors.

Thus, in Ukraine during 2019-2020 there was a very positive dynamics of the stock market, as evidenced by the volume of stock trading in securities (Table 2). Thus, according to the results of trading on the organized market, the volume of exchange contracts (agreements) with securities in 2019 amounted to UAH 304.97 billion, which is 17% more (or UAH 44.9 billion) than the volume of trades in 2018. year. In 2020, the positive trend of growth of exchange contracts to UAH 335.41 billion continued, which is 10% more (or UAH 30.44 billion) than the volume of trades in 2019. The largest volume of trades in financial instruments by trade organizers during this period was recorded with government bonds of Ukraine (in 2019 it amounted to UAH 295 billion (96.81% of the total volume of exchange contracts, in 2020 - respectively UAH 328.7 billion). (98%) [13] There was a consolidation of trading in securities on the two stock exchanges "Perspective" and "PFTS", which accounted for 98.7% of the value of exchange contracts in 2019, 99.28% in 2020. Such a moderate The increase in trading volumes on the stock market is explained by the increase in the amount of financial resources invested in securities, as well as the increase in the value of securities of issuers with whom agreements were concluded.

Table 19

Trading volume on the largest stock exchanges of Ukraine in 2018-2020, billion UAH.

№	Exchange	2018		2019		2020	
		Primary market	Secondary market	Primary market	Secondary market	Primary market	Secondary market
1	Prospect	2,90	124,42	0,008	186,35	0,0	201,46
2	PFTS	1,26	111,26	0,56	114,76	0,247	131,53
3	UMFB	0,035	0,0	0,0	0,004	0,0	0,007
4	Ukrainian stock exchange	1,74	19,25	2,61	0,0	0,0	2,41
5	Total	5,94	212,13	3,27	301,72	0,247	335,41

Source: National Securities and Stock Market Commission (2021)

Analyzing the data given in Table 19, it can be seen that in terms of trading volume, the stock exchange "Prospect" ranks first, increasing their volume by 8.11% to 201.46 billion UAH. in 2020 compared to 2019. The total increase in trading volumes in 2020 was 11.17% compared to 2019. In addition, a number of securities of foreign issuers are currently admitted to trading on the Prospect stock exchange: shares Facebook, Tesla, Netflix, Visa, Microsoft, AMD, APPLE, bonds US Department of the Treasury [14].

One of the important prerequisites for achieving positive trading results on the stock exchange "Prospect" is the use of Internet trading based on the electronic trading system of the Exchange (hereinafter - ETS Exchange), which is a set of organizational, technological and technical means used by the Exchange to

ensure contracts with securities and other financial instruments. The exchange of information in the ETS Exchange is carried out by electronic document management, which is a set of processes for creating, processing, sending, transmitting, receiving, storing, using and destroying electronic documents, which are performed using integrity checks and, if necessary, confirming receipt of such documents.

The Exchange, with the participation of the duly registered Key Certification Authority, provides electronic document flow between Exchange Trading Participants, the Payment Organization, banks and depository institutions that are subjects of electronic document circulation. The Key Certification Authority is of great importance in the Exchange's activities in the stock market, as it discusses important information systems used by professional stock market participants - subjects of electronic document management, namely:

- electronic trading system of the Exchange used by Members Of the Exchange and Exchange Trading Participants,
- BIT eTrade Mail e-mail system,
- software products created to automate the activities of professional stock market participants,
- interbank non-governmental payment system "Settlement Stock" System".

To participate in the Exchange Trading or view the information on trading on the Exchange, it is necessary to access the electronic trading system of the Exchange in trading or review modes, respectively. With the help of the specified system and BIT eTrade Trading Terminal the Exchange Trading Participant gets authorized access to the Markets, which are a separate segment of the Exchange Trading and has features of circulation of securities and other financial instruments, conditions, procedure, terms of fulfillment of obligations under the Agreements. In addition, the Exchange uses several other types of trading terminals as components of Internet trading in order to perform its operational tasks (Table 20).

