

INFORMATION PROVISION FRAMEWORK FOR STRATEGIC PLANNING IN PUBLIC INSTITUTIONS

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Abstract. *In order to use strategic planning as a rational means to develop the activity of public institutions effectively, it is necessary to solve methodological and information provision problems. The solution of the methodological issues allows the creation of a model revealing the concept of effective strategic planning as well as forming the rational composition set of methods for the fulfilment of the strategic planning objectives. The solution of the information provision problem enables to reach strategic planning objectives by applying a decision support system (DSS). The offered DSS is based on the integrated approach, the use of which allows joining in the whole of the support elements for the fulfilment of planning objectives under internal and external conditions of different uncertainty.*

Keywords: *public institution, strategic planning, methodological and information provision, decision support system.*

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1. Introduction

The significance of strategic planning in public institutions is based on the fact that it creates preconditions to stimulate the development process of the institutions' activity and the country's economy as well as to ensure its purposefulness by revealing, distributing, using and developing the institutions' potential. For this reason, strategic planning is an effective means to encourage harmonious development of institutions as well as of the state (Chlivickas and Raudeliūnienė, 2007, 2008; Bivainis and Tunčikienė, 2009). The definition of the components of strategic planning models, the formation of their content, the improvement of methodology and information provision for the fulfilment of planning objectives, the application of the theoretical planning potential are frequent subjects of scientific research and often the topic of scientific discussions. Not so long ago, methodological issues were, in principle, solved (Bivainis and Tunčikienė, 2009). However, the information provision for the fulfilment of strategic planning objectives is still an open problem. The improvement of information provision for the management decision-making as well as the creation of decision support systems (DSSs) are frequently considered by researchers (Mickaitytė et al., 2008; Azadeh et al., 2009; Gudas, 2009; Kaklauskas et al., 2009; Urbanavičienė, 2009; Kanapėckienė et al., 2010). Still, in order to use the strategic planning model, the existing research results (Goul et al., 1986; Koutsoukis et al., 2000; Mabin, 2001) are inadequate.

The subject of the present research is information provision for strategic planning in public institutions. The main goal of the research is to define the principal approaches of the DSSs for strategic planning, with reference to which a DSS that would help analysts prepare and adopt planning decisions would be developed. Methods of systematic analysis, logics and synthesis were applied in the research.

2. Conception, Structure and Variety of DSSs

A DSS is interpreted as a computer-based information system which is intended to form the information needed for making decisions and in this way to help the user or a group of users solve a problem. DSSs provide the information necessary to generate alternatives, to analyse and evaluate them and to choose the best alternative for achieving the set goals (French and Turoff, 2007; Kaklauskas et al., 2007; Mickaitytė et al., 2007). The system purpose is specified by characterizing the object in terms of problem certainty. DSSs are perceived as systems for accumulating and processing various sources of data and knowledge, what helps managers make decisions in dealing with specific or unstructured and/or partially structured problems.

A DSS concept presented by Alekseev and Borisov is mixed (Alekseev and Borisov cited in Dzemydienė, 2006). According to them, DSSs can be understood not

only as systems for helping to choose the decisions but also as systems which select the best ways from its own formed alternatives or from the alternatives produced to it. This DSSs' conception is criticized by Adla et al. (2007) who argue that such DSSs do not integrate users into the process of decision-making and are suitable for solving simple problems.

DSSs allow: 1) developing problem solutions; 2) increasing decision-making efficiency. Many researchers agree upon the mentioned functions. For example, Turban and Aronson (2001) approved such a conception of the DSSs' destination. According to them, the main functions of DSSs are: 1) interaction with the decision-maker; 2) problem identification; 3) offering solutions of a problem; 4) substantiation of decisions. The main qualities of DSSs offered by Turban and Aronson (2001) allow discovering an analogy with DSSs' functions presented by Kaklauskas et al. (2007), Banaitienė et al. (2008), Kaklauskas et al. (2009). Summarizing the opinions of these researchers, it can be concluded that the purpose of DSSs is to rationalize the preparation and making of decisions in this way assisting the analysts to make reasonable decisions. Such essential requirements for DSS were distinguished by Urbanavičienė et al. (2009) and Kanapeckienė et al. (2010).

The diversity of approaches to DSSs is determined by the nature of the problem, the goals as well as the chosen approaches to achieve the goals. According to the results of the analysis of the factors which determine the role of DSSs, DSSs as computerized information systems provide thorough information necessary to set, analyse, evaluate alternatives and make the right choice. In order to choose the most rational means of neutralizing specific problems, they also provide the possibility for a purposeful development of prepared information reports.

