

## LEGAL DECISION SUPPORT SYSTEM APPLICATION POSSIBILITY IN CORPORATE GOVERNANCE

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**Abstract.** Decision-making that must be supported by specific information or reasoning extensively relies on decision support systems, capable of handling data from multiple sources. Most decision-makers seek to find cost-effective solutions, i.e. mainly focusing on most efficient solutions in economic terms, consequently, it is the economic information that is basically processed and offered for decision-making process by decision support systems, along with economic models. Though businesses focus on the most rational solutions to the management process, other criteria also play an important role, including time costs, confidentiality, and friendly relations with service users, customers, partners and government agencies, etc., thus management decision-making may successfully rely on legal decision support systems. The article presents an overview of legal decision support systems and their potential as regards their application in addressing a wide array of business management issues. The article also focuses on the selection and screening of indicators critical to decision-making, and offers a potential structure for management decision-making.

**Keywords:** decision support system, multi-criteria decision support system, legal decision support system, Multiple Criteria Decision Making (MCDM) methods, business management, corporate governance.

**JEL Classification:** A12; C61; M15.

### Introduction

Fast Internet, intellectual technology growth and usage in recent years has pushed scientists into conflict prevention, also into solution of various process management related issues, using electronic innovations.

In order to facilitate the decision, which for basing needed some information or reasoning acceptance, decision support system is widely used. These systems enable the user to transform enormous amounts of raw data to produce information reports required for the analysis of the tackled problem as well as for decision-making. In the decision-making process, alternatives can be considered from economic, legal, social, technical, political, ethical and other angles. Decision Support Systems Engineering is a general branch of engineering science that deals with solutions on how to create any nature or character of artificial systems. Because practical management system of meeting the needs in Lithuania was applied only in isolated cases, it is possible to agree with the authors that say that so far none of the known methods of modeling of reasoning cannot be sufficiently accurate to simulate the process of legal reasoning. In addition, each process management is often associated

with legal decisions, also legal knowledge of representation formalisms is difficult to understand for lawyers, it is unclear how they can approve and validate these formalism based knowledge legal bases. An engineering way of thinking for lawyers is unusual and strange, so attempts to install formalized solution assessment methods receive active resistance. The term, “engineering” for many people is still linked with traditional engineering disciplines such as, for example, construction or manufacturing.

Despite the difficulties that are encountered in the implementation of legal information systems in practice, the best option for average process management that can be successfully selected and applied is the rule of decision support systems. Decision support system, which can be supported by a variety of sources, has to allow users to transform raw enormous amount of data to solving problem analysis and solution needed information reports. Through various mathematical and logical models, they provide the decision-maker with the information needed to analyse, compile and evaluate possible alternative decision, and subsequently store the derived outcomes. However, in order to identify an appropriate decision support system for

the most rational management decision the most important task is to select an appropriate decision-making method to rely on for the model base of the decision support system.

## 2. Legal decision support systems overview

Traditional informatics provides users with a wide range of measures to support decisions. Among them – best-known decision support systems widely introduced in 1980, that so far has not lost relevance. The aim to use information technology in legal proceedings, inevitably leads to legal ontology, which is a semantic basis for the computerization of performance optimization or legal situation classification, construction (Paliulionienė 2007). However, this task should be left to computer professionals, and this paper is reviewing only the most common decision-support system functioning principles and application possibilities in management processes.

The most frequently chosen option among the alternative rationality leads to not one but more than one criteria, which is not always possible to objectively describe. In such a situation, it is appropriate to use the help of expert decision support systems.

Legal decision support system is distinguished from other information systems by a flexible situation modeling options, necessary data mining, data, knowledge and models of integration, the key results of the decision-making emission characteristics. Legal decision support system performs the following functions:

1. Communication with the solver;
2. Identification of problems using environment or individual objects monitoring;
3. Proposal of problem solving;
4. The justification of decision.