Table 20

Components of Internet trading of the stock exchange «Prospect»

<i>No</i>	<i>Type of trading terminal</i>	<i>The purpose of implementation</i>	<i>Performed functions</i>
1.	BIT eTrade IPO	Provision of a system of initial public offering of securities on the Exchange's trading platform.	Debugging the hardware and software part of access to the trading system as a module of the electronic system of the Exchange. Defining and implementing the Rules of the Exchange. agreements and sending orders for settlements when placing securities.
2.	BIT eTrade	Ensuring interaction between the Exchange Trading Participant and the Exchange regarding the submission of Applications, conclusion of	Registration of the Application for the Exchange in the form of Electronic documents. users, confidentiality of information exchange during the submission of Applications and conclusion of Agreements. Obtaining information on Exchange Trading,

		Agreements and receipt of information on the progress of Exchange Trading	maintaining a database on submitting Applications and concluding Agreements.
3	BIT eTrade Future	Ensuring interaction between the Exchange Trading Participant and the Exchange when concluding Term Contracts, concluding Agreements and obtaining information on the Exchange Trading Process	Submission of the Order on the Derivatives Market in the form of Electronic Documents. Ensuring authorized user access, confidentiality of information exchange during the submission of Applications and conclusion of Term Contracts.
4.	BIT eTrade Mail	Creation of organizational-legal and technological preconditions of Electronic document circulation between stock market participants and use of Electronic documents by Users due to performance of their guaranteed delivery, check of integrity and validity	Authorship verification: EDS verification allows the recipient to identify the author of the electronic document. Denial protection: the sender will not be able to deny the fact of sending the electronic document. Creation of archives and duplicates of electronic documents. Use of cryptographic protection of information that meets the standards of public key technology (Public Key Infrastructure), which implements encryption based on asymmetric algorithms and electronic digital signature, which provides the ability to decrypt an electronic document only to its recipient.

Source: Perspective Stock Exchange (2021)

Another example of the use of Internet trading in the securities market of the Ukrainian Stock Exchange is the activity of FREEDOM FINANCE UKRAINE, which is a division of the international group Freedom Holding Corp. The holding is registered in the United States and provides clients with access to global stock markets and provides comprehensive investment assistance, providing brokerage operations for large and small investors, expert assistance in investing, stock market research and analysis. In 2019, Freedom Holding Corporation entered the TOP-5 OTCQX Best 50 in terms of trading activity, overtaking well-known global brands. Among the characteristic features of the holding's activity are the ability to trade online, namely: clients use the online platform for trading Tradernet securities; the holding's clients can use multi-currency accounts and mobile banking [15].

Today, thanks to the full transition to electronic document management, to automate the implementation of operations in the stock market, Internet trading provides the most favorable conditions for private investors, which intensifies the investment market of Ukraine. The main criteria for the rapid development of all services related to online securities trading is the availability and efficiency of the relevant operations.

In the complex conditions of today's business environment, Internet trading attracts potential investors, primarily by the external simplicity of transactions and low tariffs for online brokers. In this case, as in reality, the investor can use a full-featured service, relying entirely on qualified advice from a broker, or discount service, when all responsibility for making a trading decision is transferred to the investor. The trader gets access to the exchange through a special trading program and can monitor the market situation in real time and make informed investment decisions. The trading program is provided to traders by an online broker who provides technical and analytical support to its clients. Therefore, we can conclude that Internet trading can be carried out as a way of investing, doing business or as an aid to the main activity (table 21).

Table 21

Type characteristics of Internet trading in the stock market

No	Type of Internet trading	Species characteristics
1.	Internet trading - as a business	A private trader constantly monitors the dynamics of the value of shares, analyzes the market and carries out relevant operations on it.
		The main income is the profit received from the purchase / sale of securities.
		The advantage of this type of activity is freedom of action and free schedule, as the trader independently makes investment decisions and, accordingly, is solely responsible for them..
2.	Internet trading - as a way to invest	Lack of time and desire to constantly monitor the market encourages the investor to understand the opportunities and benefits provided by the process of investing in stocks, with a predominantly annual period.
		Allows you to increase your capital through accumulative investment
3.	Internet trading - as an aid	Provides the opportunity to work at the main job and in parallel to monitor the stock market.
		Allows you to play on the stock exchange, earning extra income on the difference in stock prices.

