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SCIENCE OF POST-INDUSTRIAL SOCIETY: GLOBALIZATION AND TRANSFORMATION PROCESSES

held on July 22th, 2022 by

NGO European Scientific Platform (Vinnytsia, Ukraine)

LLC International Centre Corporative Management (Vienna, Austria)

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E-BUSINESS AND E-COMMERCE TECHNOLOGIES AS AN IMPORTANT FACTOR FOR ECONOMIC EFFICIENCY AND STABILITY IN THE MODERN CONDITIONS OF THE DIGITAL ECONOMY (ON THE EXAMPLE OF OIL AND GAS COMPANY)

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Summary. *The article proves that a necessary factor for increasing economic efficiency of an oil & gas company is the use of Internet technologies, in particular, in support of management decision-making. The advantages and disadvantages of using internet technologies in the oil & gas industry, its specificities, are studied. Recommendations for each possible direction of application of internet technologies in DSS in the oil & gas company are outlined. The trends, ways of improvement and practical recommendations identified by the authors should be taken into account during further theoretical research and practical implementation (or reengineering) of DSS systems in Ukraine for industrial corporations (ie, not only for oil and gas companies). The obtained results are relevant and applicable not only for local companies and organizations, but also for international applications in the context of global, regional macroeconomic and current national crisis phenomena.*

Keywords: *E-business, E-commerce, Digital Economy, Economic Efficiency and Stability, Oil & Gas Company.*

Introduction.

Current state and the future, predisposing factors and obstacles to the use of Internet-based technologies in the oil & gas industry.

The Internet, electronic commerce and information technologies have a significant impact on the development of the energy industry, including oil & gas industry in the world. And the mentioned technologies will be a significant factor in the success of oil & gas companies in the coming years. Active distribution among oil & gas companies of on-line data management services, applied tool complexes and internet trading platforms created a situation where the oil & gas company became "accelerated" and has the capabilities that could only be dreamed of in the recent past. Applications for oil & gas companies (the main role will be played by knowledge-oriented DSS) in the near future will provide the following opportunities:

- managers of oil & gas companies will be able to explore, calculate reserves, develop, extract and reach the profitability of an oil & gas field in 2 times less time than before [1];

- staff will be able to buy, evaluate areas (for exploration, development) and seismic data in a few days;

- the ability to use secure electronic data rooms and Internet-oriented applications to create a virtual environment for organizing cooperation in the process of investing and withdrawing capital investments between the buyer and the seller (without the need for real rooms for negotiations);

- oil & gas companies engaged in exploration and development of oil & gas deposits will have the opportunity to use the best third-party geologists, geophysicists and engineers for cooperation and exploration in a virtual environment;

- the best means of interpretation and deposit assessment models can be used together in online mode by all divisions of the company and provide instant access to the estimated consequences of the investment portfolio [2];

- global optimization of the complex of drilling resources and Internet-oriented applications will provide online decision-making support for drilling programs and operations;

- asset management departments, partners and service companies around the world can work together using the Internet to access project data, to use specialist knowledge and the capabilities of specialized applications.

Oil & gas exploration and development companies are at the very beginning of understanding these enormous opportunities.

But it is not entirely obvious how the "new economy" built around the Internet and e-commerce will behave in an industry that is largely *oriented to traditional, if not conservative, methods of conducting business and managing business processes.*

In other words, although the oil & gas industry usually leads in many areas of technology, there is one in which the oil & gas industry is not at the forefront - this is the use of Internet technologies and elements of electronic business. E-business hit the market with active advertising, but today the level of its use is noticeably decreasing.

It should be noted that the most developed use of Internet and e-commerce technology is in the supply of industrial goods for the oil & gas industry. If we reflect

the dynamics of the use of e-business in the oil & gas industry, then there is a "shadow" zone of a trend change, the so-called zone of "deprivation of illusions". When reaching this zone, oil & gas companies have a certain expectation that they can get any product at the one click and deliver it immediately, and that's exactly what they want.