There are different opinions in terms of DSSs' structure. Typical DSSs consist of three subsystems: data and model management and user's interface (Kaklauskas et al., 2007; Naimavičienė et al., 2007; Urbanavičienė et al., 2009). DSSs may possess systems of e-mail management (Kaklauskas et al., 2007, 2009; Naimavičienė et al., 2007; Urbanavičienė et al., 2009). Turban and Aronson (2001) configured a DSS with four subsystems: 1) dialog generation and management system (DGMS); 2) database management system (DBMS); 3) model-base management system (MBMS); 4) knowledge-base management system (KBMS). A significant component is the decision-maker or user and his tasks (Adla et al., 2007; Naimavičienė et al., 2007). Such DSS composition can be considered the most rational (Figure 1).

A significant element of the conceptual structure of DSSs is the decision-maker usually understood as an analyst who analyses the situation, takes into account the rules, however, makes his own conclusions. The components (DGMS, DBMS, MBMS, KBMS) are considered to constitute the software portion of DSSs. The essential function of the DGMS is the transformation of the user's input into languages that can be read by the DBMS, the MBMS and the KBMS and into a form that can be understood by the user (Turban and Aronson, 2001; Kaklauskas et al., 2007; Banaitienė et al., 2008). The DBMS supports the dialogue between the user and other constituents of a DSS. Users, directly interacting only with the DGMS subsystem, regard this component as the entire DSS (Adla et al., 2007).

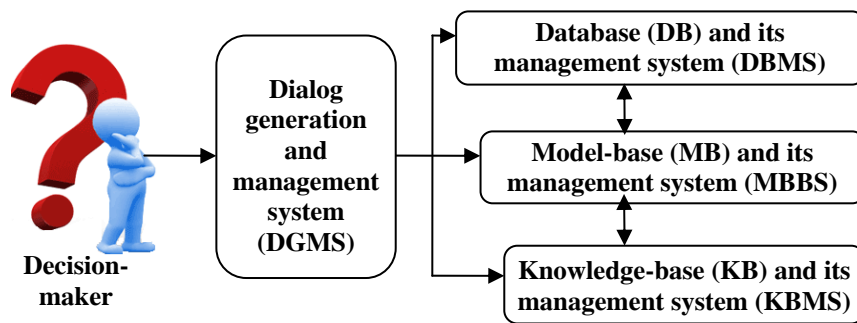


Figure 1. Typical DSS structure

The DBMS is defined as a software kit for organizing data in databases. The primary tasks of the DBMS are the capture and storage of internal and external data which are needed to make decisions (Adla et al., 2007). As a number of researchers (Kaklauskas et al., 2007; Banaitienė et al., 2008; Urbanavičienė et al., 2009) claim, databases can possess both quantitative and qualitative data which describe certain objects. The DBMS allows linking data from different sources. The primary functions of the MBMS are the creation, storage and update of models that enable problem-solving inside DSSs. The much broader list of the MBMS functions includes the ones which correspond to the DBMS functions. According to Kaklauskas et al. (2007), the role that the MBMS performs in respect of models is similar to the role of the DBMS in respect of data. The MBMS assists the user to choose a desirable model and to adapt it to a particular situation. According to Turban and Aronson (2001), Dzemydienė (2006) and Kaklauskas et al. (2007), the KBMS is a necessary component of DSSs. Adla et al. (2007) cited the statement by Holsapple and Whinston in which they claimed that the KBMS as well as the problem processing system were the key DSSs' components. The KBMS allows generating, collecting, managing, disseminating and using knowledge necessary to solve problems.

In scientific literature, different approaches to the analysis of the DSSs' diversity are proposed. The most acceptable approach is the essential or conceptual approach the application of which allows differentiating DSSs according to the object. According to Kaklauskas et al. (2007), DSSs may be classified into DSSs, group DSSs, expert systems and artificial neural networks. As stated by Mickaitytė et al. (2008), a DSS, expert system, neural networks and multimedia form a network of distributed systems each facing and solving a specific problem. A DSS as a separate group of systems consists of the individual and collective decision-making systems. The latter includes group and negotiation support systems (Oprean et al., 2009; Istudor and Duta, 2010). The most rational list of DSSs from the standpoint of intelligent support specification consists of: 1) individual decision support system (IDSS), 2) group decision support system (GDSS), 3) negotiation support system (NSS), 4) expert system (ES).