Source: Law of Ukraine "On Electronic Commerce" (2015), Law of Ukraine "On Electronic Documents and Electronic Document Management" (2018), Order of the Cabinet of Ministers of Ukraine "On Approval of the Concept of Development of Digital Economy and Society of Ukraine for 2018-2020" regarding its implementation " (2018)

As can be seen from the table, there are many benefits of Internet trading for private investors, namely: simplifies and speeds up the process of concluding contracts; the number of transactions that an investor can perform per day increases; the ability to adjust the investment portfolio over time for the most attractive stocks; it is possible to trade on two stock exchanges at the same time and earn on the difference in securities prices, etc. This, in turn, will promote the development of the Ukrainian stock market on the basis of agreements with both residents and non-residents within the legislation of Ukraine.

It should be noted that Internet trading is carried out with the help of professional stock market participants, who, fulfilling the requests of investors, ensure the quality of services provided and additional services of brokers. Therefore, Internet trading operations in the stock market should be carried out in

the main generalized stages, which will allow to work on establishing relations between clients and brokers in order to successfully complete the transaction of purchase and sale of securities (Fig. 32).

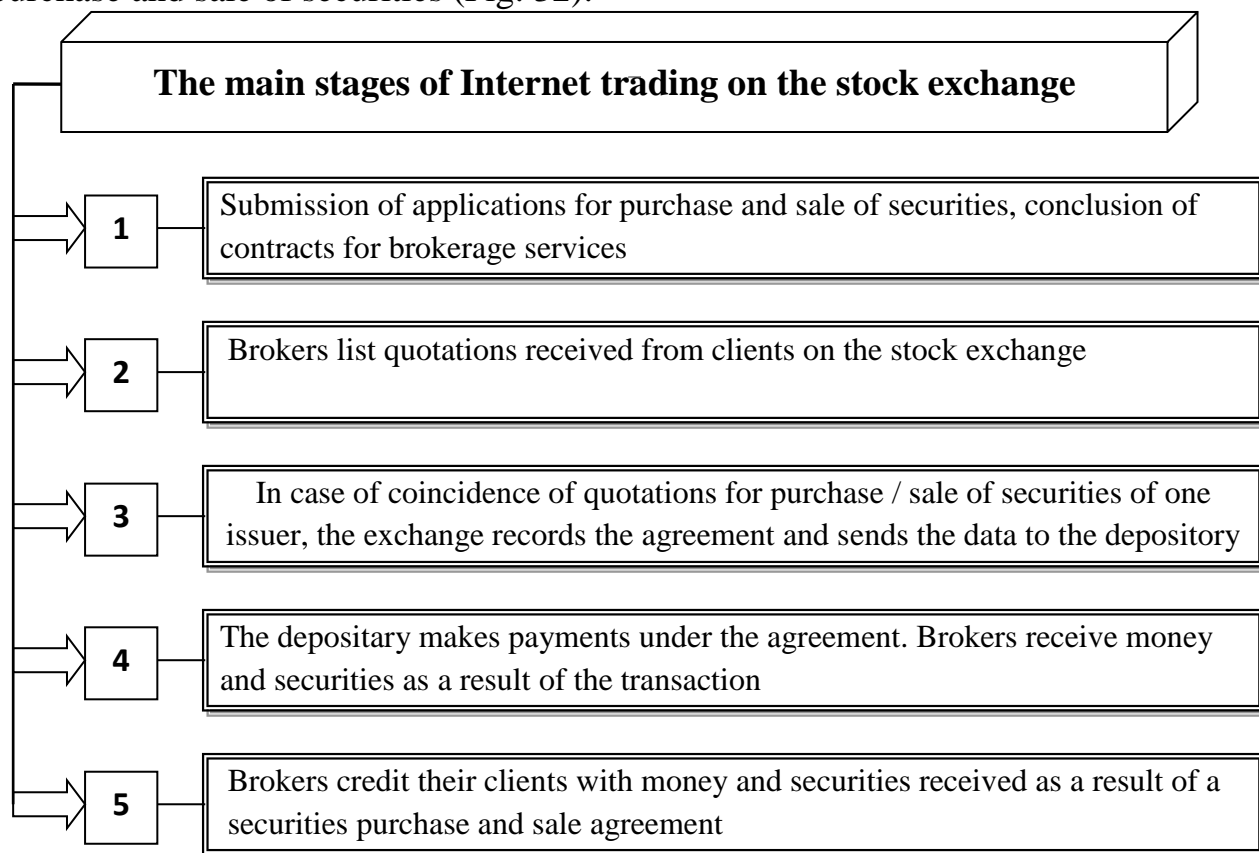


Figure 32. Algorithm for trading securities through the Internet trading system

Source: Ukrainian Stock Exchange (2021), Stock Exchange Perspective (2021), National Commission on Securities and Stock Market (2021)

Thus, Internet trading is a real way for private investors and traders to increase their capital in stock trading, along with professional participants in the securities market. Internet trading provides an opportunity to buy and sell shares of Ukrainian companies from anywhere in the world with a computer and the Internet, using direct access to the stock exchange. Internet trading will interest such a category of investors who care about financial stability and increase their capital; ready to constantly learn, use new tools in trading on the stock exchange; is financially literate, ambitious.

In today's reality, investing in the securities market has become much easier, more affordable and cheaper for Ukrainian investors. All the privileges that previously could only be enjoyed by professional participants or very large investors are now available to any investor who wishes to do so. Thus, Ukraine already uses several certified programs for access to stock exchanges, such as QUIK, WEB2L, SmartTrade. Over time, their number will only increase. In Ukraine today we can name such online brokers who have the opportunity to

connect participants to Internet trading on stock exchanges: City Brock LLC, JV LLC Dragon Capital, FC OK-2 LLC, Ginsfort-Online LLC , JSC "IC Prospect Investments", LLC "FC Ukrnet", LLC "Securities Specialist", etc.. [9, 13].

