CLASSIFICATION AND SELECTION OF PRIORITY MODELING FACTORS OF E-BUSINESS SYSTEMS

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Abstract: This article is devoted to the current issue of modeling business processes of e-business systems. The classification and selection of the most priority factors and criteria for assessing business processes of e-business systems has been carried out. And also the analysis of methods of modeling of e-business systems and the choice of priority factors in their modeling. As a result of the analysis, the architecture of e-business systems has been proposed.

Keywords: modeling, models, factors, system, e-business, business process, classification, criteria, indicator.

Introduction

Model approach to Electronic information system (EIS) design automation is the most promising and is based onthe same principles as information technology. This allows us to consider the model approach as an information technology of EIS design automation, since the automation of any process, be it design or management, implies the presence of an information technology outline.

Materials and methods

The essence of the model approach is the sequential transformation of control: from a general mathematical control model to an algorithmic model of the functional problem to be solved. An enlarged scheme of such sequential decomposition and transformation of models in the process of EIS design is shown in Fig. 1. The basis here is the general mathematical model of control (GMMC), reflecting the criterion and the target function of control, taking into account the constraints imposed on the control object.

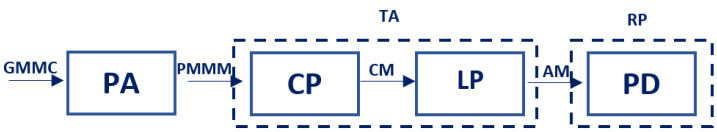

Fig.1 General scheme of the model conversion sequence

As a result of the pre-project analysis, the general management model is decomposed into partial mathematical management models (PMMM) of the object, reflecting particular management tasks and their objectives. Technical design (TA)

includes conceptual (CP) and logical design (LP). The conceptual design allows to create a meaningful image (conceptual model of the designed automated system) fromprivate control models, and the logical design results are algorithmic models (AM) ofthe control tasks to be solved in the system. The physical design (PD) provides a working design of the software and hardware implementation of the information technology in the EIS.

This sequence of model transformations can be implemented by the processes and tools of information technology. At the physical level, the automated design of EIS is performed by a designer using an ARM, including a computer with appropriate basic and problem-oriented software. The sequence of automated design of information technology in EIS is shown in Fig. 2. The general mathematical model of object management is the basis for the development of the subject area model (SAM), displayed by a set of functional management tasks (FMT). Particular models, extractedfrom the general management model, are represented by individual functional tasks, which is the main result of the pre-project analysis. Conceptual design is carried out onthe basis of the created private models of management, the content of which allows to develop the concepts of information process organization (IPO) and create a conceptual model of the management system.

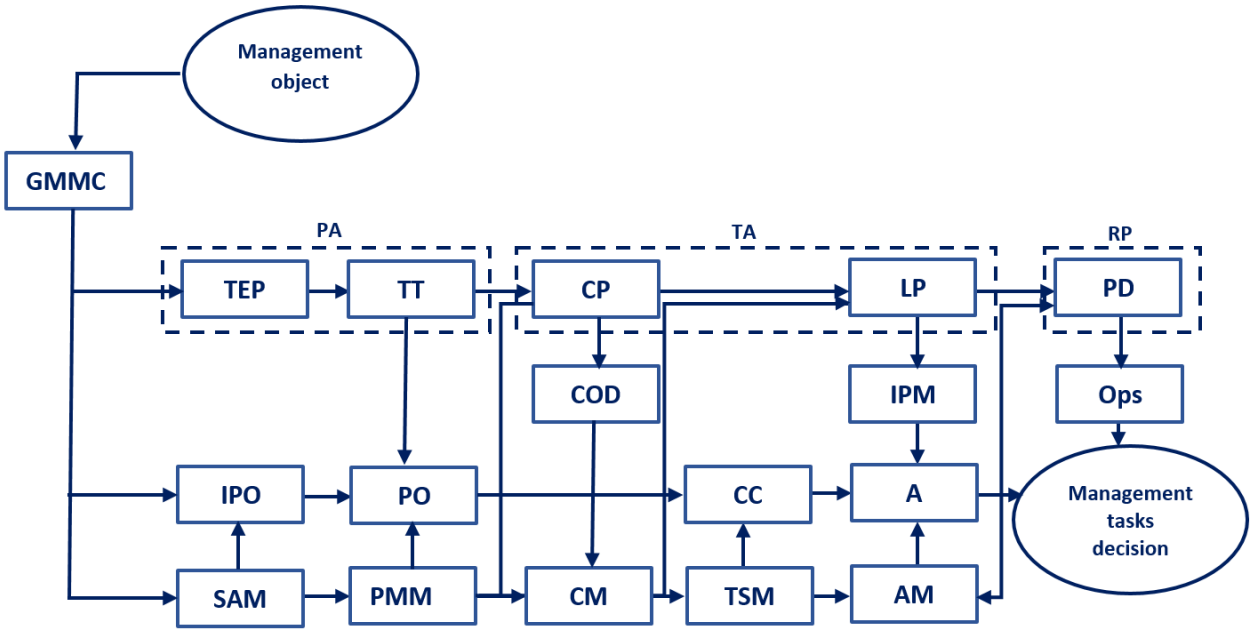

Fig.2 Sequence diagram of computer-aided design of EIS with the model approach

The content (conceptual) model of the system in the process of logic design is formalized by information process models (IPM) and problem-solving models (TSM),

