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### **Business entities management information and analytical support improvement areas**

The transformation of Ukraine's economy into the European space, domestic economy instability functioning, the growth of international competition requires new business intelligence tools usage for the business entities' management. The emergence of new risks (pandemic, etc.) increases the requirements for enterprises and organizations management quality. One of the ways to solve this problem is to use modern computer information technology to obtain the necessary complete and reliable information by all management units to make informed optimal decisions. The implementation of new technologies into practice leads to the modification of approaches to enterprise management.

From the efficiency and accuracy of information analysis results depend on the correctness and adequacy of management decisions that affect the efficiency of financial and enterprise economic activities. The constant accumulation, processing and use of information resources increases analytical work the efficiency. Therefore, it is important to organize information flows at the enterprise rationally. The main information system of the enterprise is the management accounting and analytical system, which forms all the necessary data for enterprise management. That is, at the present stage of domestic economy development, enterprises need to update and improve analytical support. Thus, today the urgent task is to introduce the latest information and analytical support to ensure competitiveness and financial stability for long-term activities of business entities in the face of uncertainty about the new risks of the market environment.

In today's world, the structure of business processes at the enterprise is becoming more complicated, the number of internal and external information flows in various sectors of the economy is increasing. Therefore, to improve the quality of

management decisions, information technologies (IT) justification are used more actively. In order to improve competitiveness effectiveness of financial and economic activities and maintain company, owners and managers need to properly organize business processes to improve the quality of management. Management information systems are used to integrate data on the work of all divisions of the company. They, in contrast to accounting and operational accounting programs, provide an opportunity to influence and adjust the process at the development stage, as well as increase business transparency.

Improving the efficiency and quality of company management is closely linked to the development of computer technology, modern management concepts are based on appropriate application software. In the structure of software of management information systems of enterprises every year the means of information-analytical data processing gain weight.

In the 70s of the twentieth century, the concept of material resource management of MRP (Material Resource Planning) was proposed. It was designed to automate the planning of raw material requirements in warehouses according to production plans. The disadvantage of the concept was the lack of capacity planning for production capacity and manpower.

Modification MRP II (Manufactory - production) was created in the 80s of the twentieth century for automated planning of all production resources (raw materials, equipment, labor costs) and control of the entire production cycle from the purchase of raw materials to shipment to customers. Its disadvantage was the lack of financial resources planning at the enterprise.

In the early 90's of the twentieth century, a new concept of management system was developed - ERP (Enterprise) to automate and optimize internal business processes, it combined the planning of material and financial resources into a single system. The disadvantage was the lack of company's external relations management. Therefore, in the late 90's of the twentieth century there was a modification of ERP II, which includes the management of internal resources (ERP) and two new

components: the accounting system and management of logistics supply channels (SCM) and customer relationship management and customer interaction (CRM).

Thus, modern full-scale ERP is a comprehensive information environment for automation of planning, accounting, control and analysis of all major business processes of the enterprise (production planning, procurement, inventory and sales management, accounting for various resources, interaction with suppliers and customers, quality and human resources management, etc.), which is implemented based on integrated software.

A large number of developed software requires coordination of development stages and information-analytical systems (IAS) implementation with the existing management information systems at the enterprises. The information component of the IAS is formed based on the following information types: planning, accounting, regulatory and reporting. Information support provides an opportunity to quick assess the indicators status that characterize the effectiveness and efficiency of activities. If the main tasks of the IS are the operational processing of data and ensuring transactions between them, the IAS form a sample of relevant information from different types of data sources, as well as presented in a convenient form for management decisions and control the execution process.

In a market economy, competition between enterprises is intensifying. During digital economy development there is a transition from management technologies to technology management to capitalize data, protect information and increase the efficiency and soundness of management decisions. In such conditions, the relevance of IAS, which provides the ability to collect, process and store a variety of data, taking into account the business processes of the enterprise. Due to the availability of accounting and control modules, planning, operational management, analysis in the IAS integrates information from different areas of activity - production, finance, logistics, personnel, suppliers, customers and others. The obtained data are used at all levels of management: preparation of corporate reports, calculation of financial and economic indicators, strategic planning, etc.

