


# Meaning of quantitative methods in managerial decision making

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## Význam kvantitatívnych metód v manažérskom rozhodovaní

**Henrieta Hrablik Chovanová<sup>1</sup>, Dagmar Babčanová<sup>2</sup>**

<sup>1</sup>*Slovenská Technická Univerzita Bratislava, Materiálovotechnologická fakulta so sídlom v Trnave, Ústav priemyselného inžinierstva a manažmentu, [henrieta.chovanova@stuba.sk](mailto:henrieta.chovanova@stuba.sk)*

<sup>2</sup>*Slovenská Technická Univerzita Bratislava, Materiálovotechnologická fakulta so sídlom v Trnave, Ústav priemyselného inžinierstva a manažmentu, [dagmar.babcanova@stuba.sk](mailto:dagmar.babcanova@stuba.sk)*

rozhodování

informace

řízení

kvantitativní metody

### Abstrakt

Riadenie podnikov je veľmi zložitý proces, ktorého najnáročnejšou zložkou je rozhodovanie. Rozhodovanie je teda jednou z najvýznamnejších aktivít, ktoré sú realizované manažérmi v organizáciách. S rastúcim konkurenčným tlakom na trhoch Európskej únie sa nevytvára priestor na žiadne nesprávne rozhodnutie. V súčasnom období prežijú len podniky, ktorých manažéri prinášajú v správnom čase správne rozhodnutia. Pre uskutočňovanie takýchto rozhodnutí sú nevyhnutnou podmienkou informácie a taktiež schopnosť manažérov rozhodnúť sa. Tento článok zdôrazňuje dôležitosť informácií, metód (kvantitatívne metódy) používaných pri rozhodovaní riadiacich zamestnancov - manažérov, ako aj prípravu manažérov pre rozhodovanie.

V článku sú použité výstupy z výskumnej úlohy VEGA 1/2601/05 „Rozvoj podnikového manažmentu a rozhodovacích procesov v podmienkach integrácie“ (vedúci projektu: doc. Ing. Ľuboslavovi Szabovi, CSc.), výsledky sú interpretované bez priamej účasti autoriek článku na danom výskume. Tento článok je doplnením k článku, ktorý bol publikovaný v časopise JOSRA 1/2014 (Manažér a rozhodovanie).

**Kľúčové slová:** riadenie, rozhodovanie, kvantitatívne metódy, exaktné metódy, informácie

### Abstract

Managing companies is a complex process whose most difficult component is decision making. Decision making is one of the most significant activities, which are realized by managers at organizations. As competitive strain grows in markets of the European Union, no room for incorrect decision is to be created. At present time only companies with their managers bringing right decisions at right time can survive. Essential conditions for making these decisions are

information as well as ability of managers to decide. The article emphasizes importance of information, methods (exact methods) used in making decisions by managerial employees – managers as well preparation of managers for decision making.

The article uses outcomes from research task VEGA 1/2601/05 „Rozvoj podnikového manažmentu a rozhodovacích procesov v podmienkach integrácie“ („Development of company management and decision making processes in conditions of integration“, project leader: doc. Ing. Ľuboslav Szabo, CSc.), results are interpreted with no direct attendance of female authors of the article within given research. The article connects to article that was published in magazine JOSRA 1/2014 (The manager and making of decision - Manažér a rozhodovanie).