At the same time, sellers of goods to the oil & gas industry have an expectation that they can make a profit, their share of each transaction. None of these expectations correspond to reality. That is, as indicated above, the use of electronic business technologies in the oil & gas industry is now *at a plateau, that is, there are factors that push the situation forward, and which at the same time hinder progress.*

According to recent studies, the oil & gas industry is well prepared for the adoption of e-commerce: *approximately 90% of transactions are carried out by firms, not end customers, vertical integration is a good transfer medium, bureaucracy in the oil & gas complex operates according to the principle of command and control, the industry has a large capitalization, the end customers of the industry are very fragmented.*

And despite such a favorable foundation, the industry lags behind other traditional sectors of the economy in its perception of Internet technologies. Studies show that the full implementation of Internet-oriented technologies in making management decisions and elements of electronic business will save 5-15% of the costs of an oil & gas company. So, among the factors in favor of the use of electronic business elements in the oil & gas industry, Western researchers single out the following: saving time, improved management of business relationships, the amount of available information, many options for choosing and low prices for goods and transactions.

Among the hindering factors, the following are highlighted: insufficient security (distrust of certain payment systems and lack of trust in the level of confidentiality of private data), creation of too many relationships with customers (and therefore it is difficult to manage them), non-compliance with orders, insufficient evidence of cost reduction, possible requirements to change corporate policy, insufficient utilization of both equipment and personnel, legal issues, cost of implementation (equipment and personnel costs). So, *E-business should begin to cooperate with the oil & gas industry in the field of fulfilling many orders for relatively cheap goods and gradually move towards the fulfillment of fewer orders, but for expensive goods and services.*

Problem statement and relevance of the research.

Implementation of the concept of knowledge-oriented DSS and electronic business technology as a basic element of the innovation policy of a successful oil & gas company.

Today, there are 3 main innovative trends in the global oil & gas industry: drilling above deep underwater wells, increasing attention to natural gas, and *the growing influence of advanced information technologies.* And although the impact of the e-business wave on the oil & gas industry, which occurred a few years ago, has fallen significantly (due to which many specialized firms went bankrupt), it is still quite noticeable.

For example, the application software systems that currently control and connect the high-tech equipment (including for underwater deep drilling) located around the world of any of the 20 largest oil & gas corporations are no less important than the equipment itself.

In this regard, the management of research works at an oil & gas production enterprise is very important. Despite the fact that the *oil & gas industry largely depends on innovations that reduce costs and help to reach hard-to-find deposits [3], research and development budgets are the first to be "cut" when oil & gas prices fall.*

Summarizing the conclusions of top managers from the research work of the world's leading oil & gas companies, the following can be stated: new ideas appear in the process of combining ideas and inventions of other companies; companies must implement all the best that is available on the market; oil & gas companies should jointly use their knowledge and technological resources of universities and laboratories; the speed of adoption of new technologies is more important than endless disputes over intellectual property.

Much attention should be paid to knowledge management, which will improve the effectiveness of cooperation within and between companies [4, 5].

The oil & gas industry has all the components to fully use the possibilities of electronic business: *globality, information intensity, the presence of a large number of value chains* that can be combined more effectively.

One of the easiest ways to implement e-business elements in the oil & gas industry *is to reduce transaction costs and time, once this goal is achieved, other benefits such as increased supplier relationships and organization of workgroups* add to the company's cost savings. And the final step is *integration*.

And again, let's note that in today's crisis times for electronic business, it is appropriate not to focus on current conditions, but to pay attention to further development; *in times of crisis, managers often underestimate long-term prospects and overestimate short-term prospects*. So, when developing an e-business strategy in any industry, it's important to *"keep moving forward."*

Oil & gas companies go further and further "beyond their walls". While Wall Street may not be paying much attention to e-business right now, it doesn't mean that oil & gas companies shouldn't do this. In the end, the exchange recognizes the achievement.