One of the ways to improve the mechanisms of Internet trading should be noted the development of margin trading, which is a speculative trade using money and goods provided to the speculator on credit secured by a specified amount (margin). A simple margin loan differs in that the amount of money received (or the value of the goods received) is usually several times the amount of collateral (margin), in other words, the investor-trader is given a leverage. Increasing the popularity of marginal trading in financial markets will intensify the activities of Internet investors, which is a very important task today for the domestic economy.

In order to develop Internet trading in Ukraine, it is necessary to intensify work on strengthening the information and software of the stock market based on the experience of using innovative technologies of foreign companies. Improving the quality and availability of analytical information on the functioning of the stock market and its electronic trading systems will help attract novice traders, intensify investment activities in the financial sector of the Ukrainian economy. This, in turn, requires equal, complete, sufficient access to telecommunications and digital technologies. The use of a set of technologies of electronic payments and transactions, e-commerce and online interaction of business entities, financial digital infrastructures will contribute to qualitative changes in investment research and Internet trading with artificial intelligence, which will ensure Ukraine's success in digital development and increase competitiveness of Ukrainian business in the international arena.

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7.2. Methods of constructing the recruitment process based on artificial intelligence

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A study of recruitment issues in Ukraine during the crisis showed that it is during this period that human resources need to intensify their activities. This is due to the difficult operating conditions of enterprises. The task of management is to prevent a decline in profits and loss of weight among competitors. Most companies resort to the method of reducing costs, which is mainly the cause of mass layoffs. During this period, human resources face a number of difficult tasks: to prevent the leakage of better minds, get rid of ballast, reduce the cost of finding candidates and, at the same time, find qualified professionals of the highest level with a contract on favorable terms for the company. Monetary investment in a crisis in recruitment can be a stimulus for the company to rise rapidly. Subject to the successful construction of a recruitment system and the proper professionalism of internal recruiters, the company can close vacancies on its own, without seeking the help of specialized agencies. Exceptions are cases when the employer clearly knows which specialist he would like to "lure" with the help of headhunting, leaving the company's reputation unblemished.

Large companies seek to attract successful recruiters to the HR department. As this profession is relatively new, recruiters are mostly self-taught, and there are not many really talented professionals in the labor market. What is the system of recruitment at the enterprise, what processes should be mastered by novice