**Keywords:** control, decision making, quantitative methods, exact methods, information

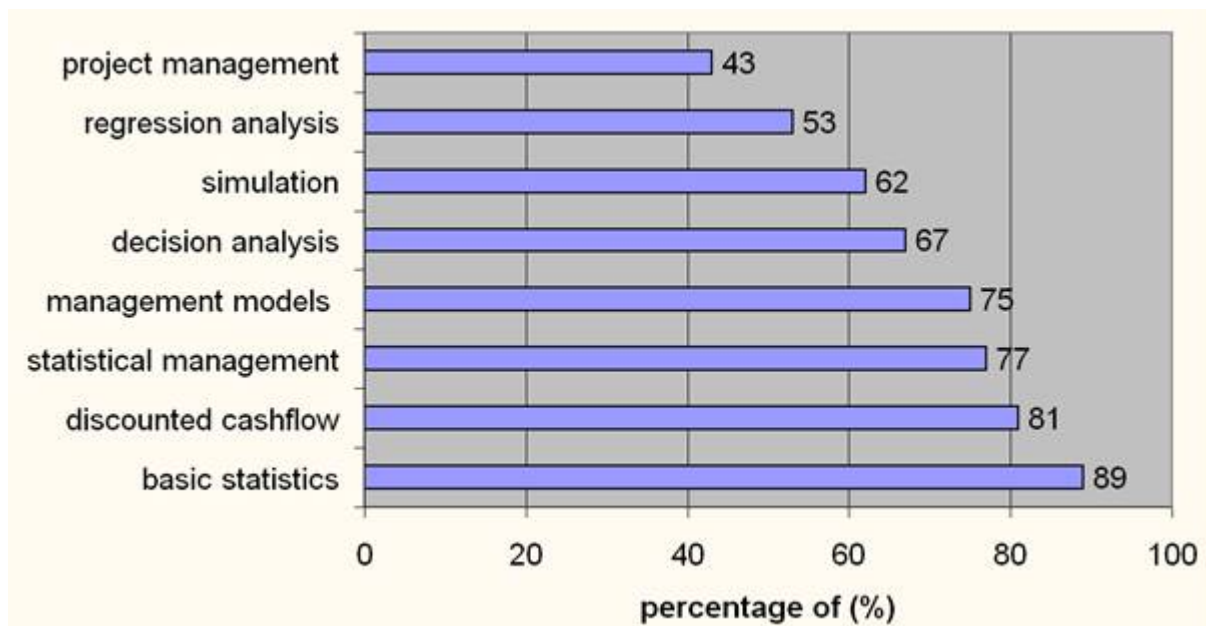
## Introduction

If companies want to survive in current turbulent economic situation, their prosperity is dependent mainly on company management's timely and correct decision making about acquiring and volume of financial, raw material, material flows, working effectiveness of respective work places and employees in production, on stock management and sales, efficient use of machines and equipment, localization of suppliers, clients and transportation, on the environment in which the company operates as well as other factors.

The system of decision making and planning at company must continually improve itself as the research and techniques develop. New methods based on mathematics and its applications now begin to be applied in order to solve economical problems at companies.

Modeling of managerial decision-making tasks becomes significant tool for solving managerial problems. Exact approaches together with information technologies have become decisive impulse and a principle of development of quantitative methods in management of industrial plants. Scientific discipline that includes collection of quantitative approaches and methods for managerial decision making is operational analysis (operational research).

Quantitative methods enable approaching particularly at micro economical level significant economical results and therefore their importance is continually rising. In practice it is important to connect quantitative methods with qualitative methods, which are built on managers' experience. Development of information technologies has brought about rise of importance of quantitative methods, referring to enormous possibilities of application of quantitative methods through intelligent software products. Researches in field of quantitative methods used at companies reveal their use as follows fig. 1. (Metódy ekonomickej analýzy)



**Fig. 1. Use of quantitative methods at companies (Metódy ekonomickej analýzy)**

Meaning of quantitative (economical-mathematical) methods at industrial plants (Metódy ekonomickej analýzy):

- ✦ they are an important tool of decision making,
- ✦ they solve optimisation of structural relations of respective companies,
- ✦ they are fundamentals for making optimal decisions,
- ✦ they are an important tool of effective management,
- ✦ they are decisive for improving of corporates competitiveness,
- ✦ they ensure achieving of maximum affectivity of management,
- ✦ they ensure fed back for company management.

Following paragraph contains processing of results of research task VEGA (1/2601/05) “Development of plant management and decision processes in conditions of integration” (project leader doc. Ing. Ľuboslav Szabo, CSc.), which were published by the author Ing. Henrieta Hrablik Chovanová, PhD. on conference “Business and Management 2012” (May 10-11, 2012, Vilnius, LITHUANIA), and in article there are listed to replenish the article Manažér a rozhodovanie JOSRA 01/2014.

### Survey of managerial decision

Within the project VEGA (1/2601/05) “Development of plant management and decision processes in conditions of integration” (project leader doc. Ing. Ľuboslav Szabo, CSc.) a questionnaire survey was made in Slovakia with main target to describe factors which influence managerial decision and to identify most frequent mistakes which are done by managers in decision making.

