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## CLASSIFICATION OF INFORMATIONAL SYSTEMS OF ACCOUNTING AND MANAGEMENT OF ENTERPRISES BY LOGISTIC CONCEPTS AND STEPS INTEGRATION

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## КЛАСИФІКАЦІЯ ІНФОРМАЦІЙНИХ СИСТЕМ ОБЛІКУ ТА УПРАВЛІННЯ ПІДПРИЄМСТВАМИ ЗА ЛОГІСТИЧНИМИ КОНЦЕПЦІЯМИ ТА СТУПЕНЕМ ІНТЕГРАЦІЇ

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## КЛАССИФИКАЦИЯ ИНФОРМАЦИОННЫХ СИСТЕМ УЧЕТА И УПРАВЛЕНИЯ ПРЕДПРИЯТИЯМИ ПО ЛОГИСТИЧЕСКИМ КОНЦЕПЦИЯМ И СТЕПЕНИ ИНТЕГРАЦИИ

The article deals with the evolution of logistic conceptual approaches to the management of enterprises by types of resources, which form the basis of the corresponding information management systems of enterprises. The structural scheme of automation of industrial enterprises, the classification of information systems of accounting and enterprise management by degree of integration is given. It is established that when making a management decision on the implementation of information technologies, a comprehensive approach is needed that will allow it to assess its consequences for the industrial enterprise as a whole.

**Keywords:** information system, information technology, accounting, enterprise management, resource management systems.

*Fig.: 2. Tabl.: 1. Bibl.: 7.*

У статті розглянуто еволюцію логістичних концептуальних підходів до управління підприємствами за видами ресурсів, які становлять основу відповідних інформаційних систем управління підприємствами. Наведено структурну схему автоматизації промислових підприємств, класифікацію інформаційних систем обліку та управління підприємствами за ступенем інтеграції. Встановлено, що під час прийняття управлінського рішення щодо впровадження інформаційних технологій необхідний комплексний підхід, який дозволить оцінити його наслідки для промислового підприємства загалом.

**Ключові слова:** інформаційна система, інформаційна технологія, облік, управління підприємствами, системи управління ресурсами.

*Рис.: 2. Табл.: 1. Бібл.: 7.*

В статье рассмотрена эволюция логистических концептуальных подходов к управлению предприятиями по видам ресурсов, которые составляют основу соответствующих информационных систем управления предприятиями. Приведена структурная схема автоматизации промышленных предприятий, классификация информационных систем учета и управления предприятиями по степени интеграции. Установлено, что при принятии управленческого решения по внедрению информационных технологий необходим комплексный подход, который позволит оценить его последствия для промышленного предприятия в целом.

**Ключевые слова:** информационная система, информационная технология, учет, управление предприятиями, системы управления ресурсами.

*Рис.: 2. Табл.: 1. Библ.: 7.*

**JEL: M41**

**Formulation of the problem.** For most countries, the development of an information society is one of the state priorities. Herewith information technology is an important factor in innovation development and an instrument of socio-economic progress. Their role in creating optimal information flows that meet the needs of accounting, in the modernization of the management, introduction and development of elements of system integration in the context of the development of the information society in Ukraine leads to serious transformations in the system of accounting and management to the industrial enterprises. Exactly therefore it is necessary to classify information systems and technologies by using logistic concepts and degree of integration.

**Analysis of recent research and publications.** The works of M.N. Grigoriev, V.M. Degtyareva, R.I. Zabolina, O.V. Matvienka, V.S. Sergeeva, V.I. Starikova, G.A. Titarenko, V.B. Utkina, N.G. Chumachenko, and others are devoted to the research, development and implementation of information technologies in economics and management.

**Selection of previously unsettled parts of the general problem.** An analysis of the latest literature and periodicals made it possible to conclude that the development and application of integrated information systems at enterprises is very acute. The use of technical means for

obtaining information in the process of monitoring the activity of the object, data collection, their registration, transmission through communication channels requires further in-depth study of information processes.

**The purpose of the article.** The main purpose of this work is exploration the peculiarities of the conceptions of information systems of industrial automation and to justify the construction of a structural scheme for the automation of industrial enterprises, the classification of information systems by using logistic concepts and the degree of integration.

