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Research Article

THE IMPORTANCE OF COGNITIVE MODELING IN THE DIGITAL ECONOMY AND COGNITIVE SYSTEMS AND SERVICES IN DIGITAL BUSINESS

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ABSTRACT

Currently, obtaining reliable data and its quick analysis has become the most important condition for successful management. This is especially true if the object of management and its external environment are a set of complex processes and factors that significantly influence each other. One of the most effective ways to solve problems arising in the field of management and organization is the use of cognitive modeling in the digital economy, which is the subject of study in this article.

KEYWORDS

Digital economy, digital business, modeling, cognitive model, measurement factor, cognitive analysis, alternative solution, business process management, management decisions, analytical software, services based on cognitive computing, transactions, blockchain.

INTRODUCTION

Cognitive modeling is used to systematize, analyze and make management decisions in complex and uncertain situations (geopolitical, domestic, military, etc.), in the absence of

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quantitative or statistical information about the processes taking place in such situations. intended. Cognitive modeling helps to better understand the problem situation, identify contradictions and qualitatively analyze the system. The purpose of modeling is to formulate and clarify hypotheses about the operation of the object in question as a complex system consisting of interrelated elements and subsystems. The emergence of the cognitive approach is related to the complexity of analysis and decision-making in fields such as economics, sociology, and ecology. In such systems, the number of factors that need to be taken into account when making a decision is measured by dozens. The factors themselves have a complex interaction. Often, there is no specific methodology for determining measurement factors, and the amount of data is insufficient or qualitative in nature. Due to the specific characteristics of such systems, they are called weakly structured.

One of the definitions of common cognitive modeling is the following definition - it is a method of analysis with the ability to determine the strength and direction of the influence of factors in making the management object a target, taking into account the similarities and differences of the influence of various factors on the management object. Cognitive modeling helps to better understand the problem situation based on the qualitative analysis of the system. It allows you to identify problems and contradictions specific to the system. The purpose of modeling is to form and clarify a hypothesis about the operation of the object under study, which is considered as a complex system consisting of separate, but interrelated elements and subsystems.

Cognitive analysis of the research object allows you to:

- to see the general situation of the analyzed problem;
- prediction of system (situation) development direction;
- to determine the factors affecting the development of the situation;
- development of action strategy;
- offer alternative solutions to the problem;
- formation of the decision-making process;
- obtaining qualitative and quantitative descriptions of the situation under consideration;
- increase the quality and validity of decisions.
- The step-by-step technology of cognitive analysis includes the following steps:
- collecting preliminary information about the problem;
- systematic study of the problematic situation (the problem is permanent or changing in nature);
- structure of knowledge on the subject of the problem;
- create a cognitive model of the studied problem;
- structural analysis of the cognitive problem situation;
- structural features of the cognitive model of the problem situation;

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- problem modeling based on a target approach;
- possible results at the model level, denial of current models;
- thematic interpretation of modeling results;
- to analyze the results and determine new knowledge about the dynamics of the situation.

The essence of the cognitive approach is to develop an effective management strategy based not on intuition, but on organized and verified information about a complex system.

The source of such knowledge can be sociological research of the population or surveys of expert groups. The development of cognitive models is a very laborious process, so special tools are needed to automate the work of researchers.

The tools of cognitive technologies are diverse and they are designed to solve different problems:

- business process management;
- supporting management decisions;
- analytical software and services;
- services based on cognitive computing;
- transactions and blockchain.

When talking about cognitive systems and services in digital business, it can be said that a natural cognitive system is a biological system of cognition based on the consciousness of a living organism (individual, group, community). The basis of such a cognitive system is the interaction of thinking, consciousness, memory and language. Although it is not clear in the general case, it is possible to agree with the opinion that the human brain is the main carrier of the cognitive system. An artificial cognitive system is a non-biological system characteristic of machines with features of artificial intelligence with cognitive functions and the ability to connect time to create an interactive temporal model of events.

Modern mental systems use communication technology, cognitive models, and computer systems to transform raw data into useful information for business analysis and decision-making. The tools used include intellectual and textual analysis of data, operational-analytical processing aimed at processing a large amount of unstructured data. It helps identify new strategic business opportunities and allows for more accurate alignment of existing business processes.

Cognitive business analytics (CBA) can be used to support a wide range of business objectives and strategies. Short-term operational solutions such as product placement and competitive pricing have greatly expanded with CBA. Long-term strategies in areas such as brand recognition and market share will be more successful with the forecasting and scene modeling that CBA provides. An important advantage of cognitive systems in general, and CBA systems in particular, is that they have the ability to process both external information from the market in which the company operates, and internal information from the company, such as financial indicators and operational data. When external and internal information are combined, they will create knowledge in the future that cannot be obtained

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in any other way. Technological and methodological provision of cognitive systems for business is aimed at supporting knowledge about previous, current and forecast indicators, ideas and its status.

Depending on the needs, the following capabilities and technologies of business analysis can be used:

- BI - reporting (reporting based on business intelligence systems);
- Data Mining (intelligent information search);
- Intellectual processing of complex events;
- CPM (application programs for managing business activities);
- Comparison based on expert systems.

In the field of financial services, cognitive systems are used in order to optimize the process of risk management, prepare personal recommendations and potential objects for investments, evaluate financial data of the stock exchange and information about customers. Predictive models built on platforms and their cognitive capabilities help to identify the most profitable and actively developing business lines and help clients increase their return on investment. Other tasks include financial risk modeling and detection of money laundering and suspicious transactions. In the banking sector, as well as in other sectors, where processing of large volumes of data and personalized service is important, cognitive systems will fundamentally change the relationship between banks and customers. Machine learning and user behavior analysis allow us to identify some important patterns and trends, predict expected customer behavior, create personalized offers for customers, and improve service quality. In addition, cognitive systems are used to detect fraud, analyze and automate threats, as well as develop recommendations.

The main goal of cognitive management technologies is to support decision-making that helps reduce operating costs, increase revenue, increase competitiveness, improve the efficiency of almost any business, or simply get advice on request. In the near future, with the development of cognitive technologies, the principles of working with information will change, just as personal computers have changed their lives in time. Based on the accumulated knowledge about the system, the assistants can give reasonable advice on the feasibility of completing a specific business issue, developing a sequence of its elimination, monitoring its implementation, and determining priorities in the execution of work.

Business success in modern conditions is provided by the hardware capabilities of information technologies - the speed of infrastructures and communication channels, as well as cognitive technologies used in the development of the most interesting and promising offers on the market and data analysis. Modern business processes continue to become more complex, and the time to make important decisions in the company's operation is running out. Companies that have found their niche are slowly expanding, but as they scale, most of them realize that no single person or team is enough to handle the amount of data they face today.

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Analytics, artificial intelligence, clouds, enterprise mobility, blockchain and other latest technologies are helping not only large corporations, but also small companies. And these processes determine the digitization of business.

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