



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

ALGORITHMS OF INTELLIGENT DECISION SUPPORT SYSTEMS OF STATE BODIES IN THE FIELD OF INFORMATION TECHNOLOGIES

Azimov Bunyod Rakhimjonovich

*PhD on technical science, dosent, Department of Artificial Intelligence,
Tashkent University of Information Technologies named after Muhammad al-
Khwarizmi, Tashkent, Uzbekistan*

Muzafarov Mirali Qahramon ugli

*Master of Department of Artificial Intelligence, Tashkent University of
Information Technologies named after Muhammad al-Khwarizmi, Tashkent,
Uzbekistan*

Abstract: *An algorithm for the intellectual support of decisions in integrated management systems has been developed, its main components have been described, its structure has been formed, and algorithms have been developed to work in several modes that increase management efficiency on the example of tax authorities. An alternative solution structure has been designed and developed for management decision making. An integrated functional structure has been developed for the overall decision-making system. The process of operation of the proposed intelligent decision-making system for an integrated management system is shown. Issues of improving management efficiency by supporting intelligent decision-making are analyzed. An optimal schematic model for the process of forming a knowledge base in the management decisions, coordination of the work of the expert system was recommended. Perspectives of forecasting issues to achieve efficiency in the management mechanism were analyzed. The process of intellectual support for decision-making is described algorithmically.*

Key words: *intelligent decision support system, integrated management system, expert system, module, algorithm, structure, model, tax authorities.*

INTRODUCTION

The activity of modern integrated management system is determined by many interrelated parameters. Therefore, a situation is quite likely in which the tax's management, using traditional methods of analysis and management, may not take into account the negative aspect in the work of its structure. This is most likely when the integrated management system prefers simple, convenient, but not always effective working methods in its current activities.

The creation of an early response system and the ability to prevent negative processes in taxing through the development of an intelligent decision support system is an important area in the management of complex systems.



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

The purpose of the work is to develop an intelligent decision support system as the main tool in the process of solving problems of tax management, using data, knowledge about the functioning of the system, subjective and objective models describing banking processes, including both quantitative and qualitative characteristics.

Formulation of the problem. Using the principles of organization and methodology for constructing a DSS, develop a decision support system to solve the problem of intelligent management of banking activities. To achieve this goal, it is necessary to solve the following tasks:

- determine the main components of the system being developed;
- to form the structure of the intelligent decision support system (IDSS);
- to develop algorithms for decision support;
- to evaluate the results and prospects for further research.

Description of the main components of the system

To develop the IDSS structure, it is necessary to identify and describe its main components [3].

1. Database - designed to save, manage, display and analyze data. The system uses two types of sources:

- external - official data of the National Bank of Uzbekistan, the Tax Committee, the Organization for Economic Cooperation and Development;
- internal sources - data that are entered manually by the user, namely, the performance indicators of a particular integrated management system (For example tax authorities).

2. Knowledge base - the base, which stores the knowledge of the intellectual system [1].

The knowledge base consists of two parts:

- conceptual model - a generalized description of the subject area, its composition and structure;
- a model of production rules, which presents knowledge about the quality indicators of banking.

3. Model base - a system that includes a set of models to meet user requests and solve the necessary problem. The base includes the following models:

- a model for the development of the banking system at the macro level;
- a model of a commercial bank's activities at the micro level;
- fuzzy model of quality indicators management [1].

4. User interface - designed for dialogue with decision makers both at the stage of entering information and outputting results, developed using graphical display tools. The IDSS interface for tax management serves as a means of displaying the results of the application of models in the form of graphs of predicted



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

indicators, functional dependencies, as well as calculations of financial indicators and their assessment as a criterion for achieving the set goal.

Formation of the IDSS structure

After highlighting and describing the main components of an intelligent system, it is necessary to develop a structural diagram, which is a means of visual display of the relationship between them (Fig. 1).

The intelligent system is hybrid [2], since the following methods and approaches are used for the practical implementation of tasks:

- methodology of conceptual modeling to identify the main elements of the management model and cause-and-effect relationships between them; Forecasting analyzes the prospects of issues to achieve efficiency in the management mechanism. It is also useful to describe the process of intellectual support for decision-making in an algorithmic way.

