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DEVELOPMENT OF THE MANAGEMENT SYSTEM OF UKRAINE'S ENTERPRISES IN THE CONDITIONS OF THE DIGITAL ECONOMY

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In the context of the rapid development of the information and communication economy, the management system of social and economic agents in Ukraine is forced to respond promptly to constant changes in the digital society. They have to process large amounts of multiparameter data daily for efficient operation and management. To ensure these processes are information technologies that support from Big Data and the Intellectual technology of analytical process. We proposed based on this technology decide decision on the financial equilibrium of a commercial enterprise.

Keywords: digital economy, innovation, information technology, cloud storage, intelligent analytical processing, indicators of financial balance

1. THE DIGITAL SOCIETY AND THE INFORMATION-COMMUNICATION ECONOMY IN UKRAINE

Becoming an independent state, Ukraine became a part of the whole planetary society and began to be exposed to positive and negative tendencies in all spheres of public life. Especially such influences are exposed by all socioeconomic agents whose management systems must respond quickly and adapt to the latest changes.

To date, constant changes are observed in the field of information and communication technologies and they are crucial in the development of modern society. Even at the beginning of the new millennium, a well-known American scientist, management specialist, business consultant for world corporations, Peter Drucker defined the modern economy as an information and communication technology

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that cannot function without the introduction of the latest technology (Drucker, 1999, p. 13-21) Today, we are confronted with the notion of a digital economy that is identical to that of Peter Drucker.

The notion of a digital economy arose in the last millennium. This term was introduced in 1995 (Tapscott, 1997, p. 15-36). And in the new millennium (Mesenbourg, 2001, p. 23-36), three main components of the Digital Economy concept were proposed:

- supporting infrastructure (hardware, software, telecommunications, networks),
- electronic business (how the business is conducted, any processes that an organization conducts through computer networks),
- electronic commerce (transfer of goods).

Digital technologies are developing at an exponential rate, radically changing the essence of business, dematerializing, demonizing and democratizing every industry. The emergence of Amazon, Netflix, Google and Apple has destroyed a number of industries and opened new markets. And this is just the beginning. Tomorrow's challenges are globalization and competition with free products and services by creating new products and constantly rethinking the needs of their customers. This is a scaling up of the concept of "customer" to the category of "humanity", which will generate birthplace of new ambitious goals and business models based on partnership and synergy (Jacobson, 2013, p. 153-165).

The issues of digital society development are relevant for the whole world. Back in 2000 at the summit of the G-7, the "Okinawan Charter of the Global Information Society" was adopted, which concerned the optimization of global networks.

Since 1994, the European Commission has been developing the "Action Plan for Action of the European Society on the Information Brochure". Most conservative Europe countries are adopting relevant National Digital Citizenship Development Programs for the next few years, with priority medium-term and short-term goals and indicators for achieving their goals.

In Ukraine, the issue of informatization our society laid in the program "Strategy of sustainable development of Ukraine" since 1997. But for Ukrainian society and for the IT industry, this was not enough. That's why the Chamber of Commerce and IT leaders in the spring of this year elaborated a strategy for the development of the digital economy of Ukraine in the form of a document "Digital Agenda of Ukraine 2020" and was submitted to the relevant committee of the Verkhovna Rada as a bill "Digital Advance Ukraine 2020". The main objectives are as follows: To stimulate the economy and attract investment; To lay the foundation for transforming the sectors of the economy into a competitive and efficient ("digital" economy, "digitalization" of business, industry); Make "digital" technology accessible to everyone; Create new opportunities for human capital development and development innovative, creative and "digital" industries and businesses; Develop and capture world leadership in the export of digital products and services (Verkhovna Rada of Ukraine, 2016).

To accomplish these tasks, you need to focus on the main directions. This is, in particular, the development of a "digital" infrastructure to overcome the digital divide between regions, between cities and rural areas. Given the need for large investments, it is desirable to implement such projects in partnership with neighboring European countries.

2. ANALYSIS OF THE DIGITAL TRANSFORMATION OF UKRAINE WITHIN THE FRAMEWORK OF THE WORLD ECONOMY

The study conducted by Deloitte Digital in May 2016 in Central Europe and Ukraine, "Digital Transformation – strategy for the future or the pursuit of reality?", showed that "the digitalization of business has ceased to be a way of gaining competitive advantages, but has become a decisive factor in staying on the market" (Deloitte, 2016).

Digital transformation is a very dynamic process that affects all sectors of the economy and ruthlessly rejects outsiders. Thus, according to the director of the Association "Innovative Development of Ukraine", Deputy Chairman of the Board of the Public Association "Center for the Development of Market Economy" Yuri Pivovarov, the rapid development of the digital economy is changing the world literally before our eyes. There was even a new term "GAFAnomiks" - from the first letters of the names of Google, Apple, Facebook and Amazon. The cash capitalization of this "big digital four" has already exceeded the GDP of some EU countries, such as, for example, Spain, and the growth rates of these companies are striking and measured annually by double digits (Pivovarov, 2017). That is why Poland is striving to become the European center of new technologies in the next few years.