A typical approach to the creation of IAS includes three aspects: technical (capabilities of computers and office equipment), technological (information processing methods and technologies for implementing these methods), organizational (principles of information system organization and algorithm of interaction of individual elements). Such a system consists of a data warehouse and telecommunications facilities. It is able to turn a large amount of disparate information into final reports, which are necessary for management decisions. After data integration, enterprise management moves to a more competitive level. In order to maintain market share and profit from business activities, it is necessary constantly to improve the information and analytical systems used at enterprises. Due to model's usage of economic analysis, the scientific level increases. At different levels, the IAS user who makes management decisions needs different data, both in volume and content. To determine the information needs, it is necessary to compile a nomenclature of enterprise resources, perform an analysis of the market, explore the capabilities of existing competitors, and so on. It is also necessary to develop report forms, determine the deadlines for their submission, make a list of users and a list of data that they will obtain on request.

Based on existing experience it is possible to form an algorithm for construction of IAS of the enterprise. The proposed technique structurally consists of 4 consecutive stages, which can be further divided into separate tasks. The content of the stages is as follows:

1. Development of the concept: the necessity of creation is substantiated; the purpose and criteria of efficiency are defined. After the first stage the purpose of the project should be formed, sources of financing are defined, the estimation of possible risks is made, efficiency from realization of system is estimated.

2. System design: evaluation of existing hardware and software, as well as the development of information databases. At this stage, a logical data model and a single database of the enterprise are built, tools for data manipulation are created.

3. Connecting the system software: first install the standard Business Intelligence tools and configure the functions of generating queries and reports, and

then create analytical tools that complement the typical capabilities of the system. During the implementation of the third stage it is necessary to build a set of necessary reports, develop tools to find all the necessary information, as well as create the necessary specific analytical tools for the company.

4. Implementation and operation of the system is the longest stage in time. At this stage, the capabilities of the system are tested by a small group of employees of the enterprise, the efficiency of using individual modules is determined, and then the users desire to configure and add individual modules of the system are taken into account. After a comprehensive setup of the system, the efficiency of implementation is calculated and development possible ways are determined, taking into account the capabilities of hardware and software in the future.

Therefore, during the construction of IAS it is important to take into account the information base specifics and tasks economic essence. Initial data uncertainty and results dimensionality increasing leads to an increase in the informational and structural complexity of management tasks, significantly increases the mutual influence of factors, as well as the number of relations between the data to be considered. The formed single IAS will provide models high-quality transition and management tools to a higher level.

The dynamics of changes in the business environment in 2020 increased the likelihood of income shortfalls or a decrease in the market value of banks' capital. The pandemic has tested the technological readiness of the world's banking sector. Contactless payments have taken on a new meaning, and the security of non-cash payments has become their key advantage. Most banks in Ukraine continued to create new modern products and improve information and analytical support based on the urgent needs of customers.

The leader of the Ukrainian market, Privatbank, has opened more than 100,000 new accounts for legal entities and entrepreneurs, continued to work on national infrastructure development of non-cash and contactless payments, and implemented remote customer identification together with the Diia project. During the year, Oschadbank increased users quantity of the Oschad 24/7 platform by 49%,

and Ukrgasbank increased the volume of lending for sustainable development projects, and now environmental projects account for 35% of the bank's loan portfolio. Raiffeisen Bank Aval switched to remote operation in a week and since then more than 70% of tasks are performed remotely. Last year, UKRSIBBANK made significant efforts to organize fast and convenient remote service and ensured that all financial transactions were carried out remotely. Credit Agricole continues the digital transformation of the bank in 2021 - plans to develop a mobile application CA +, and also intends to issue virtual cards. Alfa-Bank has launched a new mobile application Sense SuperApp, which can create folders, select a screen saver, change the sound design, communication style and more.

In the financial market, Monobank offered customers a modern version of Privat24 with more attractive and understandable tariffs. Long before the pandemic, it relied on digital in the business model. For example, opening accounts after a few clicks in a mobile app and a five-minute meeting with a courier to sign a contract. The business model of the bank is very simple - a single product with maximum ease of use, so that there is nothing superfluous in the interface, user experience and so on. In 2020, new products continued to be launched, the bank worked on creating automatic payments possibility and on changes in the cashback program.