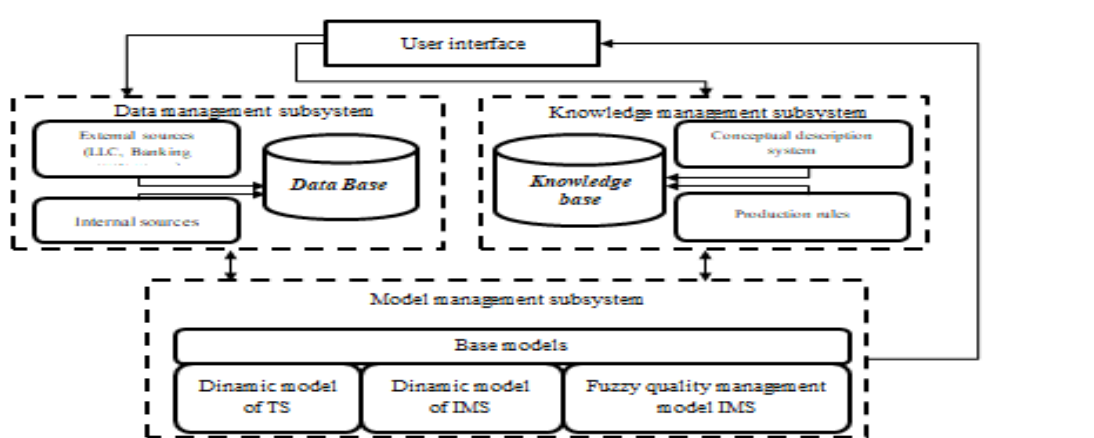


Figure 1 - Structural diagram of the tax's IDSS

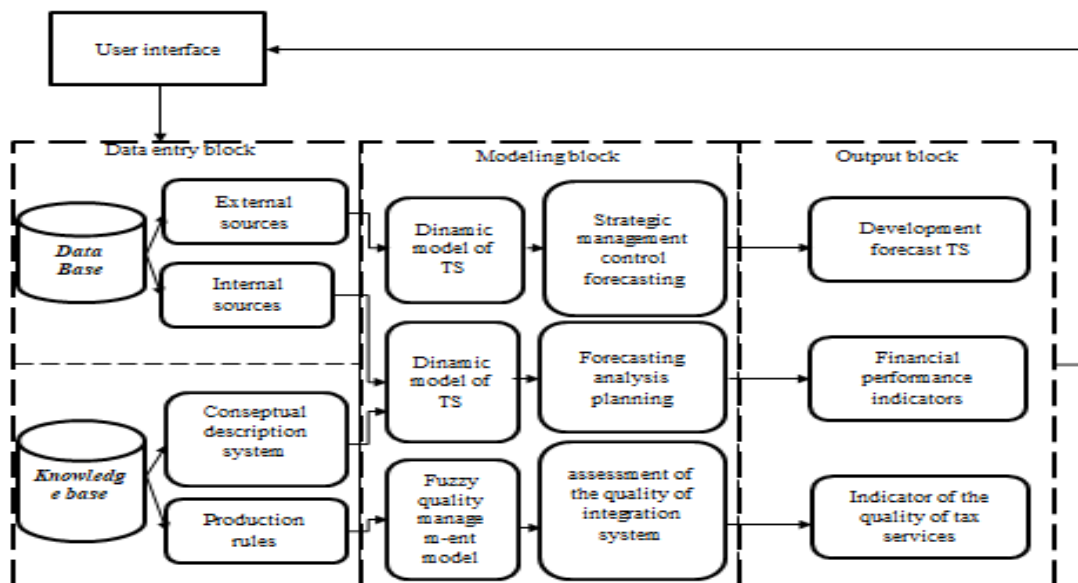


Figure 2 - Functional diagram of the IDSS tax authorities

- methods of statistical and regression analysis to identify non-linear functional patterns of taxing development;



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

- methods and principles of system dynamics for building a mathematical model of a bank's functioning at the macro and micro levels;
- artificial intelligence methods for managing activities using fuzzy logic.

Functional diagram of the IDSS tax authorities, shown in Fig. 2, shows the tasks that each of the models of the subsystem implements and the results of modeling, combined into a subsystem for outputting the results, displayed using the interface.