Comparing the development of the economies of Ukraine and Poland over the past 27 years, it can be noted that in 1990 they were almost equal to GDP per capita. Unfortunately, in the 1990s, Ukraine, having high-tech instrumentation and scientific and technical potential in the field of information, did not use its chance of developing the economy with the widespread use of information and communication technologies. And now the difference between the economies of these countries has become enormous. It also affects their pace of innovation and the digital economy. Thus, over the last 10 years, Poland has sharply increased exports of high technology. It overtook Russia in this indicator in 2008 and brought it to nearly 14 Billion current US $ in 2016. Ukraine during this time reached 10 times less results, yielding also to Kazakhstan, but ahead of Belarus (Figure 1).

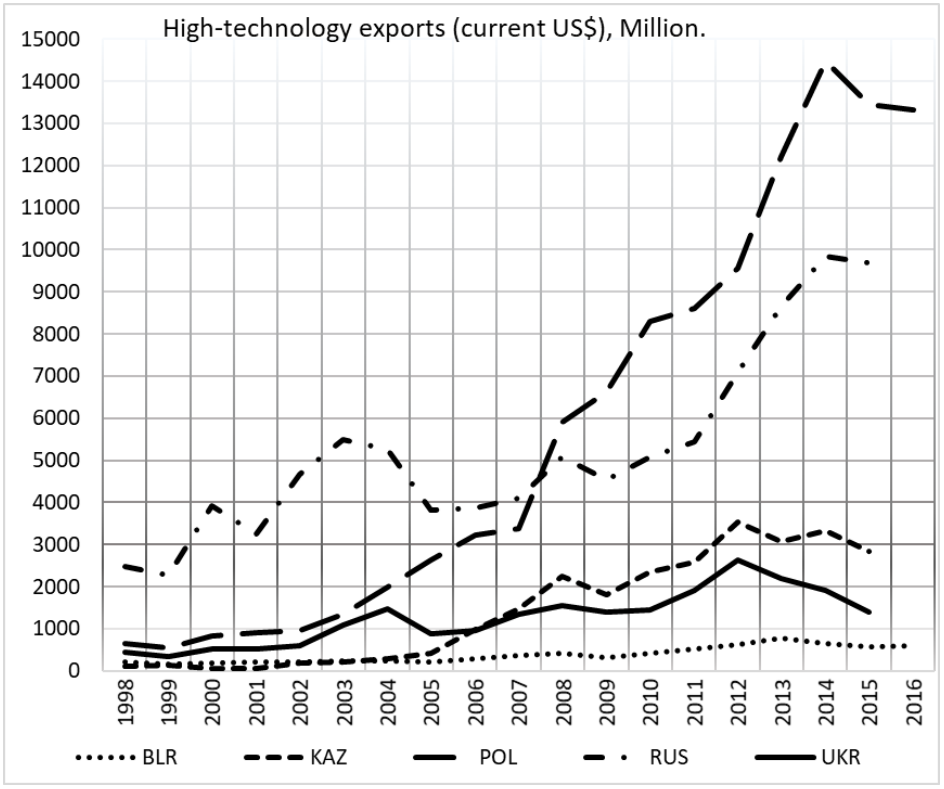

Fig. 1. Dynamics of High-technology exports of Poland and Ukraine in comparison with comparable countries of the former CIS countries (source: own study based on the World Bank's data (World Bank, 2017))

According to the Global Innovation Index, 2017, jointly prepared by Cornell University, INSEAD and WIPO (2017), Poland ranks 38th out of 127 countries, and Ukraine is 12 positions lower. Russia is 45th, Kazakhstan – 78th, Belarus – 88th position.

The Global Innovation Index contains two complex factors: Innovation Input Sub-Index (Institutions, Human Capital and Research, Infrastructure, Market Sophistication, Business Sophistication) and Innovation Output Sub-Index (Knowledge and Technology Outputs, Creative outputs). If Ukraine and Poland are located next to the second Sub-index (40 and 41 place, respectively), then the Innovation Input Sub-Index Ukraine lags in 43 positions and occupies only 77th place.

Poland's successes in the field of innovation and digital transformation, in our opinion, are related to three components:

– a favorable business climate in the country, which stimulates companies to innovate,

– a high-quality human capital that perceives innovation and is ready to take an active part in the processes of digital transformation,
– a high-quality human capital that perceives innovation and is ready to take an active part in the processes of digital transformation.

It should be noted that the introduction of innovations depends entirely on business owners and managers. Poland, for example, is the undisputed leader among countries in which even during the economic crisis of 2008-2012, they did not reduce their R & D spending, which in 2015 was 300% compared to spending in 2008. Poland is also one of the leaders in the growth of gross domestic expenditure on R & D. According to the Global Innovation Index, it increased them by 2015 by 200% compared to 2008.

Due to this, Poland ranked 36th in The Global Competitiveness Index (World Economic Forum, 2016) and Ukraine is only 85th out of 138 countries in the world.

However, Ukraine, despite the difficult economic situation, has a rather high-quality human capital (41st position in the Human Capital & Research Sub-Index of the Global Innovation Index) and effective tools for the introduction of technological innovations (32nd place in Knowledge & technology outputs Sub-Index).