Based on the initial data, and sets of rules, the rule of decision support system detects a situation, “sets diagnosis”, formulates decision, recommends selection of actions. Using various mathematical and logical models, it provides the decision-maker with the information which is needed for analyzing possible solution options, to create and evaluate, make a decision, whereas received results to derive and store. In other words, we can say that decision-making is an iterative process, in which the managing link – an entity, that provides basic data and evaluates calculation results.

Decision-making alternatives can be assessed from economic, legal, social, technical, political, ethical and other positions. Most decision-makers are struggling to find cost-effective solutions,

which means they only are looking for the most economically advantageous solutions, thus many decision support systems process and provide for solutions only the economic information and apply economic models. While businesses are choosing the rational management of the process solution, particular importance is attached and for other criteria – time costs, confidentiality, friendly relationships with service users, social partners, government agencies preservation and so on, thus management decision-making successfully can be applied in legal rule of decision support systems. In order to describe in detail examined decision alternatives, it must be described in terms of economics, legal, social, technical and other quantitative and qualitative indicators. Therefore, in used decision support system database there should be quantitative and qualitative data, that fully characterize a specific process management solution alternatives, whole.

Management problem solving is often applied in expert systems, which from other decision support systems stands out by the fact that it enables to receive expert advice in different areas while the expert himself isn't participating. Expert systems have had evolved as an interactive system; they represent one of decision support system subspecies. The main idea of these systems – instead of high-class expert solving the problems, use a computer system, in which expert knowledge is formed in aggregated heuristic rules. In addition, the expert system can justify its decisions, explain them; sometimes the explanation is more important than the decision itself. Expert systems operating principle is shown schematically in Figure 1:

In foreign scientists works according to which terms of knowledge (data) basis using decision support system process submitted information and offered a solution to the problem, there are excluded several legal decision support system subspecies:

1. Rule-based;
2. Case-based;
3. Hybrid.

For example, internationally renowned legal decision-making system MELDMAN rules help an action is defined, and then, based on the precedents (similar solved cases) solutions are proposed. Details and links, are used to convey everyday problems and are hierarchically divided into categories. Real details immediately are compared and links with the precedents established. The system sets the precedent case, closest to the problem analyzed.

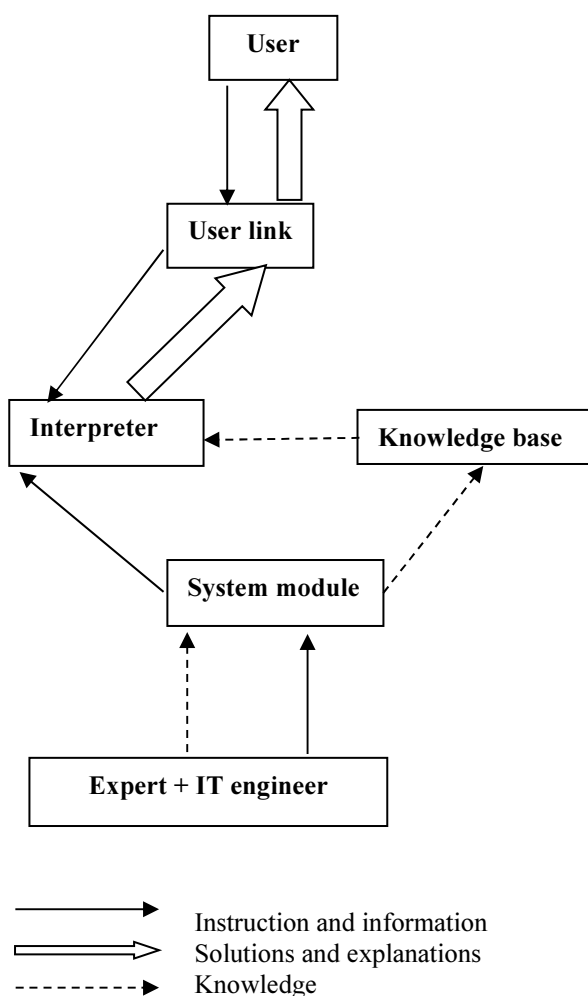


Fig. 1. Expert systems operating principle  
(Source: Keršulienė 2008)

In the Taxman I system rules-based model was used. The system is designed for decision-making in corporate taxation matters. In another created modification of this system TAXMAN II without the rules in use are also the precedents (McCarty 1980).

