Design of information support systems for enterprises based on the principles of system analysis

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Abstract. The information support systems of enterprises and the tasks they perform are considered. An analysis of the basic requirements for information support systems was carried out. The basic principles of system analysis applicable to the design of an information support system are considered. The main directions of interaction between the enterprise information support system and other systems are identified based on the principles of system analysis. The information support system interacts with other systems based on the principles of system analysis, using data and analytical tools to make decisions on enterprise management and monitor the operation of other systems. The direction of ensuring security for the information support system is separately considered. The main stages of designing an information support system are formulated based on the principles of system analysis. Recommendations have been put forward for the further development of the information support system based on the principles of system analysis. These recommendations will help the enterprise continue to develop and improve the information support system in accordance with its needs and strategic goals.

1 Introduction

In the modern world, information technology plays an increasingly important role in the life of organizations and enterprises. Information support systems are used to collect, process and analyze data, manage processes and make decisions based on facts and analytical data.
Information support systems are a set of software and hardware specifically designed for processing and analyzing information in order to support decision-making based on current and reliable data. Currently, information support systems are widely used in various fields of activity, including business, economics, science and education, public administration and others [1, 2]. They provide automation of business processes, can significantly increase work efficiency and make informed decisions.

Currently, the concept of information support systems for decision making, or Decision Support System, is being developed in various fields [3], for example, marketing [4], scientific research [5], medicine [6].

Enterprise information support systems perform many tasks, including:

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1. Collection, storage and processing of data. The information support system must collect data on the activities of the enterprise, store it in a form convenient for use and process it to obtain the necessary information.
2. Data analysis. An information support system must analyze data to identify trends, predict future events, and make decisions based on facts and insights.
3. Business process management. The information support system should help manage the enterprise's business processes, optimize them and increase efficiency.
4. Resource management. The information support system should help manage enterprise resources, including finance, personnel, material and technical resources.
5. Client base management. The information support system should help manage the enterprise's customer base, including the collection and analysis of customer data, sales and marketing management.
6. Ensuring data security. The information support system must ensure the security of enterprise data, including protection from unauthorized access and viruses.
7. Ensuring data availability. The information support system must ensure that enterprise data is available to the right users at the right time and place.
8. Improving the efficiency of the enterprise. The information support system should help improve the efficiency of the enterprise, optimize processes and increase profitability.

2 Analysis of requirements for an information support system

Designing information support systems is one of the key elements in the development of organizations and enterprises. The information support system must be effective, flexible and adaptive to meet the needs and goals of the organization.

However, designing information support systems can be a complex and time-consuming process. Many factors must be taken into account, such as business processes, user needs, technology requirements and much more [7].

System analysis principles help solve many of these problems. They define the methods and approaches that must be used in analyzing and designing a system for it to be effective and adaptive. The principles of system analysis play an important role in the design and evaluation of information support systems. They define the methods and approaches that must be used when analyzing and designing a system so that it is effective and adaptive [8].

Basic principles of system analysis applicable to the design of an information support system:

1. System approach - consideration of the system as a whole, taking into account the interconnection of its elements.
2. The principle of integrity - the system must be connected and consistent for effective functioning.
3. The principle of flexibility - the information support system must be able to adapt to changes in the organization.
4. The principle of efficiency - the system must achieve its goals with minimal expenditure of resources.
5. The principle of adaptability - the system must adapt to changes in the external environment and conditions, and take into account the needs of users.

Using these principles when designing information support systems helps create an effective and adaptive system that meets the needs and goals of the organization.

The enterprise information support system (ISS) interacts with other systems based on the principles of system analysis. The main directions of this interaction can be listed:

1. Integration: The ISS must integrate with other enterprise systems, such as enterprise resource planning (ERP) systems, project management systems (PMS) and

customer relationship management (CRM) systems. This allows the ISS to receive data from these systems and use it for analysis and decision making.

2. Data exchange: The ISS must be able to exchange data with other systems. For example, if the enterprise resource management system detects a shortage of materials, it can send a request to the EISS for recommendations on purchasing the necessary materials.
3. Data analysis: The ISS must use data obtained from other systems to analyze the business processes of the enterprise. For example, the ISS can use data from a customer relationship management system to analyze customer behavior and determine the most effective marketing strategies.
4. Decision Making: The ISS must use data and analytical tools to make decisions to manage the enterprise. For example, the ISS can use data from the project management system to determine the most effective project management strategies and make resource allocation decisions.
5. Monitoring: The ISS should monitor the operation of other enterprise systems and warn of anomalies and problems. For example, the ISS can monitor the operation of an enterprise resource management system and warn of material shortages or delays in deliveries.