The engine accelerated movement of Ukraine towards digital transformation should be the area of information and communication technologies. In this area Ukraine is constantly increasing the volume of IT outsourcing. Today, the IT industry generates about 3.4% of gross domestic product of Ukraine and under favorable conditions; it has all chances to grow to 4.5% in 2020. In 2016, the growth of the industry amounted to 15-20%, and the market grew from $2.5 billion to $3 billion. Over 80% of the nearly 4000 outsourcing IT companies in Ukraine operate in foreign markets, thereby contributing to the "digitization" of other countries, which become more effective and competitive on the global arena. At the same time, the domestic ICT market does not grow in Ukraine. There are several reasons. This is a complicated economic situation, and devaluation of the national currency, and inequality of salaries of IT specialists in Ukraine and abroad. If the situation in the field of digital transformation does not fundamentally change in the coming years, the Ukrainian economy will continue to lag behind, will increasingly turn into a resource-agrarian. That is why the ICT industry needs special attention in terms of infrastructure development, direct investment, and the improvement of the B2G dialogue. State support in the two areas is very important for the development of the industry: stimulating domestic demand for domestic developments and facilitating the export of services. The latter noted positive developments with the adoption of the law "On Amendments to Some Laws of Ukraine on the elimination of administrative barriers for the export of services" (Verkhovna Rada of Ukraine, 2016).

At the First International Forum of Innovators "Digital Ukraine - Switch on your business" On 27 April 2017 in Odesa, Deputy Minister of Economic Development and Trade of Ukraine Mykhaylo Titarchuk presented the key goals of the

Government in implementing the Digital Agenda of Ukraine, among them: "to provide citizens access to the broadband Internet, especially in villages and small cities, and the export of "digital" products and services (IT outsourcing). "He also noted that within the framework of the Association Agreement and the Digital Community, Ukraine, together with the EU, is working to harmonize legislation, develop common approaches and practices in the field of telecommunications, trust services and cybersecurity, the development of ICT infrastructure, the development of e-commerce, including electronic customs and digital transport corridors and other initiatives. At the same time, "the state should become the main driver of" digitization "and building a digital economy, and" digitalization "is a priority of economic policy and a key element of the reform" (Titarchuk, 2017). At the same time, the key task of "digitization" of Ukraine should be the formation of domestic demand for "digital" technology and their implementation in all sectors of the economy, public administration and public life. However, in Ukraine, until now, there is no single government body that coordinates and controls the implementation of strategic plans for the development of ICT and digital transformation in accordance with the Digital Agenda for Ukraine.

We are witnessing another situation in Poland. Here at the state level began to deal with issues of digitalization of the country much earlier than Ukraine. In 2011, the Ministry of Administration and Digitization, which in 2015 was transformed into The Ministry of Digital Affairs, was created. The main areas of the ministry's work are: "to develop broadband infrastructure, support the creation of web content and e-services and promote digital competences among citizens" (https://mc.gov.pl/en/).

As you can see, the state bodies of Ukraine and Poland consider the priority task of providing citizens with access to broadband Internet. Analysts say that every additional 10% of broadband Internet users make an increase of 1.2% to GDP. Similarly, an increase in the speed of access to the Internet gives rise to GDP. In terms of fixed broadband speeds, both countries in July 2017 took rather high adjacent positions (39 and 40) in the Speediest Global Index (Speediest, 2017) among 133 countries. But ranking mobile speeds Ukraine is at 109 positions and significantly behind Poland, which ranks 49th. The leaders of mobile Internet at present are Norway, the Netherlands and Hungary (46-52 megabits per second). Therefore, for both our countries, building and developing mobile networks of new generations - 4G and especially 5G is important. This was emphasized by the speakers at the Impact'17 Forum in Krakow from 31.05 to 01.06.2017 (Impact Foundation, 2017). They believe that this will be one of the factors of the intensive development of the Polish economy in the coming years.

This focus on mobile 5G networks is due to the fact that they are beside the user's mobile internet; they are the basis for automation of processes and management of mobile objects in Industry 4.0. This includes, inter alia, the Internet of Things and industry-based automation systems such as Smart City, Digital Farming, eHealth, and access to Artificial Intelligence, Virtual Reality, and the like. It should be noted that the main requirement for the implementation of such applica-

tions is to ensure the safety and preservation of both data and processes. That is, the issues of cybersecurity, as well as user identification, must be resolved.

In Ukraine, in order to accelerate the information society, they plan to launch Mobile ID service in the second half of 2017 and intensify the deployment of 4G mobile networks. Mobile ID is now successfully operating in 28 European countries. This service will simplify access to administrative services and documents reduce queues in state agencies. In addition, the Mobile ID service will give the subscriber access to secure electronic documents, allow digital signature, and in the long run also vote and make purchases. But in order for the service to work, changes are needed in the legislation. Experts also warn that there is a threat to the protection of personal data of citizens. These issues were the focus of the European Forum on Electronic Signature and Trust Services - EFPE 2017, which took place on June 6-7, 2017 in Szczecin. In the Declaration of the Forum (EFPE, 2017) was noted that "the construction and development of a holistic electronic identification system will bring tangible benefits to both public authorities and citizens and the commercial sector in the planning of digital transformation.".

For Ukraine, which significantly lagging behind in development even mobile networks 4G, it makes sense to just focus on preparing the deployment of networks 5G. At the same time it is necessary to stimulate the economy, government, society corresponding demand for new services and create conditions for growth opportunities such customers pay for more expensive services.