For the TAXADVISOR system creation EMYCIN shell was used. Purpose of the System – decision making land tax administration (e.g. Michaelsen, Michie 1983).

For the decision support systems analysis, a lot of attention in their works is given by foreign authors like Zeleznikow, Risk (2002), Zeleznikow (2002), Horvath, Harazin (2015), Bellucci, Zeleznikow (2004), e.g. Davidson *et al.* (2015), e.g. Murla *et al.* (2016), e.g. Bokovec *et al.* (2015), Susnea (2013), e.g. Milea *et al.* (2013), e.g. Ivanov, Knyazkov (2014), e.g. Stalidis *et al.* (2015). Summarizing these scientists work performed research in legal decision support systems, their comparative analysis, it is possible to discern

some of the most commonly used and the most known legal ones, which are related to management decision-making decision support systems (Table 1):

Table 1. Legal decision support systems  
(Source: Keršulienė 2008)

System name	Scope
<b>Standards-based:</b>	
JUDITH	German Civil Code Regulates relations
TAXADVISOR	Real estate planning and taxes
SARA	Legal judgments/decision analysis
TAXMAN I	The aid that deals with corporate tax issues
PROLOG	Lawmaking
GetAid	Legal aid
<b>Facts (precedents) are based:</b>	
CATO	Consulting legal dispute procedural matters
FINDER	Legal counseling
HYPO	Helps in developing originating legal arguments disputes/cases
<b>Mixed:</b>	
SHYSTER	Legal dispute (case) studies: to identify similarities and differences
TAXMAN II	Improved TAXMAN I version, conditions (circumstances) dynamics assessment
MELDAM	Dispute Resolution
CABARET	Tax Law
GREBE	Pay for harm of workers questions

Legal decision support systems differ from other information systems in terms of their possibilities of flexible situation modelling, mining of required data, integration of data, knowledge and models, short-listing key outcomes relevant to decision-making as well as reasoning behind decision alternatives. Quite a lot of various decision support systems are created that help the user to orient in various legal issues labyrinths. Choosing one of these systems can be quite a challenge for the user. Of course, no method is absolutely the best, so when choosing, a prospective user should follow the logic of its surroundings, its limitations, its aims and methods of analysis feature.

### 3. Legal decision support systems application possibility in corporate governance

For specialized decision support systems for various question solving in expert subsystem there should be four basic rules and procedure categories:

1. Establishing of alternative solutions.
2. Formation of system describing alternative criteria, values and weights. This category consists of sets of rules which for devised alternatives submits them describing a system of criteria, the criteria values and significance.
3. Establishing priorities of alternatives, the degree and value of helpfulness, the subsystem rules would propose which alternatives and the reasons why it is worth further analysis. The main objective of this set of rules – on the basis of involved decision-making bodies chosen criteria to determine the most rational solutions.
4. The detailed and reasoned bargaining email and web site creation for each participating party in decision-making. Using from the previous calculations obtained information and pre-defined rules and procedures, expert subsystem for each of the users would train one e-mail message, which reasonably propose to choose one of the alternatives decisions. This e-mail message would also come with links to the calculations. But the most important task, if one wants to identify an appropriate decision support system for managing the most rational decision is to choose the appropriate decision-making method on which decision support system model base selection should be based.

Many of the decisions cannot be accurately predicted or estimated. One can only assume that such a decision variant conditions to the best results (Larichev 2000). A good solution means that we are well informed and have the necessary critical information that leads to the decision that we want to take (Sauter 1997). This information can be expressed in figures, facts, pictures, etc. means.