which are then converted into algorithmic models. The final stage of logical design is the development of algorithms (A) for solving computational problems (CC) that represent functional problems at the data level. The physical design, which results in a working design, consists in the development of supporting subsystems (Ops) ofsoftware, technical and organizational support.[1]

The next important issue is the optimization of processes in the management system of commercial activity. The role of optimization criteria at different levels of the enterprise management system can be, for example, sales volumes, profit, total deviation of production time from the required ones, equipment loading level, work planning period (month, year), total costs of production and unfinished production, etc. Variables in mathematical models are controllable parameters. When solving optimization problems, the variables may be the number of manufactured products, launch/output time, batch sizes, inventory levels, start and end times of operations. Another important feature of economic-mathematical methods is that they can be a powerful tool for situation analysis. With their help, for example, you can quickly determine that with given constraints, an acceptable solution does not exist. Some methods are not limited to obtaining an optimal solution. With a formed plan, they allow you to assess the sensitivity of the optimal plan to changes in external conditionsor internal characteristics of the enterprise.

The analysis identified the following factors as variables that determine the characteristics of the Central Asian e-commerce market, particularly domestic: the prevalence of cash; limited demand side, consumer awareness; limited e-commerce enterprise capabilities; limited digital transformation; digital workforce skills; regulatory fragmentation; e-commerce logistics, warehousing.

The next important step in the business process (BP) organization is the digitalization of data. Digitalization does not change the business model, but only increases productivity. Themain object of study in e-business computer systems are BPs. BP modeling is the direct development and implementation of measures for the organization of BP of thecompany.

Modeling is directed toward the objectives and contains measures to correct the problems found. These may include: issues of interfacing modified technologies, modified operating systems, too many levels of control, downtime, unused capacity, duplication of work tasks, errors in information transfer, loss of information, errors indocumentation, etc.

In the development of modeling activities should take into account the factors ofinfluence, which can be classified as follows: logistical, economic, temporal, spatial, personal.

The next classification of modeling factors is the classification according to the directions of activity of the enterprise, which can be combined into groups of specialized BPs, therefore, operational management of the company is the management of current processes. Process is any sequence of actions aimed at obtaining certain results, unchanged from repetition to repetition. The next important factor to consider is management, i.e. information management. The term "Enterprise Content Management" (ECM) refers to a set of technologies designed for enterprise content management, which collects, organizes, indexes, stores and distributes information to users. Given the wide range of tasks assigned to the ECM complexes, enterprises use specialized systems that perform the necessary part of operations for a particular organization: document management systems; knowledge management complexes: search and accumulation of information necessary for the formation of management decisions; Digital Asset Management - controls the multimedia flow; tools for managing enterprise Web sites and/or network portals; Business Process Management - regulation of BP.[2]

ECM is capable of working with any poorly structured information: texts, graphs, pictures, tables, scanned images, video files, e-mail correspondence.

Thus, change management in the company is carried out with the help of three classes of systems: automation of document management; automation of resource management of the company; automation of modeling and testing of BP.

The interaction of systems is never equal, since each company has its own specific requirements for automation parameters. In some cases, content management dominates, while in others, BP management plays the leading role.

Business Process Modeling is a goal-oriented representation of Business Processes, developed according to a certain systematics and form of representation. The structure of the model reflects essentially a logical and temporal sequence of functions, considered within a certain process. Common characteristics of a model serve as the basis for documentation, analysis, organization, automated processing andsupport of processes, as well as for their support and communication. The goals of theBP modeling are as follows [3]:

1) Documentation of enterprise BP in order to: obtain data in a timely manner; present the actual situation in the organizational unit of the enterprise; transfer BP to other units; regulate work processes and methods through an external management mechanism; fulfill obligations to business partners or the business community (e.g., enterprise certification); meet applicable legal standards; train employees or induction; avoid loss of knowledge (e.g., when an employee leaves

the company); support management

2) Preparing / carrying out optimization of BP: to introduce new organizational structures, to change the tasks of the enterprise when market conditions change, to rearrange or improve the processes of the enterprise.

3) Preparation of automation and implementation of information technology.