Also, in Ukraine it is worth exploring the experience of Poland in introducing a new digital mobile service – mDocuments (https://obywatel.gov.pl). She will use a mobile phone instead of ordinary documents. The first document available in the new service is the Identity Card (Passport). Next, there will be other documents such as driver's license, registration certificate, insurance, etc. Instead of carrying all these documents with you, you just have to activate the service and have a personal mobile phone. With this activated service, a citizen can check the history of the views of his personal information: who is trying to do it, in which office and when it happened. You can block or unlock personal information. It should be noted that the issue of registration of a mobile phone number may not be resolved on the way of introduction of such a service in Ukraine.

Such experience from Poland and other countries suggests that broadband networks of fixed and mobile communications already serve as the basis for digital transformation using the latest technologies. These technologies are: Cloud and Mobile services, Cloud and Foggy computing, Big Data & Digital platforms, Artificial intelligence, Paperless technologies, Social networks, Digital media, Identification technologies, Blockchain, Internet of things, Additive technologies (3D printing) and many others.

3. CLOUD SERVICES AS THE BASIS OF THE MODERN DIGITAL ECONOMY

Informatization of society 5 years ago envisaged introduction of information and communication technologies "on top" of existing processes, slightly changing the essence. At the same time, the principles of interaction between socio-economic agents have not changed. Informatization contributed, first of all, to economic development, and slowed down intensive development.

Today, we have the opportunity to observe a significant "leap" in the informatization of society and the transition to its digitization. Digitalization permeates and changes all social processes, improving them qualitatively, and creates new services. The processes of digitalization allow creating new forms of interaction of socio-economic agents: cloud services, Big Data, Machine to Machine, etc. The formation of a digital society contributes to economic development, the realization of human potential, and the forced revolutionary development in all spheres of public life.

One of the most common types of services is cloud services. Cloud services include different areas: virtual information system social and economic agent, data warehouse and archives, intelligent analytical processing of data.

To date, cloud technology is one big concept that includes many different concepts. This is software, infrastructure, platform, data, workplace, etc. The most important feature of cloud technologies is to meet the needs of users who need remote data processing. Of course, for an average home PC user, cloud-based technology is not something that cannot be done without it. However, cloud computing is essential for business, since many ways to use cloud technologies in business can be found. Consider the most significant benefits of using cloud technologies in business.

Perhaps the main advantage is the ability to save on expensive software. After all, you do not need to install expensive office packages and specialized data processing programs on each PC of the employee. Among other things, cloud technologies can allow all employees of the company to use only one operating system in general, with access to their workplaces through the much cheaper terminals.

The most commonly used cloud service is data storage and backup of data. Such a service requires the creation of a cloud data warehouse. It is a model of online storage, in which data is stored on a large number of distributed servers distributed to clients, mainly third-party. In contrast to the storage model on its own, dedicated servers, purchased or leased specifically for similar purposes, the number or any internal structure of the servers to the client is not known. Data is stored and processed in the so-called virtual cloud, which is one large virtual server.

Implementing cloud service as a data warehouse would be impossible without SQL technology. A cloud data warehouse is a scalable relational database that can handle large volumes of data and uses a massive parallel computing scheme (MPP). Among the advantages of the SQL data store can be highlighted:

- combining the capabilities of the SQL Server relational database and the ability to deploy in the cloud,
- separates storage resources from computational resources,
- allows you to increase or decrease the amount of computing resources, as well as to stop or restore the calculation,
- integrates with the service platform,
- uses SQL Server and Transact-SQL (T-SQL) tools,
- meets the existing regulatory requirements and requirements for the security of business processes, such as SOC and ISO.

The SQL data store implicitly distributes data across many storage and processing objects that use shared resources. Data is stored at the level of the locally surplus class storage Premium, on top of which dynamically linked computing nodes execute queries. When performing a load and complex queries, the SQL data store uses a detachment method. Requests received by the host are optimized for distribution, and then transferred to computing nodes for work in parallel mode.

Thanks to the separation of resources from the computing resources, the SQL data warehouse provides the following capabilities:

- increase or decrease the size of the storage regardless of the calculations,
- increase or decrease the scale of computations without moving data,
- stop computing without changing data,
- restoration of calculations during working hours.

The diagram below details the structure of the cloud data warehouse in detail (Figure 2).

The control node is responsible for managing requests and optimizing them. It is an external interface that interacts with all applications and connections. The control node in the SQL data store operates on the SQL database platform, and the connection to it is executed accordingly. The control node hidden coordinates all data transfers and computations needed to perform parallel requests to distributed data. When sending a T-SQL query to a SQL data store, the control node converts it into separate queries that will run on each computing node in parallel mode.

The computing nodes are the main resource of the SQL data store. These are SQL databases that store data and process queries. When you add data, the SQL store divides the line between the computing nodes. Compute nodes are also workstations that perform parallel data queries. After processing, they transmit the results back to the control node. To complete the query, the control node combines the results and returns the final result.

Data itself is stored in the BLOB object repository. When the computing nodes interact with the data, they write and read directly into the repository of BLOB objects. Since the Azure repository expands transparently and infinitely, the SQL data store has the same properties. Calculation and storage of data do not depend on each other; therefore the SQL data store can automatically scale the storage separately from the scale of computations, and vice versa. The BLOB storage facility is also completely faulty and simplifies the backup and recovery process.