One of the proofs of the importance of the Internet technologies introduction in the management of business processes of oil & gas companies is the world rating of the 50 largest oil and gas companies (based on their market capitalization), which reflects new trends in competition in the industry (including those related to the introduction of the Internet - technologies). The following trends are monitored: financial and not natural indicators reflect the intensity and size of the oil & gas company; the industry is becoming more and more international; oil & gas companies play a significant role as actors of convergence (the fundamental movement of many firms from the production of energy carriers to becoming them as energy service companies). The unification process is facilitated by deregulation and privatization in the global economy. There is also the movement of oil & gas companies in the direction of telecommunications and Internet business. Therefore, *a significant increase in the capitalization of shares occurs in those companies that have recently been conducting an active innovation policy, including the Internet environment*. However, some European giants, which are currently leading the rankings, are actually "sleeping", and when the EU deregulated the markets, their positions may be supplanted by oil & gas companies that pursue an active innovation policy. All

these innovative changes transform the market and provide both new opportunities and new types of risks [6]. So, local oil & gas companies should take into account both positive and negative experience of innovation policy.

The main part and results.

The introduction of Internet technologies and the change of the business model as the main factors of the future success of oil and gas companies.

Today, in a world of global competition and a possible downturn in the global economy, multinational oil & gas companies *need to reduce the costs of information transactions and significantly accelerate them*. In fact, there is only one main reason why companies become vertically integrated (an example is the merger of oil & gas companies British Petroleum + Amoco; Exxon + Mobil; Chevron + Texaco) – it is the high cost of information transactions. It is much cheaper to conduct all activities within one organization, where you can use all the information (and not only) together, and not pay attention to external sources. It was the Internet and information technologies that manifested the mentioned tendency and helped bring the costs of information transactions to "virtually zero". These technologies *are changing both the way energy business is conducted and the way oil & gas companies are organized*.

At the same time, as indicated above, there is a tendency to significantly reduce the time for information transactions. In the early 80s, 2-3 years of negotiations were necessary to conclude a long-term contract, in the early 90s this time was reduced to a few months. Using the Internet reduced the time for negotiations to 1 second, because you have information about who you are dealing with, what the terms of the contract are, what the terms of the loan are.

The Internet, e-commerce and information technology are causing changes in the business model: from a traditional asset-based model to a virtual integration business model. Previously, companies wanted to own and produce everything they needed.

Currently, the only competitive method is to buy components from outside, that is, from those companies that can produce them with better quality and with lower costs. The development of this model consists in an effort to sell the product even before it is assembled from components, and even to obtain payment for it. This is *the model of virtual integration*, which is advanced for many industries, and including for energy. So, for an oil & gas production company to be competitive in today's world, it has to change its marketing and logistics strategy in accordance with the new business model: creating new markets and delivering all kinds of goods at low and predictable prices.

Industry specialists pay special attention to choosing a suitable model from the array of options for starting an electronic business. But many small and large oil & gas companies are stuck at the stage of announcing their e-business strategies.

Finding the perfect fit for a company is a matter of trial and error, given their ever-increasing complexity and expansion.

But stomping in place is the worst solution to the problem. Complacency in this environment, when the Internet is lowering the cost curve across all sectors of the global economy, is not a step toward increasing efficiency, and means you are far behind. Industry leaders note very slow growth in their businesses and are constantly looking for ways to increase the value of their shares. Oil & gas companies

observe that their competitors are boldly entering Internet projects, and are afraid of falling behind. As a result, most oil & gas companies are taking a hard look at where e-business can have a beneficial impact on their core business processes.