4) Establishment of process indicators and performance monitoring.

5) Conducting benchmarking between departments of the enterprise, partners andcompetitors.

6) Finding Best Practice (best practices in the company, region, industry).

7) Accompanying organizational changes as: sale or partial sale; additional purchase and integration of enterprise or enterprise slopes; implementation (entry) or change (switch) of IT systems or organizational.

The general trend of modern organization and modeling of BP at the enterprise is the transition from function-oriented to process-oriented model. Modeling of BPs involves considering not only their typology, but also taking into account the level. Representation of BP implies the use of appropriate tools: symbols, indicators, graphs,charts, graphs, forms, as well as solutions such as special software.[4]

The use of automated methods makes it possible to reduce costs, simulate and visualize possible process solutions, as well as to apply and modify previously developed solutions. There are various software products for solving the problems of analysis and organization of processes. They can be divided into 3 groups:

1. Standard graphics packages, to represent processes electronically (visualization), ABC-FlowCharter, CorelFlow, Visio.

2. The process analysis software is based on graphical packages and allows, along with visualization, the processing of some process data, Ablauf-Profi, Proplan, Vamos-BE.

3. Process-oriented software. This group offers a wide range of functionality. Usually these products implement modules for analysis, modeling and visualization of processes, as well as support evaluation and documentation. Some systems allow building animation models, SYCAT, ARISToolset, AENEIS, AIBAS.[5]

The next important process in the management of BP enterprise is business-engineering. Business-engineering (business-engineering) - denotes based on the use of scientific methods and modeling, the scientific concept of enterprise design in the information age.

The concept of "business engineering" emphasizes that we are talking about scientific and engineering principles. This concept differs from highly specialized and individual design by a systematic approach

and the cooperation of different methods in the development of the "designs" of enterprises. The aim of the concept is to develop innovative solutions in business creation in the same professional way as in aircraft orindustrial equipment creation".

Results

Business engineering is at the core of enterprise management during the transition from the industrial stage of economic development to the information society. The concept proceeds from the fact that together with the changes in the environment (markets, customers, capital, etc.) for enterprises the possibilities of new innovative solutions in the field of information and communication technologies are created. It connects scientific and economic and information technology knowledge together and links them to different aspects of transformation: process representation tools, business modeling, enterprise culture, social policy. Business engineering is a holistic concept for transformation management and implementation. Specific transformation tasks are considered at strategic level, process level and working system level.

Analysis of domestic enterprises in Uzbekistan revealed the following positive and negative factors that must be considered when choosing methods of modeling BP enterprise. Positive factors, the most developed segments of the IT infrastructure of enterprises in Uzbekistan are: a subsystem of production management, network connectivity of participants in the production process and access to production services are provided, there are internal mechanisms for data exchange, subsystems of accounting and personnel records.

Negative factors:

Corporate network of the Company: there is no basic service, which is a unified corporate data network (KSPD), there are no technical and organizational mechanismsto develop and operate data networks.[6]

Corporate communications environment: corporate mail of the enterprise is served by external network resources, there are no internal mail services. employees of the enterprise operate non-corporate mailboxes, low level of use of mail services, the bulk of correspondence is conducted in external messengers, the maturity level of IT- infrastructure of enterprises in Uzbekistan. [7]

The level of IT infrastructure maturity was assessed according to the criteria of Microsoft's Infrastructure Optimization Model. The analysis revealed insufficient objective characteristics of the infrastructure to meet the assessment criteria. For the purposes of this study, the IT infrastructure maturity level was categorized as "Basic" in order to capture the state of the infrastructure.

Discussions

In recent years, the development of systems based on intelligent control has been noted. The main direction of development of these systems is the use of fuzzy logic: fuzzy sets, fuzzy modeling, etc. Development and implementation of intelligent automated business process management system (IABPMS), is an innovative process, in order to improve its efficiency and effectiveness.

The basis of fuzzy models of automated control systems are fuzzy logic regulators (FLR), used to create various IABPMS, control systems of complex dynamic systems, etc. At the heart of FLR are models of fuzzy logic: models of fuzzy logical connectivity and inference rules. The following scheme of linguistic description is common for NLR based on fuzzy production processor: translation into fuzzy values (fuzzifier), fuzzy logic bundle, compositional inference rules and conversion operators into clear values (defuzzifiers). The main stage of designing an intelligent fuzzy regulator is to create a "knowledge base", using the methods of representations and knowledge retrieval.

Since the purpose of this dissertation work is to investigate the features, justification and development of the methodology of IASBP of the enterprise in Uzbekistan in the digital economy, it is necessary to develop a system for automating the management of BP enterprise. For this purpose, it is necessary to justify the model of the control system and to study its manageability.