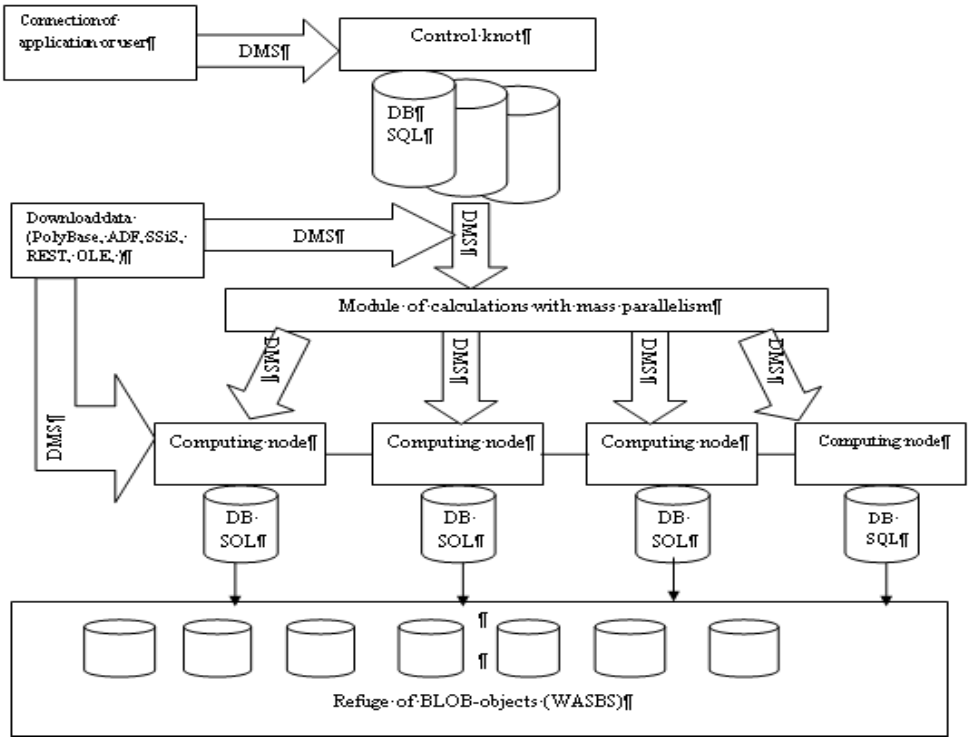

Fig. 2. Architecture and service cloud data warehouse (source: own)

The Data Moving Service (DMS) moves data between nodes. The DMS provides computing nodes access to data that is required for aggregation and aggregation operations. The DMS does not apply to Azure services. This is a Windows service that works with the SQL database on all nodes. The DMS service is running in the background. You will not have to interact with it directly. However, looking at the request plans, you can find out about the timing of DMS operations, since moving data is required to perform each request in parallel mode.

The MPP approach supports several performance optimization tools:

– distributed Query Optimizer and complex statistical suite for all data. Information about the size and distribution of data helps the service to optimize queries. This is done by evaluating the value of specific distributed operations with queries;
– improved algorithms and methods integrated into the process of moving data that effectively transfer data between computing resources, depending on the need to execute the query. These data transfer operations are embedded, and the data migration service is optimized automatically;

– an increase in data compression (compared to a traditional repository) and a tenfold (or more) increase in query performance. Analytical queries that need to scan a large number of strings work fine in the columns tore indexes.

SQL Server Parallel Data Warehouse is an effective platform for supporting large-scale data storage in hundreds of terabytes, as De Novo's experience shows (www.de-novo.biz). The nature of the system allows relatively easy to configure, install, configure, manage and extend it. SQL Server PDW allows parallel processing of requests to multidimensional atomic data models to achieve the Kimball approach in terms of the productivity, convenience, and flexibility of queries using enterprise information resources.

Next, we will consider an example of the implementation of a similar intelligent information management system based on SQL Server Parallel Data Warehouse for a commercial enterprise.

4. THE USE OF INTELLIGENT INFORMATION SYSTEMS IN THE MANAGEMENT OF COMMERCIAL ENTERPRISES

For managers of commercial enterprise specific features are:

– main and subordinate objectives specific space-time continuum that persecuted them (or have pursued) in the performance of its functions,
– evaluation indicators and determine the real state analysis and assessment of confidence in them,
– the procedure of forming lines out of situations that occur in any given period of time and score obtained confidence in the decision-making options.

On this basis, defined blocks of which shall consist of intelligent information management system trade enterprise of "supermarket". Currently, Ukraine operates hundreds of commercial enterprises of different ownership forms, which have a membership unit of information support for major management and a number of auxiliary functions.

Recently supposed to introduce the following main blocks (filling various sizes) of IIMS commercial enterprises as:

– diagnosis financial condition of the company,
– develop general recommendations,
– develop quantitative recommendations,
– calculations,
– the maintaining databases and the database of rules.

The blocs of IIMS are shown in figure 3. That is consideration in the form of advisory and analytical system with elements of an expert system

Consider in detail the purpose of each of the blocks. The arrow shows the direction of information flow. As seen from the scheme (Fig. 3) base rules (BR) and the database (DB) are organized separately, as created, adjusted, processed on different paths.