Countries, which are interested in their management decision and are participating in the decision-making, often have conflicting objectives, in addition, each of the parties also may simultaneously seek not one, but several goals (timeliness, cost, confidentiality, etc.), so the most cost-effective management solution selection should use approaches that are suitable and can deal with tasks for multiple functions tailored. This condition satisfies Multiple Criteria Decision Making (MCDM) methods, which are divided into two groups:

1. Multi Objective Decision Making (MODM) which is used in vector crest trouble solving (Andersen 2000).

2. Multi-Attribute Decision Making, (MADM) is devoted for individual solution searching.

These methods are classified according to various characteristics. One of the classification options – the distinction between classical and technical methods. Classical methods base is created on weak seniority principle, which allows to evaluate the importance of indicators. This allows to find all of alternative rankings seeking to find the most rational alternative. Technological methods include Outranking and Fuzzy-set methods.

A system settlement procedure could look like this (e. g. see Fig. 2).

Multiple criteria decision-making methods can also be divided into compensatory and not compensatory. In the methods of compensating, one target function significance decrease can be compensated by other objective function significance increases. In this case, compensation varies depending on the type of analyzed problem and decision-makers.

Other methods of classification option – by information which can support decision-making process and the nature of certainty.

Multicriteria method comprehension, knowledge calculation of algorithm method, lets decision makers be more confident in the solutions that decision support systems proposed. Intellectual decision support system provided data analysis covers these data processing algorithms seeking to identify trends, patterns, relationships and process development prospects. In all modern decision support systems used intellectual analysis methods are a logical result of a variety of analytical tests (Trakhtengerts 2003).

Multicriteria methods for several decades analyzes many scientists of the world (e.g. Mahmoud, Garcia 2000; Olson 2001; e.g. Zavadskas *et al.* 2001; e.g. Larichev *et al.* 2002; e.g. Turskis *et al.* 2013).

### 4. Indicators that describe ways of management solution and their importance determination

If one wants using decision support systems help to establish a rational management approach in the system database it is necessary to piece together solutions of the alternatives, list these following alternatives described criteria, define them in quantitative or qualitative characteristics and set criteria priorities.