Thus, the main trends in digital banking in the world are the blurring of the line between banks and payment services, as well as the emergence of many financial services (FinTech) based on modern IT-technologies that organically complement the classic bank accounts and operations. Their advantages are increased availability of some markets for goods and services, reduced transaction costs, increased competitiveness and more.

In 2010, most of Ukraine's leading heavy industry enterprises automated main processes (Industry 3.0) and began to use Industry 4.0 technologies. Digitization helps to carry out horizontal and vertical integration of production management systems, gives the necessary flexibility to quickly carry out a large number of orders with different characteristics through all technological stages. Much of the structured information contained in enterprise databases requires the use of Business

Intelligence (BI). Its usage increases the speed and quality of work with information, provides an opportunity to optimize all business processes of the company and quickly obtain the necessary quality data.

BI-technologies enables to focus only on key factors of efficiency, to model various actions options, to trace results of acceptance these or those administrative decisions. They are used to solve the following tasks: increase the efficiency of enterprise management; cost reduction; managerial risks reduction; support for strategic decision making; implementation of operational control.

The main tool of BI is software that can use a large variety of information. Data-Based Knowledge is acquired during the creation and completion of a Data Warehousing. The modern BI system collects information from all sources in the enterprise and provides management with analytical summary data together with targets. At the same time, in case of deviations from the planned results, it is possible to analyze the individual components of the unsatisfactory indicator in order to identify the cause and eliminate undesirable consequences.

The use of BI-technology is especially important in times of crisis, when it is necessary to constantly increase the efficiency of the enterprise - to reduce costs, increase productivity and more. These technologies are relevant for companies that operate in conditions of high competition and dynamic market situation in the world. Thus, BI-systems include four areas: storage, integration, analysis and presentation of data.

To save data, a database (DB) is created based on client-server architecture, relational database and decision support tools. That is, it is a large subject-oriented information corporate database, which is specially designed for the reports preparation, analysis of business processes in order to justify management decisions in the enterprise. BI infrastructure tools use the same security tools and metadata ("data"), common query generators and administration tools, and have the same interface. They provide a quick search, use and presentation of all metadata objects.

Information analysis is performed using OLAP (Online Analytical Processing) technology, which enables several indicators simultaneous analysis by

flexible viewing of information, arbitrary cutting of data, detailing and consolidation, comparison over time and more. Predictive Modeling and Data Mining are also used. These methods use statistical modeling, neural networks, genetic algorithms to create (select) a model for calculating the probability of an event or to identify patterns in the data.

Reporting tools enable to build formatted interactive reports of various types (financial, operational, etc.) in the form of information panels (Dashboards), which provide a variety of graphics. With the help of unregulated requests generator (Ad hoc query) the user can get answers to questions. The system also has convenient means of navigating available data resources. At the same time, integration with Microsoft Office is important, when the BI platform is an intermediate link in the information analysis chain, and Microsoft Excel is the BI client.

Second-generation BI systems are now in use. The main feature of modern information and analytical systems is the adaptation to the typical scenario of the user. They work through the web, use information panels with advanced visualization tools. The upper level of the system warns the manager about the presence of a critical situation, the middle carries out their analysis and research. The lower level of the analytical system contains operational data and reports. The main classes of BI systems have the following features: the use of portal technologies; interface in the form of a board with devices; multilayer data representation; interactivity: convenient data navigation and movement in different dimensions; manageability and relevance; proactivity: defining goals and constraints for individual indicators; customization: adjusting the panel to the level of user control; flexibility of access enables the user to intuitively select reports and graphs; personalization: selection of objects from the authorized list and location on the board according to their importance; collaboration: the admission of simultaneous work of a group of employees.

Currently, there are no clear leaders in the field of BI platforms, various companies have advantages in certain functional components. Oracle and SAP have



their own analytics systems, and Microsoft integrates the OLAP service into MS SQL Server and develops it into an analytics server.