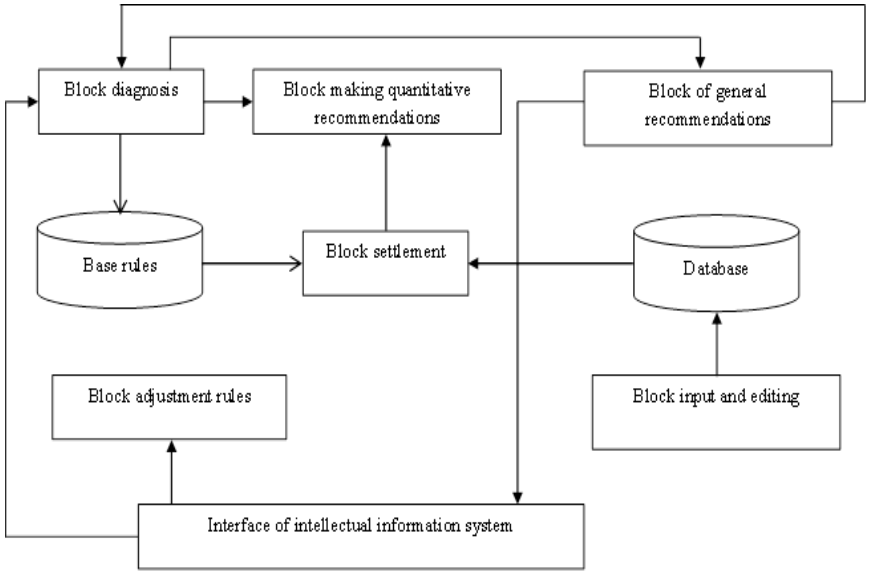

Fig. 3. Scheme linkages main blocks of intelligent information management trade enterprise (source: Beley, 2016, p.187-203)

Base rules proposed to draw up a set of structures like "if so" that allows us to identify (define) diagnosis. In this context serves is a digital database analysis, allowing for the established rules formulated decisions.

The block contains procedures for diagnosis manipulation base rules and database. These procedures are performed using special "indicator" tables of formation diagnosis text tables forming recommendations.

Block functions make recommendations based on the information that comes from the power of diagnosis. Its purpose is to issue (formation) vector-quality characteristics of the state commercial enterprise (usually ABC-analysis, SWOT-analysis) and directions out of the situation that was considered appropriate manager.

Block making quantitative recommendations involves the formation and issuance diagnosis of specific numerical values of metrics to achieve in the coming period. It uses power calculations, which are formal descriptions of the indicators. This block continuously (or periodically) updated with new formulas or conditions you need to better adapt to changes in the driving mechanism of management of commercial business.

Consider the basic aspects of the intellectual information management system of commercial enterprise, using the schematic diagram, shown in Figure 4.

Initialization block diagnosis allows activating work inference rules, the initial information which is in the input forms F.1 and other. This condition, which is a commercial establishment at a given time is identified with one of the rules on the basis of a comparison (or approximation) of the conditions.

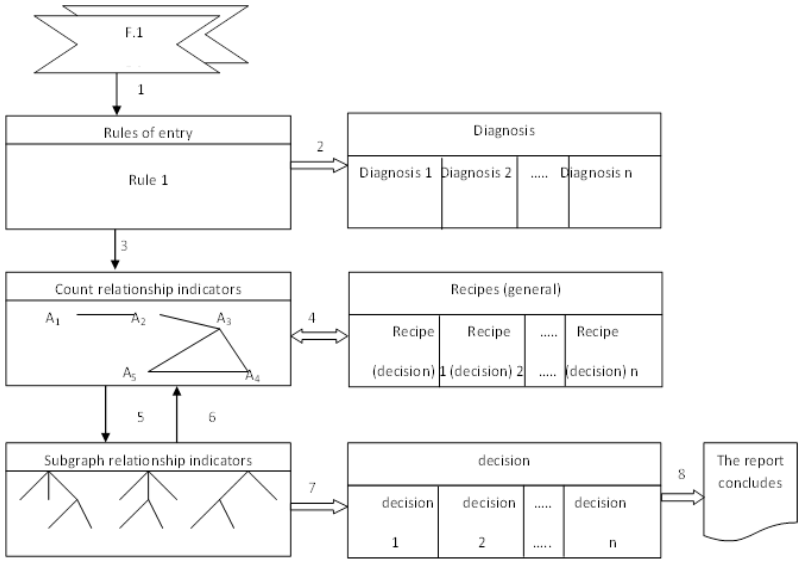

Fig. 4. Schematic diagram of the intelligent information management system of trade enterprise (source: elaboration by own)

This results in a diagnosis and published (analytical table) company. In addition, on his number of the diagnosis identified with special tables (and if not-formed) the text of the diagnosis and the managerial action is passed clearance procedure of recipe. It specified targets (set) and real (actual) values of financial position, controlled by the manager. The difference between the current values of the indexes and serves as planned initial information to find relationships in column formation of key indicators of the summit, which has the largest deviation. Definition of the first peak in the graph parameters (subgraphs of the relationship indicators) sequentially and depending on the size of the previous ones. The first indicator to be analyzed a transition to the next meaningful indicator for the top of the main column after determining. New values of this peak are calculated based on the formula of its dependence on the previous vertices in sequence.

After that, all indicators on which this peak depends are translated using the new values. The process is considered complete if the value of the main peaks of the graph and subgraph listed. As a result, emerging analytical control value as interim and final indicators used to make decisions based on specific managerial situations.