In contrast to the above computer systems for collecting and analyzing data on the quality of enterprise processes on the basis of the study proposed the following methodology for automated management system quality BP on the basis of intelligent automated system, which includes three modules (fig. 3).

1) Calculation of assessed indicators of quantitative assessment of the performance of BP enterprise, allowing to automate the process of making management decisions for the next stage of monitoring;

2) Monitoring and visualization of enterprise BP manageability on the basis of its graphical representation in relation to its average, lower and upper limits, which allows to ensure statistically manageability and stability of the enterprise

3) On the basis of the obtained information, fuzzy-multiple models of intelligent management of production processes, representing the dependence of process quality on their characteristics using the productive form of their representation are built.

Proposed in accordance with the above methodology of IABPMS of enterprise architecture IABPMS includes 3 modules (Fig.1):

1) "BPEC software" - to enter and calculate the estimated indicators of quantitative assessment of the performance of business processes of the enterprise;

2) "IMPP software" - for intelligent management of production processes;

3) "Statistical evaluation software" - for

continuous monitoring and visualization of business process performance.[8]

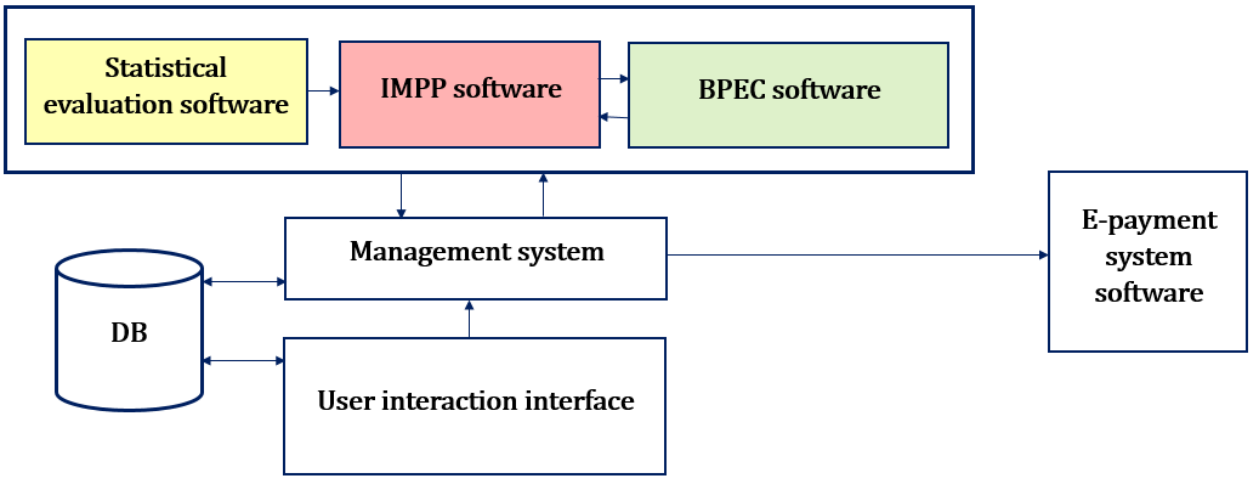

Fig. 3. IABPMS enterprise architecture

Monitoring allows you to determine qualitative characteristics, measurement, in turn, allows you to establish quantitative indicators (criterias).

Table 1. Performance indicators of business processes of the enterprise

Classification of business process indicators	
Qualitative parameters of the business process	- effectiveness - effectiveness - adaptability - productivity - duration - cost
Product performance	- - performance measures - - cost indicators - - time performance - - quality indicators - - Fragmentation indicators (organizational complexity of the business process, determined by the number of business units and employees involved in it)
Processes indicators	- process values - process product indicators - process customer satisfaction indicators - cost indicators - time indicators - technical indicators
Quantitative indicators of business processes	- complexity - processability - controllability - resource-intensiveness - controllability

The analysis of existing classifications of performance indicators of business processes of the enterprise allowed to distinguish two directions of their formation. The first direction is associated with the allocation of groups of indicators in accordance with the characteristics of the process (cost indicators, time indicators, etc.). The second direction is associated with the definition of groups of indicators to assess various elements of business process (process indicators, product indicators, resource indicators, process satisfaction indicators, etc.) (Table 1.). [9]

Conclusion

The system of enterprise business process indicators should be built in such a way as to ensure the adequacy of their assessment. In our opinion, it should combine both quantitative and qualitative approach to evaluation.

For statistical management of business processes, an effective tool is control charts, which for the enterprise's IABPMS as part of a corporate or information system have not yet found application in Uzbekistan. Based on the analysis as the main method of fuzzy inference for constructing an optimal model of intelligent control it is proposed to apply the algorithm of fuzzy logic apparatus. The analysis and justification of the model of intelligent management of business processes using the apparatus of fuzzy logic is performed.

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