Extensive research in this area (Matsatsinis and Samaras, 2001; Kersten and Lai, 2007; Kaklauskas et al., 2007; Mickaitytė et al., 2007; Banaitienė et al., 2008; Kaklauskas et al., 2009; Urbanavičienė et al., 2009) enabled to systemize the essential qualities of DSSs' varieties (Table 1) and treat them as conditions which, in the case of applying a certain variety of DSSs, are favourable to the managers of institutions in making the decisions under the circumstances of different levels of uncertainty.

Table 1. **The main qualities of the varieties of DSSs**

<i>FEATURE</i>	<i>DSS</i>			
	<i>IDSS</i>	<i>GDSS</i>	<i>NSS</i>	<i>ES</i>
Purpose	Help solve a problem by providing reasoned, usually quantitative arguments	Help solve a problem by providing the results of the synthesis of various problem solutions	Help make an acceptable decision by providing information on the opportunities for compromise	Help accept the solution of a problem according to a defined decision path
Initiative of proposals	Decision-makers and/or system	Decision-makers and/or system	Users and/or system	System
Reference direction	Individual decision-making	Group decision-making	Collective decision-making	Formation of proposals based on expert judgments
The main direction of dialogue	User → system	User → system	User → system	System → user
Nature of support	Personal	Group	Institutional	Personal and group
Nature of data manipulation	Usually algorithmic manipulation	Algorithmic, heuristic manipulation	Algorithmic, heuristic manipulation	Usually heuristic manipulation
Characteristics of subject area	Extended	Extended	Extended	Narrow
Type of appeals to system	Unique	Unique	Unique	Repetitive
Content of database	Facts (actual knowledge)	Facts (actual knowledge)	Facts (actual knowledge)	Procedures and facts
Possibilities of logical conclusions	Large	Large	Large	Limited
Possibilities of interpretation, substantiation of decision	Large	Large	Large	Limited

Considering the defined characteristics of DSSs, it is rational to integrate systems thereby increasing their expedience. A frequent practice is to take traditional DSSs as the basis and supplement them with advanced artificial intelligence elements (Koutsoukis et al., 2000; Mickaitytė et al., 2007, 2008; Huang et al., 2009; Kaklauskas et al., 2009, 2010; Secieru, 2009).

3. Factors Predetermining the Requirements for Integrated DSSs of Strategic Planning in Public Institutions

In order to create an effective DSS for institutional strategic planning, it is expedient to apply the system integration principle. The factors determining the requirements for the strategic planning DSSs are as follows: 1) the principle model of strategic planning; 2) methods for the implementation of its components; 3) the type of relation between the implementers.

3.1. The principle model of the strategic planning for public institutions

Different models are proposed for institutional strategic planning. The variety of the models is predetermined by such factors as the goals, applied methodological basis, the field of application, the focuses of the planning as well as the approach to the role of internal and external environmental factors.

For example, according to the basic document regulating strategic planning in the institutions in Lithuania (Valstybės žinios, 2010), the main goal of the planning is to create the preconditions for increasing the efficiency of institutions' activity. Strategic planning is based on the principles which reflect the goals of their activity as well as the requirements for the implementation of the goals. Strategic planning is a complex process which begins with the analysis and assessment of the environment and the resources of an institution followed by the definition of the institution's mission based on the conclusions of the assessment, by subsequently setting up the strategic goals for the fulfilment of the mission and the preparation of programs to achieve the goals (Valstybės žinios, 2010). Arimavičiūtė (2005) added such tasks: analysis of interest groups, definition of strategic problems, formation of new strategic initiatives. With reference to the results of a comparative analysis of the models of strategic planning (Bivainis and Tunčikienė, 2009), their main qualities were defined: in terms of specification, a part of models are detailed, other models are aggregated, while yet others are combinations of detailed and aggregated components; in terms of the connection of components, links are strictly defined or susceptible to concretization depending on the situation of the environment.

A strategic planning model for public institutions should be composed of the components which would express the essence of the need for developing an institution's activity and possibilities to answer this need as well as the essence of the use and development of these possibilities. The offered model which possesses such components as strategic analysis, setting of target orientation, strategic decision-making, preparation of an action plan for their implementation as well as monitoring of the implementation of the plan, where the joining of the components into a whole is based on the results of the analysis of the link between the environment and the internal factors of an institution, meets the imposed requirements.