**Presenting main material.** Today it's hard to imagine an enterprise without a computers and, accordingly, without software products. Information technology firmly into our lives. The construction of an effective management structure, the creation of a vertical of decision-making and control system, directly depends on the state of information technology, from their efficiency, productivity, safety, reliability and other, not less important indicators. The opportunities provided by modern computer technologies allow us to build models that combine the structural, dynamic and managerial aspects research of information system, describe the quality of information, allow us to rationally use the capabilities of modern computer technology.

Currently, the traditional representation of the corporate automation system of an industrial enterprise is the so-called automation pyramid, which includes the following three typical levels (Fig. 1) [1].

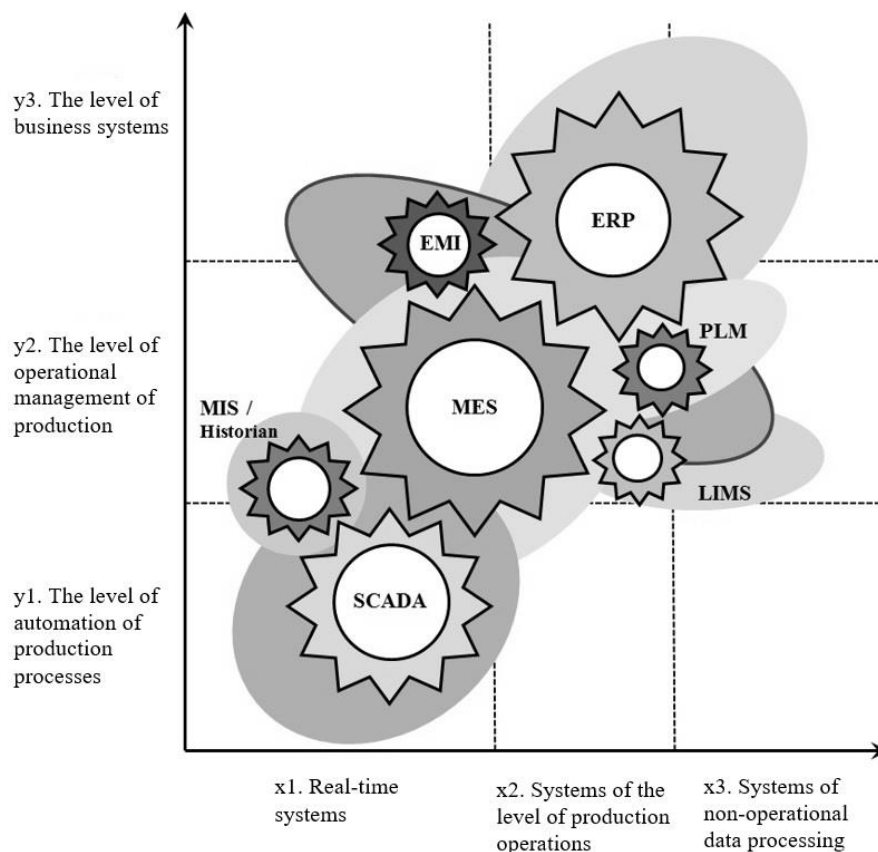


Fig. 1. Structural scheme of automation of industrial enterprises

Lower level of automation of technological processes - automated dispatch control systems SCADA (Supervisory Control And Data Acquisition), controllers and distributed control systems DCS (Distributed Control Systems) and automated process control systems developed on their basis.

The average level of operational management - the system of operational management of production MES (Manufacturing Execution System), which sometimes include management systems of the enterprise funds EAM (Enterprise Asset Management System).

Upper level - enterprise resource management systems, such as ERP (Enterprise Resource Planning System).

The three-level submission of the concept of automation pyramid gives a clear representation of the subsystem's hierarchy. However, for real modern corporate systems, it is not always possible to specify the boundaries of levels in detail. MES class systems located between ERP and SCADA often use both lower and upper level components. In this case, the degree of their integration is directly determined by the peculiarities of the automation object, which implements the system itself [2].