A separate important area can be considered ensuring security for the information support system. This direction may include:

1. Authentication: The process of verifying the authenticity of users to ensure that they are authorized to access the system.
2. Authorization: the process of determining the user's level of access to various system resources.
3. Encryption: The process of protecting data from unauthorized access by converting information into an unintelligible form.
4. Audit: a system for monitoring user actions and recording them in logs for subsequent analysis.
5. Physical Security: Measures taken to protect the physical resources of the system such as servers, data storage, etc.
6. Anti-malware: protection systems against viruses, Trojans and other malware.
7. Access Control: the access control system allows you to restrict access to certain system resources to different users.
8. User training: training users in safety rules and monitoring their compliance.

Thus, the ISS interacts with other systems based on the principles of system analysis, using data and analytical tools to make decisions on enterprise management and monitor the operation of other systems.

When designing an information support system based on the principles of system analysis, several main stages can be distinguished (Figure 1):

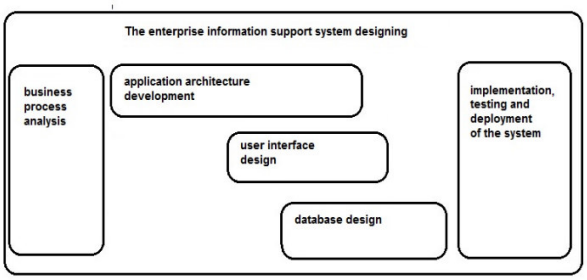

Fig. 1. Main stages of designing an information support system based on the principles of system analysis.

1. Analysis of business processes. This is a primary task, which includes studying the target processes of the enterprise and determining the basic requirements for information support. It is necessary to identify information flows, roles and responsibilities of process participants and determine requirements for timing and quality of information at various stages of the process.
2. Development of application architecture. At this stage, the components of the system, their interaction and methods of data processing are determined. The architecture must ensure scalability, reliability and security of the system.
3. User interface design. Based on an analysis of business processes and user requirements, a convenient and intuitive system interface is developed. This includes developing menus, forms, reports and other elements that will allow users to work effectively with the system.
4. Database design. At this stage, entities and relationships between them are determined, and a logical and physical database model is developed. It is important to consider information storage requirements, ensuring data integrity and ensuring quick access to data.
5. Implementation of the system. Functional of the system is implemented to the new system.
6. Testing and deployment of the system. During the development of the system, all its functional and non-functional capabilities are tested. The system is being implemented at the enterprise and the transition to a new system is taking place. Provides user training and system support.

All these areas are interconnected and important for the successful integration of an information support system based on the principles of system analysis.

3 Conclusion

Recommendations for the further development of an information support system based on the principles of system analysis depend on the specific needs and goals of the enterprise. However, in general terms, the following recommendations can be offered:

1. Constant updating and adaptation of the system. Technological innovations and changes in business processes require constant updating and adaptation of the information support system. Regular reviews and assessments of system performance can help identify weaknesses and potential improvements.
2. Integration with other systems. Development of an information support system may include integration with other systems, such as a customer relationship management (CRM) system, an enterprise resource planning (ERP) system, and others. This will help improve the efficiency of work and information exchange between different departments and functions of the enterprise.
3. Expansion of functionality. The identification of new user requirements and needs may lead to the need to expand the functionality of the system. For example, this could be adding new modules or functions that will improve project management, data analysis, or automation of additional business processes.
4. Improved user interface. Constantly improving the system's user interface will help make working with the system more convenient and efficient. User feedback and user testing can help identify weaknesses and suggest improvements.
5. Ensuring information security. Taking into account the increasing threats to information security, it is recommended to constantly update and improve information protection measures. This may include training users in basic security, using modern methods of authorization and access control, data backup, etc.

6. Collaboration with information technology professionals. Involving experienced specialists, both internal and external, will help ensure the proper development and implementation of the information support system. Regular training and development of employees responsible for the system is also necessary for the successful development and support of the system.

These recommendations will help the enterprise continue to develop and improve its information support system in accordance with its needs and strategic goals. However, before making any decisions, an analysis and assessment of the impact of changes on the enterprise and its users should be carried out.

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