Internet-oriented decision support processes for the purchase and sale of oil and gas. As indicated above, although e-commerce is not popular in the energy industry (including oil & gas industry), this industry is very information-intensive and is largely managed through Internet applications. E-commerce in oil, gas and energy is predicted to become widespread in a couple of years, in addition, Internet-based software will be used to manage related processes: statements and invoicing, improved dispatch control, automation of data collection, and automation of equipment procurement and quotation processes and sales of oil, gas, etc.

The oil & gas industry is forced to use more and more powerful risk management tools due to the unprecedented fluctuation of prices in the oil and gas markets, which in turn accelerates the introduction in the oil & gas production industry [7]: of new financial instruments and energy trading via the Internet. Although the liquidity of online oil and gas markets remains low today, the gradual movement towards internet-based decision-making processes for the purchase and sale of oil and gas will create its own liquidity and force OTC oil, gas and energy securities markets (options, futures etc.) to migrate to the Internet.

Moreover, trends in the oil & gas industry such as consolidation, market liberalization, and privatization create large waves of risk that must be managed proactively, and the Internet is a medium for such high-risk trading. Currently, there are about 60 online trading platforms for trading energy carriers in the world.

These platforms are focused on oil and gas options trading, and dominate the OTC markets, and intend to expand their activities into the coal and other energy markets. While the number of such platforms continues to increase, some of them are in poor financial condition and do not generate profits from operations. Eventually, most of these online marketplaces will go out of business, but there are bound to be a few that will dominate the online commerce space, while a small number of smaller companies will carve out niches in the market.

This pattern of change is similar in any new market. Electronic indexing and indicator screens on the exchange catalyzed the movement of the global energy industry to the Internet environment. The rise of electronic brokerage and electronic trading platforms will continue to change the face of energy trading. Although energy markets traditionally follow financial markets in terms of methodology and instruments, the approach to the properties of commodity markets continues.

European internet platforms are in the same unhealthy state as American ones. The need expressed by each EU country for a separate national electronic oil and gas market is not a demonstration of readiness to move away from nationalism. The Internet has no borders. Therefore, a significant number of electronic trading platforms existing in Europe are characterized by limited, local importance.

The online oil and gas market in Asia is in a phase of delayed development, as Asian trading platforms that previously operated oil futures have weakened and closed altogether.

The main obstacle to the development of the Internet market in Asia is the lag behind the development of the Internet compared to the Western world, but this

level will increase significantly over the next few years. China and India are experiencing huge Internet development for the Asian region, now more than 1% of their population is actively using the Internet. India has the world's largest volume of electronic trading of common stocks. In the near future, these two countries will increase their online trade by leaps and bounds.

Today, the introduction of electronic commerce in the global energy industry is at an initial stage. Market participants got rid of the initial illusions and reality showed that Internet trading significantly contributes to the development of the oil & gas and energy industry. The emotions that accompanied the birth and apparent demise of the Internet business are greatly exaggerated. *The key barrier today is not a technological one, but a change in human behavior towards the use of the Internet as a substitute for direct human relations, which today play a significant role in the oil and gas industry.* There is no doubt about the need to attract additional liquidity, creating pricing methods, an adequate system of credit risk control and management, clearing settlements and ensuring payment of contracts.

B2B electronic oil and gas exchange trading will not only survive, but thrive in the years to come, as electronic markets need to centralize information, create communities, and trade energy. *The fragmented markets that exist today will form a consolidated market in the future, dominated by a few global companies, while smaller companies will occupy their regional or functional niches in the market.*

There is a tendency to gradually use the best electronic trading platforms for trading other related products for the oil & gas industry, which will lead to the creation of *a multi-commodity electronic energy exchange*, the clearing and payments of which will be taken care of by leading banks already included in the global network.

Better functionality of electronic trading platforms will be ensured in case of technology improvement. Potential buyers and purchasing technologies in the front and back offices of companies will be Internet-oriented, so electronic exchanges will be able to provide equal opportunities for trading 24 hours a day regardless of geographical boundaries.