In contrast to the traditional representation, a two-dimensional coordinate system is proposed for a more complete description of the interaction processes of the components. The axis of the ordinate is similar to the vertical of the pyramid of automation and also contains three levels: y1 - automation of production processes (SCADA); y2 - operational management of production (MES); y3 - business systems (ERP). As you know, a description of the functionality of a particular product necessarily includes a list of issues related to the processing of data. That is why the proposed model introduces the second coordinate axis - the abscissa axis, which directly reflects the following three types of data processing systems: x1 - real-time system (PB); x2 - systems of level of production operations; x3 - systems of non-operational data processing. Based on the definition and list of requirements put forward to each of the systems of a given class, SCADA systems occupy the level x1, MES - comprise levels x1 and x2, and the business system ERP - can essentially occupy all three levels of data processing x1 - x3, although in practice, usually only cover the last two.

In addition to the traditional SCADA, MES and ERP, in the structure can be allocated by LIMS, PLM, MIS and EMI systems. In the vast majority of domestic publications, there are two interpretations of the abbreviation LIMS (Laboratory Information Management System): "Laboratory Information Systems" and "Laboratory Information and Managing Systems". According to [3], the modern concept of PLM is an integrated model of business strategies for managing the entire life cycle of a product from its concept, through designing and production, for sale, installation, subsequent operation (maintenance), technical support and dismantling (utilization).

To the classical concept of the information system of industrial automation, at the junction of MES with systems of the lower level are MIS systems. Foreign authors often identify with this abbreviation such concepts as Manufacturing Information System and Management Information System, and rarely Manufacturing Intelligence Systems (Intelligent Production Management System) [2].

MIS is a system for collecting, processing, storing and broadcasting data on internal operations and external events of the technological process of production, which provides timely access and provision of information in the appropriate format necessary for the organization of the control, planning and operational management [4]. On a structural scheme, MIS takes y1 and y2.

Similarly, at the edge of the MES and ERP, there are EMI (Enterprise Manufacturing Intelligence) intelligent manufacturing management systems, which represent a centralized system of data collection of production processes and their further interpretation in a commercial context. EMI also provides automation for inputting data about the production and movement of materials into resource management systems (eg, ERP).

System integration is the process of combining different computing systems and software products physically or functionally in order to achieve maximum efficiency of the system by establishing effective interaction of its subsystems. On the basis of the integration of information systems of various purposes with the help of computer networks in the enterprise created corporate information systems (CIS) or Integrated Enterprise Management Systems (IEMS). Table 1 lists the information systems of accounting and enterprise management by degree of integration.

This classification is rather conventional. A number of systems represented on the market by their functional capabilities, technical features, timing of implementation, cost and other parameters can relate to different classes of classification presented.

Table 1

*Classification of information systems accounting and enterprise management by degree of integration*

| <b>Systems</b>    | <b>Introduction</b>                         | <b>Characteristics and purpose</b>  | <b>Representatives of the groups</b>  | <b>Oriented cost</b>       |
|-------------------|---|---|---|----------------------------|
| Local             | Simple, boxed version                       | Form a class of financial and management systems. Designed for accounting in one or more areas (accounting, sales, accounting of personnel, etc.) | IS; BEST; Inotek; INFIN; Infosoft; Super-Menedger; Turbo-Buhgalter; Info-Buhgalter; + 100 systems and more              | To \$50 000                |
| Small integrated  | Staged or boxed option                      |   | Concorde XAL; Exact; NS-2000; Platinum; PRO/MIS; Scala; SunSystems; BOSS-Korporatsiya; Halaktika/PARUS; Resurs; Etalon. | From \$50 000 to \$300 000 |
| Medium Integrated | Only phased (6-9 months)                    | Designed for managing and planning the production process. Are focused on one or more industries and / or types of production.                    | JD Edwards (Robertson & Blums); MFG-Pro (QAD/BMS); SyteLine (SOKAP/ SYMIX); MIRACLE V.                                  | \$500 000 and more         |
| Big Integrated    | Staged, complicated (more than 9-12 months) |   | SAP/R3 (SAP AG); Baan (Baan); BPCS (ITS/SSA); Oracle Applications (Oracle).   | More \$500 000             |

*Source: developed by the author based on the monitoring of the information systems market*

Consider the evolution of logistic conceptual approaches to enterprise management, which form the basis of the relevant information systems of management enterprise (Fig. 2).