For example, Interpipe introduced an ERP system for financial management in the early 2000s, and digitalization of production began only in 2014. The company has customers from more than 80 countries. Receipt and systematization of orders are performed by the ERP-system, which is able to plan production from the first to the last operations. It can also be used to manage stocks of semi-finished products in the warehouse, so there are no impersonal balances and unnecessary stocks. IT solution enables to fulfill all orders faster and more accurately. It is possible to check quickly at what stage of production is a particular order, as well as take into account the specific requirements of each customer country. Due to the accounting and planning automation, total control of all production stages is introduced and finished products quality is improved. Digitalization is not over with products shipment and delivery accuracy to the customer is controlled.

The introduction of modern IT technologies increases the efficiency and transparency of the company, increases competitiveness in the world due to the speed and management decisions quality. Thus, due to the introduction of digital planning and production management at the enterprise, disruptions in delivery times were reduced by 10 times, inventories of work in progress decreased by 20% and the accuracy of orders exceeded 95%.

Metinvest is the largest mining and metallurgical company (MMC) in Ukraine. It consists of more than 30 companies, in size, geography and content, it is unique to our country. The scale of the business and the complexity of the group's architecture required an appropriate approach, so a separate IT company was created for the digital transformation of the business. This company consists of more than 900 specialists and implements more than 100 IT projects per year. It is fully responsible for the digitalization of MMC and ensures high-quality and continuous operation of digital services and information systems (IS).

Modern technical knowledge of specialists at expertise of IT infrastructure centers, business applications, industrial automation and cybersecurity is used in

projects of digital solutions implementation, their support and development. Internal R&D | Co-Innovation Lab. explores the possibilities of introducing innovative technologies in the company, for which there are no ready-made solutions in the world.

The integration of the company's digitalization management process is carried out at three levels: Business Engagement, Solutions Delivery, Operations. At the first level, business needs in digital transformations are formed, and the initial assessment of digital initiatives is carried out. At the second level, there is its own project office for the development and implementation of IT projects, it is responsible for change management according to the ADKAR methodology. At the operational level, the introduction of technologies is supported, namely the development of IT infrastructure, automated workstation (AWP), information and cybersecurity.

Quality control of implementation of IT projects and service is carried out daily, quarterly and annually on key indicators SLA (Service Level Agreement), COS (Conditions of Satisfaction), CSI (Customer Satisfaction Index). The effectiveness of digital transformations depends not only on the introduction of new technologies, but also on the organizational model of managing this process at all stages of production. An integrated approach is important, the digital transformation becomes end-to-end: from production processes to personnel management.

Thus, the analytical support of the performance management system at an industrial enterprise is a system of indicators of the accounting and analytical process of transmitting information about the results of the entity to interested users to make effective management decisions. Thus, the implementation of IAS helps businesses to cope with the current challenges of a changing market environment and globalization of the world economy. BI technologies are now being implemented by banking and insurance companies, large retail chains, and powerful players in the telecommunications market to emphasize business customer focus. The industrial enterprises of large corporations are also implementing modern IT to build business processes of the enterprise to ensure stable operation in the future. But the most

technological software will not implement itself. The introduction of innovations is a joint work of the company and the provider, which includes analysis and transformation of business processes, integration and configuration of systems, employee training, analytics and more. A well-chosen project manager is half the battle. He must not only know all the internal business processes, IT system, have good communication skills, but also be very persistent. Every employee must understand why he is involved in the digital transformation of the business and what benefits he will obtain from it. It is desirable to move in short iterations and understand what results should be obtained at each step.

There are already many companies in Ukraine that successfully use modern digital technologies for business. The implementation of individual IAS modules is a time-consuming process that requires significant resources and motivation from the company. Information and analytical support, as a component of the enterprise management system, provides an opportunity to solve functional management tasks, providing management with complete and reliable information about business processes and relations with the external environment. Modern business conditions impose new requirements on information and analytical support, which should take into account the constant changes in the external environment and increase the efficiency of the performance business entities management system, taking into account innovative information technologies. That is, today it is necessary to form and implement a strategy of necessary technological changes. Thus, the introduction of the latest information and analytical support is the future for Ukrainian business.