Pricing will be more transparent and market liquidity will increase significantly. The energy industry foresees the complex use of the Internet not only for trading in energy carriers, but also for intermediary services and retail trade. The global business that contains a huge amount of information can serve as *a catalyst for the use of the Internet - this are the oil & gas and energy industries.*

The use of internet-based DSS systems for effective asset management of an oil & gas company.

The main task in asset management for oil & gas companies today is the realization of the full value of proven oil and gas reserves by preventing product losses. The expected productivity of the well almost always does not coincide with the actual one, so companies conduct internal measures to use electronic means to identify and measure unexpected production losses in order to productively use this volume of oil and gas.

It is possible to increase oil and gas reserves by 10-20% only thanks to the discovery of additional reserves in existing oil and gas deposits. It is the implementation of a better on-line process of accumulation, evaluation and management of asset data using Internet technology in knowledge-oriented DSS

provides the ability to analyze thousands of wells per week, optimizing and increasing production overall efficiency [8].

The market price of oil and gas continues to be the main indicator influencing company policy, determining which assets are strategic and which are not. Decisions to invest and withdraw investments, mergers of large companies and the emergence of new companies that occupy specialized niches in the market are becoming more frequent, so the management of investment portfolios is an almost daily activity.

From the initial simple sites to support the process of investing and withdrawing investments on-line sites are evolving in the direction of providing broader services for full investment portfolio management. *In traditional asset markets, oil & gas companies hired brokers or banks to sell their assets. The nature of these deals was based mainly on personal relationships in a very local or regional market.*

On-line investment/withdrawal of assets is independent of personal relationships and breaks the chain of existing individual contacts, but most importantly, provides access to global markets.

Electronic commerce helps to create new markets for services and new markets for deposits, non-new assets, for data, including geological and geophysical [9], enabling the oil & gas company to profit from these new markets. Based on this, there are significant changes in the growth of online markets and the number of assets for sale: market growth; review of proposals in different geographical sections (local, national, at the level of the oil & gas basin, global); a wide range of types of assets (government licenses, exploration results, operating wells and deposits, royalties, leased assets, barter agreements); the value of the assets is in the average range from several hundred thousand dollars to tens of millions [10].

Conclusion of agreements in the Internet environment, in addition to significant time savings, makes it possible to instantly update information for buyers.

Before 1995, there were no significant alternatives to the traditional investment/extraction process, characterized by a network of personal relationships, physical data rooms, lengthy face-to-face negotiations, and a lengthy valuation process.

For example, it takes 10-12 months to prepare for a decision to conclude a typical \$1 million oil & gas asset sale agreement. But in 1995, the situation changed, in connection with the opening of the first site for trading oil & gas assets and carrying out transactions: Petroleum Place.

On-line sites for trading assets of oil & gas companies can potentially cheaply and efficiently satisfy the needs of a large number of buyers and sellers using new Internet technologies.

Typically, online sites offer the following: a list of oil & gas assets, which is divided into categories (such as: oil and gas, exploration, production); electronic auction asset catalogs and electronic data rooms; ordinary auctions, a hybrid of ordinary and Internet auctions, exclusively Internet auctions of oil & gas assets.

The present day. The influence of Internet technologies on the process of investment/withdrawal of investments in the oil & gas industry is showed: the trends of shortening the entire cycle of online purchase/sale of assets are clearly observed and how the further development of Internet service companies changes the focus of their activities from asset search to asset evaluation and further to asset management and their optimization. The following trend appears: the number of

offers becomes less important than the accompanying information on the assets offered for sale and the way they are managed. While the primary impact of Internet-based technologies is in market accessibility and in a cycle time reduction, as oil & gas companies have begun to focus more on portfolio management following the flood of corporate mergers, other opportunities have become more important:

- new markets for unnecessary, emergency and non-strategic assets; A key driver for these new markets is the unprecedented stockpile of assets that emerges 24 months after a wave of mergers and acquisitions (e.g. mergers such as: British Petroleum + Amoco; Exxon + Mobil; Chevron + Texaco, etc.).