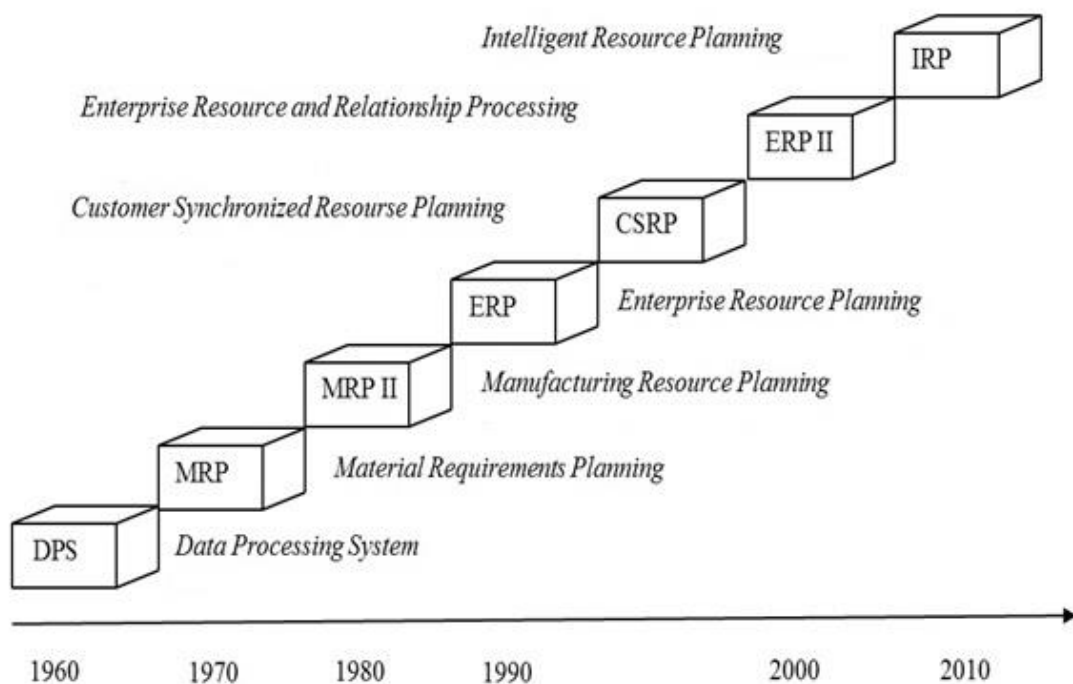


Fig. 2. Evolution of logistic concepts by types of resources

*Source: developed by the author on the basis of [2]*

The first three concepts - MRP, MRPP and ERP - are focused exclusively on the internal activities of enterprises and do not take into account the influence of external market factors (suppliers, consumers, competitors). The CSRP concept takes into account the influence of the consumer market, ignoring the influence of the supplier market.

Gartner Group defines ERPII as a business strategy and a suite of application-specific applications, which enable them to carry out internal and external business processes, joint operational and financial initiatives, and optimize them [5]. The purpose of ERPII is not only to optimize resources and process traditional ERP transactions, but also to use information. These features of ERP include in the process of collaboration between enterprises.

In essence, the concept of ERPII - is the result of the development of methodology and technology ERP in the direction of closer interaction between the company and its clients and counterparties. In this case, enterprise management information is not only used for internal purposes, but also serves to develop cooperation with other organizations [6]. ERPII systems are characterized by an Internet-oriented architecture that is significantly different from the architecture of traditional ERP systems. This is due to that fact that management information that was previously stored and used only within the enterprise now must be accessible to information systems of clients and partners. This means that the traditional client-server architecture is starting to give way to web-based clients and to distributed component technologies.

**Conclusions and suggestions.** Consequently, each enterprise functions as a single organism, therefore, the introduction of individual changes can lead both to a shift towards success, and to a decrease in overall indicators. Obviously, when making a managerial decision on the implementation of information technology requires a comprehensive approach that allows us to assess its implications for the enterprise as a whole.

System integration is the development of complex solutions designed to achieve maximum efficiency of the system by establishing effective interaction of its subsystems. The results of modernization and system integration are simplification and automation of business processes, maximally effective management of enterprises, improving the reliability and security of integrated systems, efficient interaction of systems based on a common platform, a significant reduction in the cost of further modification [7].

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