IIMS is designed for specific purposes and requirements of a situation that requires decision making and management specific state trading enterprise provides adequate justification platform solutions. This specificity of the space-time continuum and objectives of management of business processes performance indicators database of commercial enterprise not only serves as initial information, but also creates a sequence of execution, according to the authors, decision-making procedures.

The proposed concept of building up IIMS meets main goal of management of commercial enterprise, namely to ensure effective management of all system components.

Achievement of interim goals by various technological methods provided in IIMS different business units from its commercial enterprises providing that depend on what is laid the foundation of financial stability and factors of its formation at a particular time.

Designed by the authors IIMS option on the principles of "input" indicators as illustrated by the graph in figure 5 and formalization rules sequence (tree) indexes are shown in table 1.

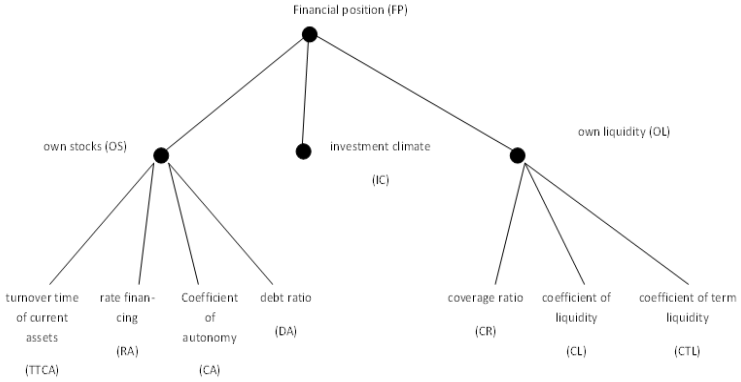

Fig. 5. The tree goals of intelligent information system in the management of trade enterprise (source: elaboration by own)

Table 1. Regulations formalize objectives tree of intelligent information management trade enterprise (source: elaboration by own)

Number of level	The code aims (sub)	Name goals (sub)	Number of level	The code aims (sub)	Name goals (sub)
1	FP	High level	2 2 2	OS IC OL	Effective use own resources Favorable investment climate High liquidity
2	OS	Effective use own resources	3 3 3 3 3	TTCA RA CA CR CR	Reducing treatment time current assets The stabilization coefficient funding Increased autonomy factor Reducing the debt ratio Increased coverage ratio
2	OL	High liquidity	3 3	CL CTL	Increased liquidity ratio Increasing emergency liquidity coefficient

Combination graph objectives and indicators used to achieve them, leading to the construction of the column "target-indicator", which target specific installation management expressed in the supermarket indicators further processed by appropriate algorithms.

The proposed model of the internal structure of information management supermarket is focused purely on making effective decisions on relevant criteria, much attention should be given to establishing real (actual) financial condition of the company and its dynamic factual.

Financial status also invited determined by formal rules diagnostics that are in Knowledge Base IIMS by structural formula "if-then". Thus, the choice of ways to improve the commercial enterprise carried out automatically based on assembly of mainly quantitative recommendations.

Without going into details, we note that the diagnosis of the financial condition of any commercial enterprise can be placed only when there is a corresponding knowledge base. For its construction suggest using indicative matrix type:

$$X = \begin{pmatrix} X_{11}^{П} & X_{12}^{П} & \dots & X_{1n}^{П} \\ X_{21}^{П} - X_{21}^{П-1} & X_{22}^{П} - X_{22}^{П-1} & \dots & X_{2n}^{П} - X_{2n}^{П-1} \end{pmatrix}, \quad (1)$$

Where $x_{ij}^{П} = \begin{cases} 1, when\ x_{2j}^{wh} \le x_{2j}^{П} \le x_{2j}^{n-1},\ або\ x_{2j}^{wh} \ge x_{2j}^{П} \ge x_{2j}^{n-1} \\ -1, when\ x_{2j}^{wh} < x_{2j}^{П} > x_{2j}^{n-1},\ або\ x_{2j}^{wh} > x_{2j}^{П} < x_{2j}^{n-1} \end{cases}$, $x_{1j}^{П}$ –

change of the indicator analyzed (j – indicator, п – period), $x_{2j}^{П}$, $x_{2j}^{П-1}$ – important indicator that analyzes the current п and previous п-1 period's.

This indicator $x_{1j}^{П}$ takes the value 1 if the figure increased or decreased compared to the previous period, but reached its (planned) optimal value, and the indicator is -1 if deviated from its optimum value (increased or decreased).

Matrix, which is based on these principles, allows setting the general trend of the functioning of supermarket. This indicator "changes" is calculated as follows:

$$\overline{X^{П}} = \sum_{j=1}^{n} X_{IJ}^{\prod} \quad (2)$$

Where $X_{IJ}^{\prod}$ – indicator changes indicator X_{2j} for the period n; n – number of indicators analyzed.

It is interpreted as follows: if $\overline{X^{П}} < 0$ means that most of the indicators in the period n deviated from its optimum (planned) values; if $\overline{X^{П}} = 0$ – there is a balance of positive and negative changes in period n; $\overline{X^{П}} > 0$ – stable financial position, as most of the indicators improved (deviated in the best way).

Formation of recommendations for management decisions thus has two options: pre-populated forms of reporting documents (forms) are issued without a change in the order confirmation proper diagnosis; recommendations made up depending on the results of diagnostic analysis or the calculations.