- data management.

The success of on-line services and knowledge-oriented DSS for asset management of oil & gas companies will depend on many factors:

- Access to data. Most oil & gas companies estimate that it takes 3-6 months to collect a large block of data, depending on the conditions of the data source, with about 70% of the total time spent on data collection and organization.

- Broadband Internet access.

- Data security.

- Asset management: enabling oil & gas companies to achieve efficiency in daily operations, to more quickly revalue internal financial and technical assets and to improve relationships and reduce debts between partners, optimizing the schedule and coordinating investment/withdrawal activities and financing, with access and management of immediately relevant data several projects.

- State-of-the-art application programs. Oil & gas companies will be able to safely use software hosted on Internet servers without spending extra money and time on developing and maintaining their own software.

In the future, the government will conduct licensing on-line rather than off-line, exploration data of a defined subsurface block will be analyzed and sold over the Internet, real-time analysis of works from explosive seismic to well drilling will be conducted, with data directly from wells will be available for on-line assessment.

Assets of oil & gas companies will change their owners 5 times more often than today. The total time for a transaction for the purchase and sale of assets in the future will be from 3 months to several days.

The success of Internet service companies will depend on their ability to build such means of subterfuge that would satisfy not only the valuation goals, but also the executive goals of the oil & gas companies. The success of oil & gas companies will depend on their ability to see and quickly take advantage of new opportunities to realize asset value. Oil & gas companies should monitor the following opportunities:

- collection, transfer and management of internal and external (critical to the company's mission) data throughout the entire life cycle of assets.

Oil & gas companies continue to suffer from a combination of poor or incomplete data, poor access to current data, collection and storage of data in different ways and formats, and poor cross-referencing capabilities [11].

Since the data never leaves the on-line servers, their confidentiality is ensured and the possibility of their instant evaluation is ensured.

- access at any time and from any place to means of analysis and assessment

of assets, which will allow oil & gas companies to reduce their operating costs, since employees will communicate via the Internet, and not directly. Reduction of technological costs for updating the software, as it will be achievable in online mode and the possibility of online renting of this software.

- implementation of fast, efficient and inexpensive business processes in the electronic market (paperless transactions, reduced time to set the price and to sell, rejection of physical data rooms, improved selection efficiency, and reduced time from years to months and days for investment/withdrawal transactions).

In general, *online property trading markets will evolve from simple and low-cost tools for selling/buying assets to resources that change the way oil & gas companies manage their current operations and investment portfolios.*

The impracticality of introducing e-commerce technology into oil & gas exploration business processes.

Estimates show that the global oil & gas industry spends billions of dollars annually on the administration of the process of finding and supplying the necessary goods and services, and according to Internet companies, the use of Internet-oriented technologies will speed up and simplify this process and save each oil & gas company a lot of money.

This model will probably work quite well when it comes to ordering pipes or valves, ordering hydraulic fracturing services, or even cementing well walls.

But will this model work with seismic exploration services that are multipurpose/complex, technically complex and labor-intensive? Usually, these data *do not have a clear price and fixed costs, and the seller and the buyer agree in the process of price negotiation, which is hidden from outsiders.* But the process of trading and agreeing on the price of said item over the Internet will make it open, similar to auctions to reduce the price. However, given that the seismic exploration services industry is already in a state of crisis today and seismic exploration companies agree to prices that are below their costs, just to keep the exploration units idle, conducting such open auctions will not be beneficial.

Seismic service contractors predict that if the above negative scenario develops, the seismic industry will cease to exist. Because there will always be some surveying company that will be ready to offer a lower price, which is lower than profitability, in order not to lose customers, market and work.

And it will be a sad end for the seismic industry. On the other hand, an open bidding process will allow contractors to identify the "violation" - the company that agreed to work at a price lower than the cost price.