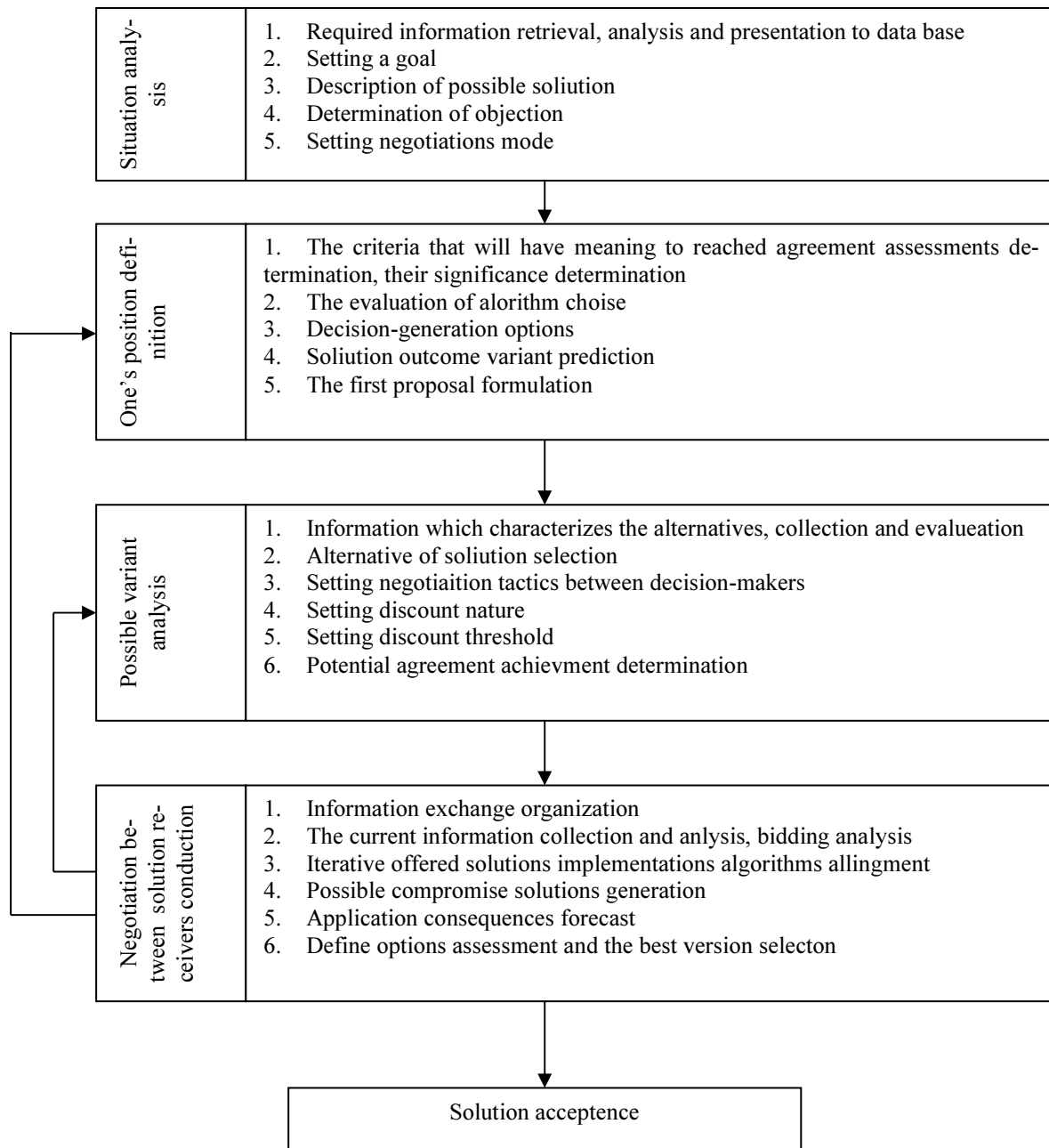


Fig. 2. The proposed management decision-making structure (Source: Keršulienė 2008)

In order to determine which of the alternatives mentioned are ones of the most important criteria for the assessment, using questionnaires to survey companies (corporate representatives) can be done. Criteria for determining the significance of the values and methods can be divided into two groups:

- *Quantitative methods* – by applying, the criteria can be expressed in monetary equivalent
- *Qualitative methods* – by applying, the criteria do not give monetary expression.

With initial data on the importance of the criteria, it is necessary to sample these variables and determine the selection criteria weights. Materiali-

ty shows the number of times one or the other criteria are more important than another criterion. The selection of indicators and weights determination process is shown schematically in Figure 3.

Respondents are showing a lot of different factors that determine the choice of solution, sufficient accuracy to evaluate a smaller number from 3 to 10 key indicators. Their weights determined in accordance with Figure 3 shown algorithm.

When dealing with the company's collegial management decision-making bodies of rationality, it is necessary that these control organs release reasoned opinions, and position coordination. This task is successfully implemented in a group decision