This option is recommended used in the identification of simple diagnoses, prescriptions which largely standardized. These include: changing strategies borrowed funds through financial instruments; change the asset balance as the results of economic and financial activity are not teetering; change the rules of distribution of profits as the rate of turnover below the growth rate of economic return and so on.

Implementation of the second option already requires implementation in two ways: each recommendation in the form of phrases selected templates from the catalog-based conclusion as the case; set phrases templates for each pre-generated recommendations, with the exception of certain key phrases and measuring data on the analyzed indicators.

The phrase templates, whose number is determined by the specific trade enterprise, based issuing apparatus resulting forms documents.

Databases used in the functioning of such intellectual information system include multivariable data array sin the form of hypercube. With these structure managers of trade information management system can now instantly receive the required set of data for accurate analysis and decision almost perfect solution.

The model representation of trading process based in the form of hypercube (Figure 6), where the number of ribs corresponds to spatial-temporal values. It indexes are in a certain place that is made in order to simplify addressing him.

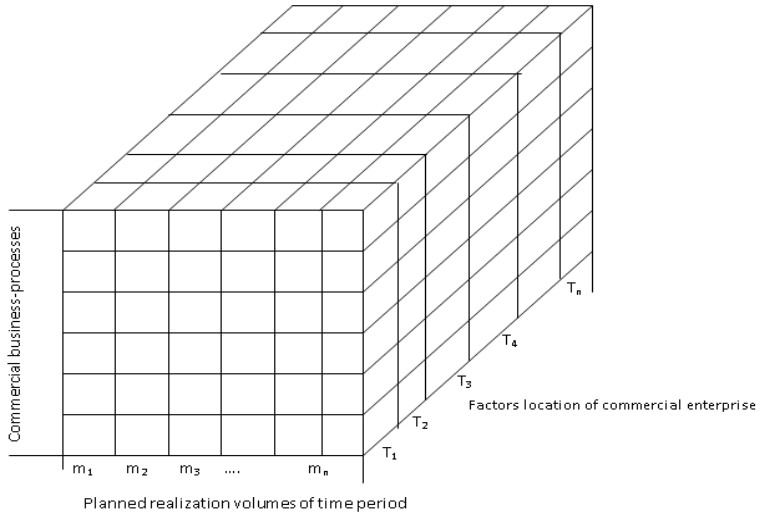

Fig. 6. Model representation trade processes depending on factors location of commercial enterprise in the form of hypercube (source: elaboration by own)

Views appropriately in a hypercube clearer and clearer manager than formal set of tables. This allows you to build analytical formal requests to IIMS. In addition, the use of multidimensional data model leads to a decrease in search time DW, providing performance analytical queries in real time. Thus, the "Information" hypercube can be implemented within the relational model, and exist as a separate specialized databases for each business process multidimensional structure IIMS.

The situation where the analysis of a business process should have all the information that is in storage, there is seldom enough. Since each manager-analyst serving individual business processes commercial enterprise, he first needed data describing precisely the elements of the business process (operation). Usually, the actual amount of data does not exceed the limitations that are characteristic of modern multidimensional database. Therefore, there is the idea of the selection of data that actually require specific managers in separate sets. These sets sold in a specialized multidimensional database. But the source of data for a centralized data warehouse serves IIMS commercial enterprise.

5. CONCLUSION

We in the article the use intelligent information search system for the future location of commercial enterprise. This is the stage of business planning and development of the project. It is important to remember that the ideal place to find and achieve his placement of the new commercial enterprise is a complex organizational and functional tiered task manager (as any place has both positive and negative). But managers need to understand that requests groups of customers, which is going to serve a new commercial enterprise have in the future will be crucial. It is safe to say that information technology is not something extraordinary. They have become the subject of daily use, a tool without which you cannot conduct business, a tool without which you cannot learn and teach, a tool without which you cannot communicate. In this way, all boundaries and obstacles in communication and knowledge of the unknown are overcome. This allows us (modern people) to develop very intensively, to know, to do some intellectual work and to make effective decisions virtually regardless of age and any other possible constraints. The only and open question remains for us: to learn to use the possibilities of modern technologies in the information and communication society.

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ROZWÓJ SYSTEMU ZARZĄDZANIA PRZEDSIĘBIORSTWAMI UKRAINY W WARUNKACH CYFROWEJ GOSPODARKI

Streszczenie

W warunkach szybkiego rozwoju gospodarki informacyjnej i komunikacyjnej system zarządzania agentami społecznymi i gospodarczymi na Ukrainie zmuszony jest do natychmiastowego reagowania na ciągłe zmiany w społeczeństwie cyfrowym. Mają codziennie przetwarzać duże ilości danych multiparametrycznych w celu zapewnienia skutecznego działania i zarządzania. Procesy te mogą być dostarczane przez technologie informatyczne,

które obsługują przetwarzanie dużych zestawów danych (Big Data) i ich inteligentnych technologii przetwarzania analitycznego. Zaproponowano do podjęcia decyzji o równowadze finansowej w przedsiębiorstwie komercyjnym na podstawie tej technologii.

Słowa kluczowe: gospodarka cyfrowa, innowacje, technologia informacyjna, składowania danych w chmurze, inteligentne przetwarzanie analityczne, wskaźniki równowagi finansowej