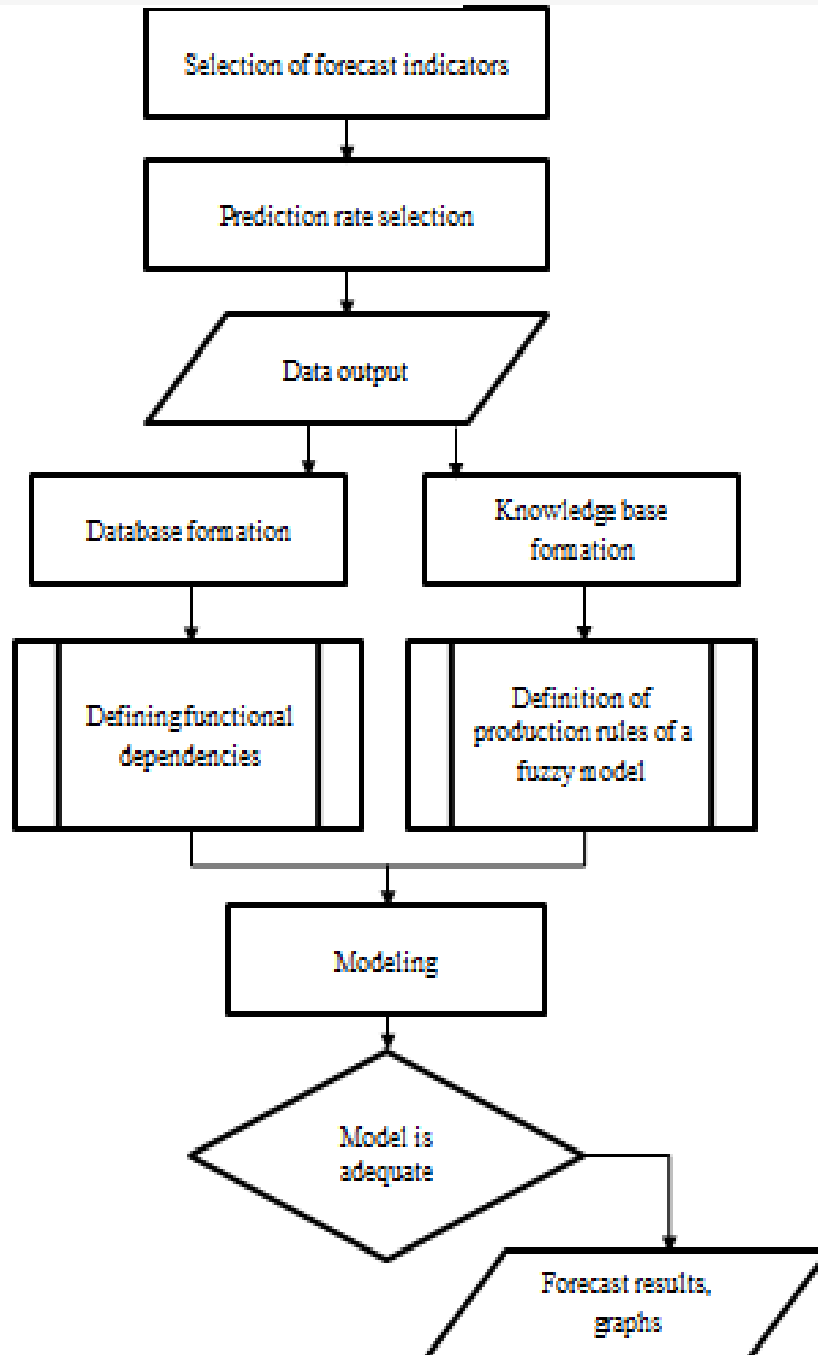


Figure 3 - Performance algorithm of intelligent decision support system (a)

Development of decision support algorithms



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

IDSS is a multifunctional and dynamic system aimed at solving the following tasks:

- tasks of strategic management: development and implementation of actions aimed at long-term increase in the level of performance in the financial market;
- planning tasks: setting such sizes of interest rates and indicators of the quality of banking services, which will lead to a more efficient use of available financial resources;
- control tasks: tracking the status of the assigned tasks, identifying deviations from the goal and establishing their causes;
- analysis tasks: calculation of the main indicators of the bank's activity, study of their dynamics;
- forecasting tasks: identify trends in the development of a commercial bank in the existing banking environment and use the resulting forecast as a means of improving current activities.

The developed intelligent decision support system for banking management operates in two modes:

- a) as a forecasting tool - the functioning algorithm is shown in Fig. 3;
- b) as a tool for assessing the achievement of the set goals (Fig. 4).