In order to ensure the correspondence of the offered model to the imposed requirements that are essential for efficient strategic planning, the content of the model components suggested in scientific literature was analysed (Bivainis and Tunčikienė,

2009). The analysis of the potential content of suggested model components allows stating that model components differ in their sets of tasks and their content. Their synthesis allows setting a valid composition of the suggested model components (Table 2).

Table 2. **Suggested set of the objectives of strategic planning in public institutions**

<i>COMPLEX OBJECTIVES</i>	<i>OBJECTIVES</i>
Strategic analysis of the institution	• Analysis and evaluation of the environment of the institution
	• Analysis and evaluation of the resources of the institution
	• SWOT analysis and evaluation of the institution
	• Analysis and evaluation of the strategic links of the institution
Defining the target orientation of the institution	• Forming the mission of the institution
	• Creating the vision of the institution
	• Defining the strategic goals of the institution
Preparing and making strategic decisions in the institution	• Generating strategic alternatives
	• Defining the evaluation criteria of strategic alternatives
	• Analysis and evaluation of strategic alternatives
	• Making strategic decisions
Preparation of an action plan of the implementation of strategic decisions in the institution	• Generating action plan alternatives
	• Defining the evaluation criteria of the action plan alternatives
	• Analysis and evaluation of action plan alternatives
	• Adoption of an action plan
Monitoring of the implementation of the action plan of the institution	• Record and controlling of the implementation of the action plan
	• Analysis and evaluation of the results of the implementation of the action plan
	• Use of the results of the analysis and evaluation of action plan implementation

The following advantages of the model were defined: rational formation of a strategic setting, preparation, making and planning of the implementation of reasoned strategic decisions, joining components of the model into a whole which creates pre-conditions for flexible planning.

3.2. Methods for the fulfilment of the strategic planning objectives in public institutions

To prepare an effective strategic plan, the methods which could reflect rational institutional strategic planning model should be used. Extensive theoretical potential for the planning and sufficient abilities to use it are a guarantee for reaching the goals of strategic planning. In order to make the best use of the methodological potential, the variety of methods was systemized in terms of the objectives of the suggested model components (Bivainis and Tunčikienė, 2009).

Generally, certain combinations of the methods to solve an institution's strategic analysis tasks are recommended in scientific literature. The use of the combinations of the methods allows analysing and evaluating different factors which influence the development of an institution's activity and synthesizes the results. The use of theoretic potential for an institution's objective orientation-setting creates preconditions for the formation of the mission, the creation of the vision and the setting of strategic goals. The theoretic potential for the preparation and making of the decisions is sufficient for the generation of alternatives, the formation of the criteria for the evaluation of alternatives along with the combination of criteria, the analysis and evaluation of alternatives, the choice of the best alternative. The use of the theoretic potential of the monitoring of the implementation of an institution's action plan creates preconditions for the analysis and evaluation of internal changes resulting from the implementation of the action plan, for setting connections between the results of the implementation of the action plan and the indicators of the institution's activity development.

4. Integrated System of Support for Strategic Planning in Public Institutions

The characteristics of strategic planning tasks with an emphasis on the type of relation between the actions of individuals participating in the process allowed revealing the particularities of the need for intelligent support for strategic planning tasks in DSSs.

According to the suggested model, strategic planning in institutions begins with an analysis and evaluation of the environment and recourses followed by the SWOT analysis and evaluation, by subsequently analysing and evaluating the strategic links. In order to reach rationality, in particular to avoid duplication, it is expedient to centralize the procedures of the strategic analysis of an institution at the strategic planning department. In order to use the suggested methods and models for strategic analysis, the support of a decision based on algorithmic and heuristic data manipulation is necessary, namely, to solve such a task, it is expedient to apply an individual decision and expert support. The strategic planning department refers the results of the analysis and evaluation of the environment and the recourses to all concerned structural departments. These departments present their comments, assessments and proposals for the strategic planning department. In analysing the evaluations of the environment and internal factors of an institution as well as synthesizing them with the help of the proposed methods, it is typical to apply the group work mode; therefore, it is rational to apply group decision support. The expedience of such support is grounded by the circumstance that the iterative exchange of information by specifying the arguments and evaluations is the most probable. Such support would allow setting the SWOT and strategic links more reasonably, in accordance with the evaluations of the external and internal factors (Chlivickas and Raudeliūnienė, 2007, 2008) of the departments of an institution. Besides, it is typical to apply the group work mode in discussing the final results of the strategic analysis (the participants are

the authorities of the institution, the heads of structural departments, the strategic planning department). It would be helpful to additionally apply the negotiation support mode to the latter one. To increase efficiency of the works, at this stage it is the most appropriate to use group decision and negotiation support.