And if contractors can refuse offers at ultra-low prices, it will bring stability back to the industry.

Since such a scenario may require a general termination of transactions, it is the immediacy and transparency of the Internet that will allow such changes in the positions of seismic companies.

But there are also potential problems for customers of seismic services. Companies like Shell have to be very careful about secrecy, so that competitors do not get information that Shell needs seismic exploration in a certain region (that is, there may be significant deposits of oil and gas in this region, and competitors will try to be able to quickly buy out or licenses on these areas or available information

from earlier reconnaissance).

It is also a problematic issue to choose which products and services will have the greatest benefit for the customer, because seismic surveying of the earth's surface is one thing, and sea shelf data is quite another.

Therefore, in certain areas of management decision support, the advantages of Internet technology and electronic commerce are not useful for the oil & gas industry. Unlike world-renowned online stores and auctions like E-bay, which present a product to an audience far larger than any other media outlet, oil & gas companies need data on a certain defined block of the earth's surface and will only negotiate with a few precisely defined seismic exploration companies that can compete with each other on price, because only a few of them actually have some exploration data in the target region, have appropriate licenses, production bases, and are generally adapted for exploration in certain natural conditions (desert, swamps, sea shelf, mountains, etc.).

The seismic services industry does not have fixed costs, it essentially has a unitary nature of the production process, which is project-oriented. That is, the process of agreeing the price for seismic survey services in the Internet environment, which is open and constantly changing, will not work. And while the use of e-commerce in the drill pipe trade sector has a positive track record, *trying to apply e-commerce technology to the survey market is not practical.*

Security of electronic transactions of oil & gas companies is a strategic issue of energy security of any country in the world.

For the energy security of a country that depends on the import of oil and gas (Ukraine is one of them), a computer attack by an anonymous hacker can pose a threat comparable to the influence of the OPEC organization and constant military conflicts in the countries of the Middle East, which supply a significant share of oil to the world market.

Although in the developed countries of the West, oil and gas drilling seems to be protected from computer attacks, almost all aspects of the energy business depend (like almost every other industry in the West) on computers and the Internet, with the help of which the majority of routine operations are carried out. Oil refineries, gas pipelines, and power plants are all critical infrastructure that is vulnerable to cyber attacks. The government of any country must pay close attention to the ever-increasing risk of cyber-terrorism, both from its own citizens and from other countries. US government officials say it's much easier to fight an enemy you know than an anonymous hacker. And the new information age makes it increasingly difficult for the governments of countries to identify the real enemy. *To reduce the risk, the government, in cooperation with private oil & gas companies, should create a comprehensive database of the necessary information to counter computer attacks and involve the most experienced specialists in the field of information security.*

Conclusions and perspectives of further research.

The above-mentioned trends and features should be taken into account during further theoretical research and practical implementation of internet-based IT and IS not only in the oil and gas industry.

It is important for the management of most companies, when considering the issue of the possible wider application of E-Business and E-commerce, to realize that the means of intelligent soft calculations are a real way to increase the efficiency

and stability of business processes in the company. However, it should be taken into account that building a model is only one step in the process of finding new knowledge. To obtain correct results, it is necessary to conduct systematic and total ETL or ELT processes, apply ensemble ML methods and carefully and systematically check the obtained models on new data. The best model can be found after building different types of models using different algorithms and different sets of their global parameters.

Thus, the question is not whether new intelligent internet technologies are needed, but how to effectively apply them in each specific case. The costs of setting up a task and supporting intelligent systems can be an order of magnitude higher than the cost of a separate program package. It is obvious that it is worth spending part of the money on training specialists - in the end it will be cheaper and more efficient. The role of specialized consulting firms that provide comprehensive project support is growing, including problem diagnosis, analysis of solution methods, development of recommendations, implementation of the chosen approach, support, further adaptation and optimization.

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