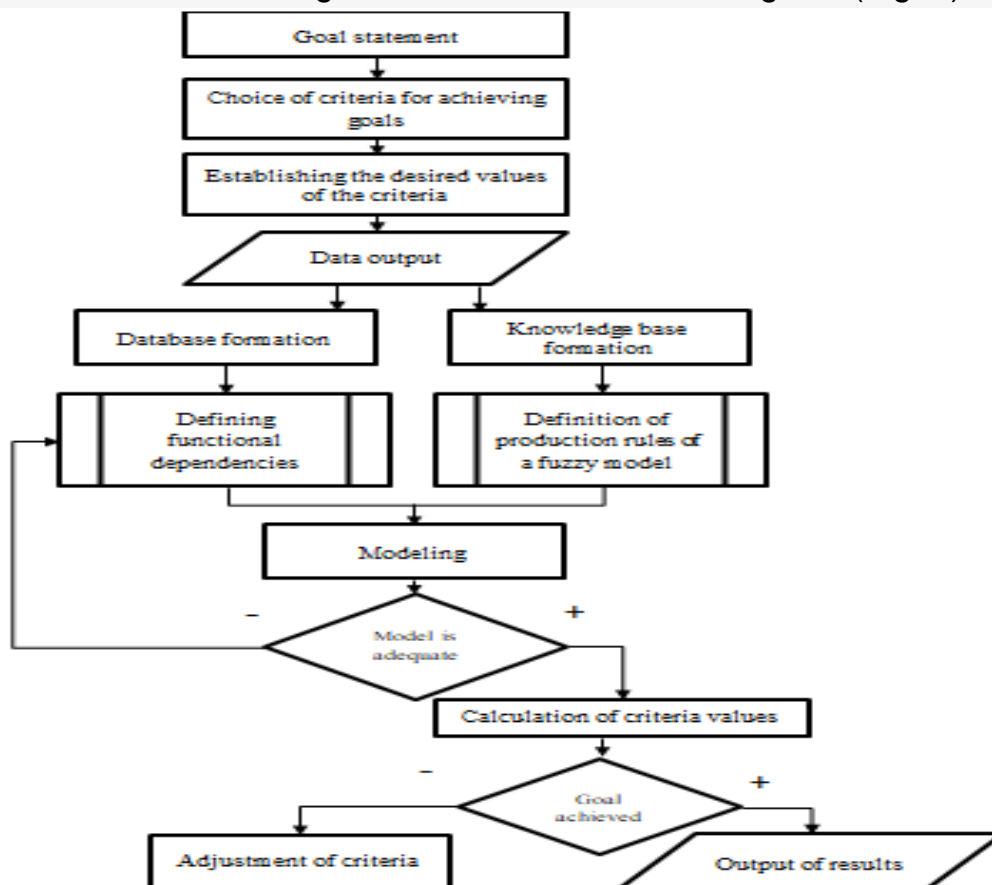


Figure 4 - Performance algorithm of intelligent decision support system (b)



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

Thus, in the example of integrated management systems, intellectual decision support helps to increase management efficiency and reduce financial costs. In our case study of the tax authorities, it was the creation of an intellectual management environment, the formation and implementation of an expert system using the knowledge base. It should be noted that the use of intelligent control modules in integrated control systems remains the most optimal solution in terms of efficiency.

CONCLUSIONS

Implementation of IDSS developed for management modules in integrated management systems reduces material, time, and labor costs for decision making.

Evaluating the effectiveness of tax authorities by assessing whether the implementation of the management process using this system has achieved the set goal, allows you to predict the development of a particular tax office, taking into account the trends of the tax system based on an integrated management system. The use of artificial intelligence methods in the development of the knowledge base allows to manage not only financial indicators, but also the qualitative characteristics of the system. The prospect of further research is the development of appropriate software that will make the intelligent system work.

REFERENCES:

[1]. Zaynutdinova M.B., Askaraliyev O.U. Qaror qabul qilishni qo'llab quvvatlovchi ish asosida axborot ishonchliligini baholash. International Scientific-Practical and Spiritual-Educational Conference "International conference on importance of information-communication technologies in innovative development of sectors of economy". Tashkent - 2018. -B. 833-836

[2]. Inmon W.H. Using the Data Warehouse / W.H. Inmon, R. Hackthorn. Willey. -2018.

[3]. Inmon W. H.. Building the Data Warehouse / W.H. Inmon. -Willey. - 2017.

[4]. Zamula A.A. Nechetkaya model upravleniya kachestvom bankovskix uslug / A. A. Zamula // Iskusstvennyy intellekt. – 2014. - № 2. – S. 89-94.

[5]. Ignateva A.V. Issledovanie sistem upravleniya / A.V. Ignateva, M.M. Maksimsov. – M. : YuNITI-DANA, 2012. – 157 s.

[6]. Hackathorn R.. Reinventing Enterprise Systems Via Data Warehousing / R. Hackthorn. - Wash-

[7]. ington, DC: The Data Warehousing Institute Annual Conference. – 2011.

[8]. Щавелёв L. V. Способы analiticheskoy obrabotki dannykh dlya podderjki prinyatiya resheniy / Щавелёв L. V. // SUBD. - 2011. - № 4-5.

[9]. Drewek K. Data Warehousing: Similarities and Differences of Inmon and Kimball / K.



"INNOVATIVE ACHIEVEMENTS IN SCIENCE 2023"

[10]. Drewek. – Electronic data.– Mode access :<http://www.b-eye-network.com/view/743>.

[11]. Saxarov A. A. Konsepsiya postroeniya i realizatsii informatsionnykh sistem, orientirovannykh na analiz dannykh / A. A. Saxarov // SUBD. - 2005. - № 4. - S. 55-70.

[12]. Demarest M. Building the Data Mart / M. Demarest.- DBMS. - 1994. - № 7. - P. 44-50.

[13]. Lvov V. Sozdanie sistem podderjki prinyatiya resheniy na osnove xranilishch dannykh / V. Lvov

[14]. // SUBD.- 1997.- №3.- С. 30-40.