In order to introduce the proposed methods of defining target orientation of an institution, different intelligent support is necessary. To form the institution's mission, to create the vision, group decision and expert support are useful. To specify the mission, it is enough to apply decision support based on the manipulation of data on previous and ongoing powers of the institution. In order to define and adjust the strategic goals of the institution, it is necessary to predict the revision of the factors which predetermine the institution's activity development and their interrelation; according to the results of such a revision, the anticipated factors of development are converted into the goals pursued, the goals set are evaluated in terms of the possibilities to neutralize the difficulties of the link between the environmental and the inner factors of the institution. The proposals on the goals prepared by the strategic planning department are discussed by the institution's authorities and heads of departments. Group decision support should be highlighted here, as it, at different stages of the definition of orientation objectives, is supplemented with expert and negotiation support.

At the stage of the preparation of the alternatives and making strategic decisions to reach the goals set, the managers of structural departments must provide the strategic planning department with information on the possible ways to implement the goals. For this reason, strategic alternatives are generated within structural departments, according to certain criteria the alternatives are evaluated, while according to the results of the evaluation the best alternatives in the form of proposals are provided. In terms of content, it is a complex task that requires non-standard thinking and creativity; however, in principle, it is autonomous work. The particularities of task solution predetermine the need for individual decision and expert support. The strategic planning department generalizes the information on the ways of implementing the goal set received from the structural departments. In order to form a rational composition sets of strategic decisions, it is necessary to revise the results of the investigation of the factors which predetermine the implementation of the strategic goals as well as the possibilities of strengthening the factors and, if necessary, to specify the list of these factors and aspects of their strengthening. In order to develop a rational composition set of the decisions for the implementation of the goals, one should apply the collective work mode as well as use group decision support. Expert judgements are of crucial importance for the evaluation of the elements of the decisions set in terms of compatibility with the strategic goals, compliance with the strategic situation and in other respects. In order to increase the efficiency of expert judgements, it is rational to supplement decision support with expert support. The consideration of the results of the multicriteria evaluation of strategic alternatives is a group work. The adoption of strategic decisions is a collective work involving various employees and managers of the structural departments of institutions and the authorities. Besides group decision support, the solution of such a task requires negotia-

tion decision support as well, in order to eliminate the potential differences between the opinions of participants regarding the weight of the intended means for the implementation of the goals.

To solve another task of strategic planning in a public institution—to prepare an action plan for the implementation of strategic decisions—analogue elements are applied. The essential decision-making is a multi-step process the stages of which are characterized by information processing, expert judgements, modelling of alternatives, their evaluation and debates. This complex task of strategic planning is dealt with within the structural departments of an institution, on the level of specialists—the managers of departments and the analysts from the strategic planning department. The modelling of the alternatives of tasks to reach the goals of the action plan and the alternatives of activities for performing the tasks, the definition of the evaluation criteria and the formation of the combinations of criteria, the evaluation of alternatives according to the criteria are carried out in an autonomous mode; therefore, it is useful to apply individual decision and expert support. Therefore, the results of the multicriteria evaluation of the alternatives, group decision support would be the most appropriate.

The strategic planning department considers the projects of the action plan for the implementation of strategic decisions prepared by structural departments. It has to inspect the validity of the factors determining the implementation of strategic decisions, if necessary, to correct the list of such factors. This is done in consultation with the relevant structural departments, usually with their leaders; therefore, it would be useful to apply group decision support. For a complex evaluation of action plan alternatives, it is necessary to supplement group decision support with expert support. In order to adapt the best project of an action plan in terms of content as well as to use the possessed resources, by considering the projects of the action plan the strategic planning department carries on negotiations with structural departments. Therefore, for this objective it is rational to supplement group decision support with negotiation support.

The ministry of finance and other subjects (for example, government office) evaluate the strategic plan of an institution. With reference to their comments and proposals, the institution must specify the program, increase effectiveness and, of course, substantiate the validity of its decisions. In order to evaluate a plan, individual decision support is necessary; to respond to comments and proposals negotiation support is crucial.