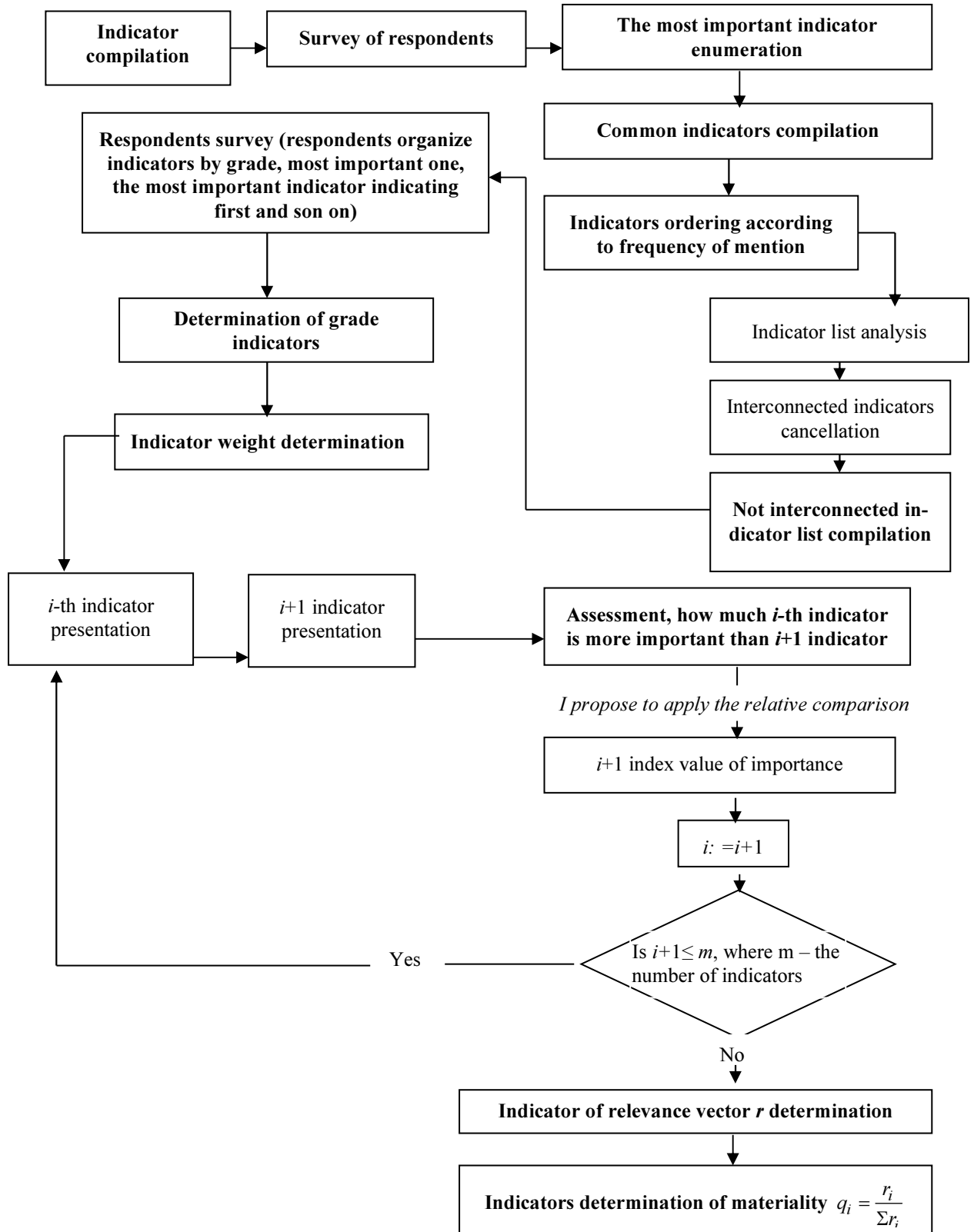


Fig. 3. Indicators selection and weight detection scheme (Source: Keršulienė 2008)

support system. Their decision-making procedure is more complex than individual decision-making. Often these systems are split up into separate negotiation support systems category.

## 5. Conclusions

The rule of decision support systems can be successfully applied for rational management chosen decisions.

Increase in competition among enterprises, corresponds with growth in disputes between companies providing similar services, or in the same sector working companies. The minor disputes settlement will always earn to adapt the summary procedures which have been marked with their delivery speed, low cost and efficiency. The Internet offers great opportunities to achieve this.

The proposed management decision-making structure can be used for practically realizing the legal decision support systems of corporate governance processes.

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