Complex support is necessary to monitor the implementation of the action plan. Firstly, considering the particularities of the solution of monitoring tasks which consist of actual data processing and their comparison with the planned indicators, it would be helpful to apply individual decision support based on algorithmic data manipulation. It is more difficult to assess the changes that occurred due to the implementation of the action plan. In this case, expert judgements are planned here. For expert judgements regarding the institutional changes that occurred due to the implementation of the action plan, expert support is undoubtedly useful. According to the results of the analysis of the implementation of the plan and the recommendations after the internal audit, the need for the specification or change of the measures for the identification of the direc-

tions of activity development is considered. In this case, group decision mode is typical. In order to define the significance of the need for new or improved measures, negotiation mode decision support is also required. So both group decision and negotiation support are necessary. The plans are specified according to the results of the consideration; for that it is helpful to apply the decision-making methods which determine the need for decision support.

The defined regularities of support in accordance with its nature allow making a decision regarding the integrated system of support for the strategic planning in public institutions. The advantage of the latter is the focus on the integrated improvement of the preparation and making of strategic planning decisions.

Conclusions

In the context of transformations, a rational means to increase the efficiency of public institution activity is strategic planning. In order to use such means effectively, it is necessary to solve methodological as well as information provision problems. The results of the methodological problem solution were specified starting from the strategic planning principles and ending with their implementation methods.

In order to solve the information provision problem, it is rational to reveal the DSSs' role; to define the standard structure of the system; to systematize the qualities of the varieties of DSSs; to define the factors which predetermine the requirements for the DSSs of strategic planning; to provide intelligent support to the planning decisions in public institutions.

To generalize the results of the analysis of the factors that determine the role of DSSs, the DSS as an informative computerized system provides thorough information necessary to set, analyse, evaluate alternatives and make the right choice; it also provides a possibility for a purposeful development of prepared information reports in order to choose the most rational means to neutralize the specific problems of management. In order to create better conditions for rational strategic planning, such DSSs should meet the requirements of the universality of the help for the managers of public institutions to prepare alternatives and make planning decisions.

What regards the review of DSSs presented in scientific literature, the most rational list of DSSs from the standpoint of intelligent support specification consists of individual decision support, group decision support, negotiation support and expert system. A detailed analysis of systems from the viewpoint of their ultimate goal, proposal initiative, leading direction, main dialogue direction and other viewpoints allowed defining the main characteristics of DSSs. The defined qualities are treated as conditions which, in the case of applying a certain variety of DSSs, are favourable to the managers of institutions in making decisions under the circumstances of different levels of uncertainty. Considering the defined characteristics of DSSs, it is rational to integrate systems thereby increasing the efficiency of support for their users.

The essential factors determining the requirements for the strategic planning DSSs are as follows: the principle model of strategic planning, the method for the

implementation of its components and the type of relation between the performers. In order to carry out strategic planning in institutions, it is necessary to apply complex intelligent support: individual decision, group decision, expert and negotiation support.

The essence of the proposed methods and models for the solution of strategic planning tasks determines the complex character of intelligent support. The application of an intelligent DSSs developed by following these principles enables public institutions to make rational decisions by providing comprehensive, real-time information, creating conditions to integrate and interpret information.

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VIEŠOJO SEKTORIAUS INSTITUCIJŲ STRATEGINIO PLANAVIMO INFORMACINIO APRŪPINIMO METMENYS

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Santrauka

Siekiant efektyviai taikyti strateginį planavimą kaip priemonę plėtoti viešojo sektoriaus institucijų veiklą, būtina išspręsti metodinio pobūdžio ir kartu informacinio aprūpinimo problemas. Metodinių problemų sprendimas leido sukurti modelį, kuris išreiškia efektyvaus strateginio planavimo koncepciją ir kartu suformuoti racionalios sudėties metodų rinkinius pasiūlytiems strateginio planavimo uždaviniams spręsti. Informacinio aprūpinimo problemos sprendimas leidžia išspręsti racionalaus strateginio planavimo uždavinius siūlomais metodais, panaudojus sprendimų paramos sistemą. Siūloma sprendimų paramos sistema pagrįsta integruotu požiūriu, kurio taikymas leidžia sujungti į vieną visumą paramos elementus, reikalingus planavimo uždaviniams išspręsti įvairaus neapibrėžtumo aplinkos ir vidaus sąlygomis.

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