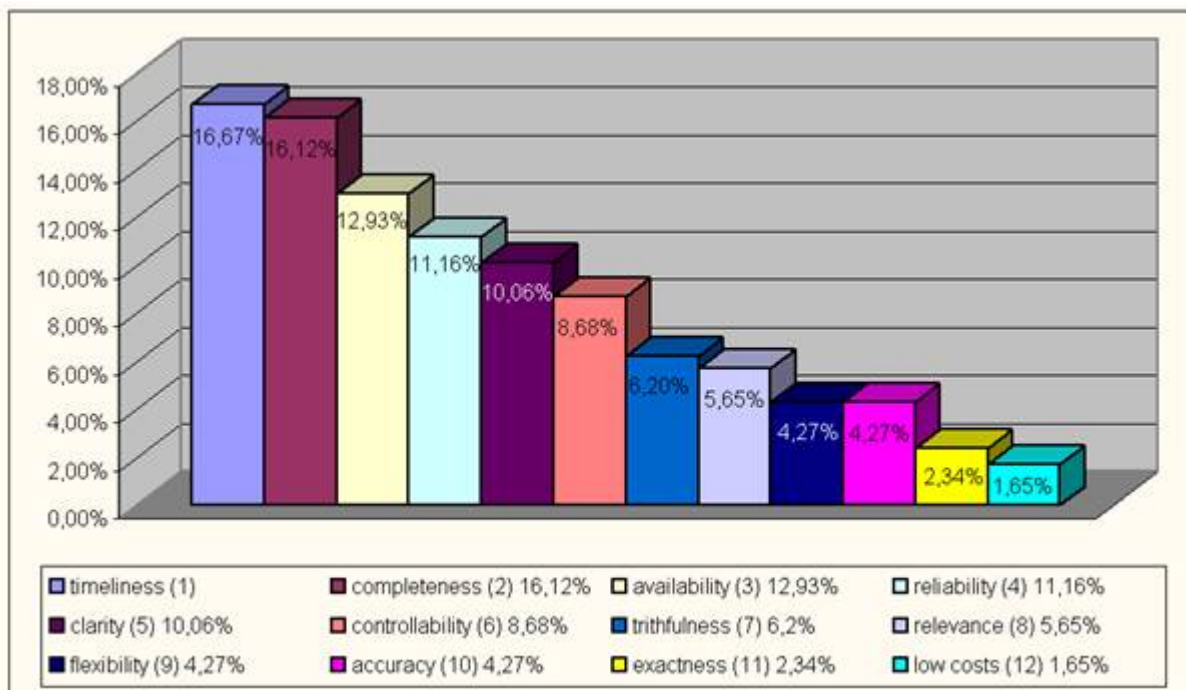
Survey sample consisted of 264 managers active in Slovakia at various level at organizations and within various specializations. The survey focused on fields as follows: sources of information needed for decision making and their form, ways of acquiring information and use of respective types of information systems for support of decision making processes. Brief characteristics of survey, that was processed by (Szabo, 2008), is described further in article.

Decision making does not depend on available information only, it also depends on **knowledge, skills and experience** of “decision maker”, which enable smaller information need in problem solving in cases they met similar

problem already and their decision that time was correct, or in case of an incorrect decision feedback was afterwards successfully used.

During the survey most important features of information (fig. 2) were being ascertained, which are:

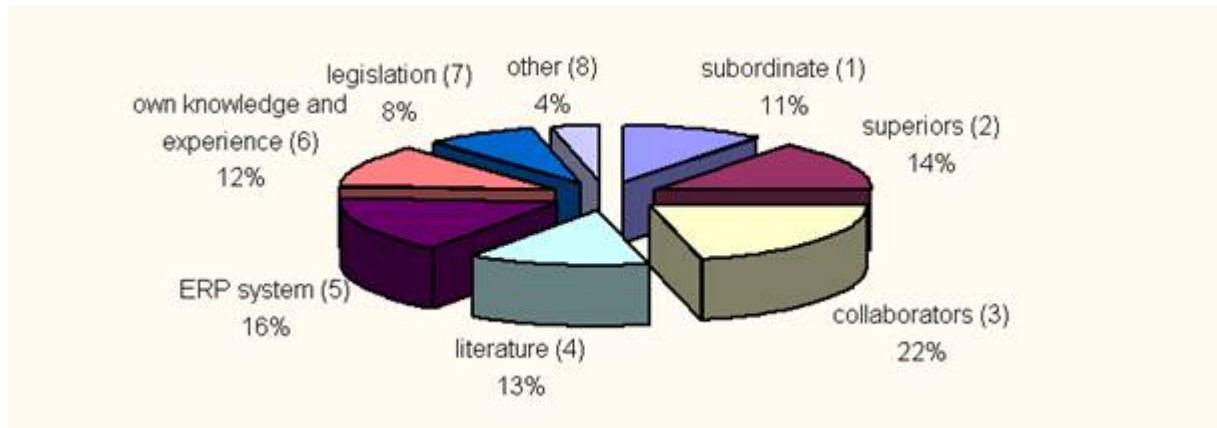
- ✦ timeliness (16,67 %),
- ✦ completeness (16,12 %),
- ✦ availability (12,93 %),
- ✦ reliability (11,16 %),
- ✦ clarity (10,06 %),
- ✦ controllability (8,68 %),
- ✦ truthfulness (6,20 %),
- ✦ relevance (5,65 %),
- ✦ flexibility (4,27 %),
- ✦ accuracy (4,27 %),
- ✦ exactness (2,34 %),
- ✦ low costs (1,65 %).



**Fig. 2. Most important features of information in % (Szabo, 2008)**

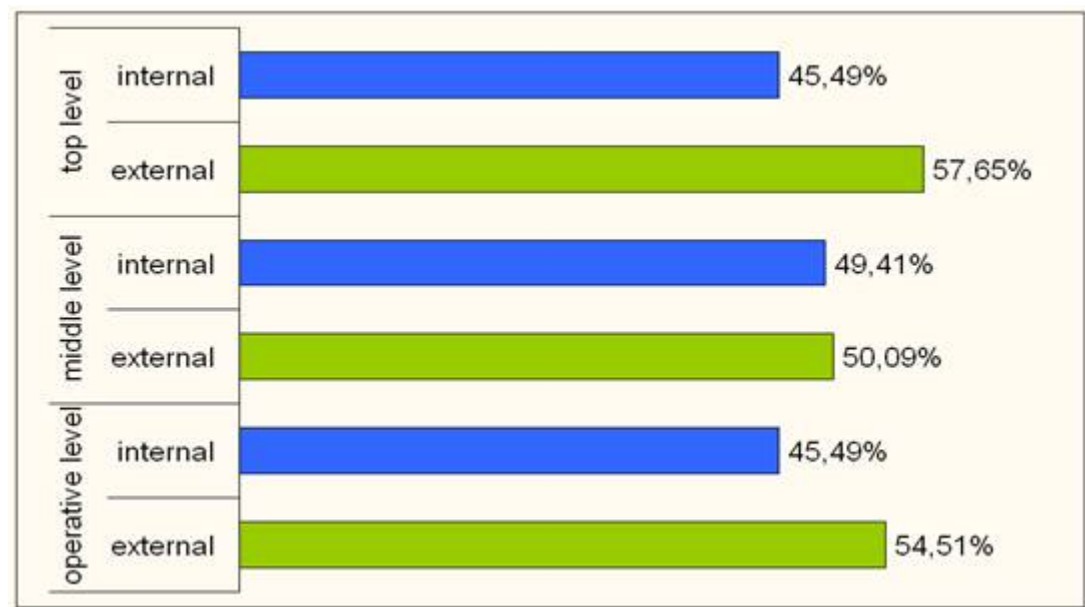
From mentioned it follows, that managers consider in time delivery its timeliness of information as most important aspect of information, which however cannot be at cost neither of its reliability nor truthfulness. Low cost spent on acquiring information is not considered especially noticeable requirement by managers, whilst majority of companies has their information systems (IS). IS help in decision making and expenses for its acquiring and consequent maintenance are not negligible.

Most important sources of information considered by managers are shown in fig. 3. More than a fifth of managers said, they mostly use own knowledge and experience. From picture also follows that they use subordinates information potential in a not sufficient extent (only a one tenth). This fact is remarkable mainly thanks to tendency of filling managerial positions with generalists, which are surrounded by specialist from various fields.



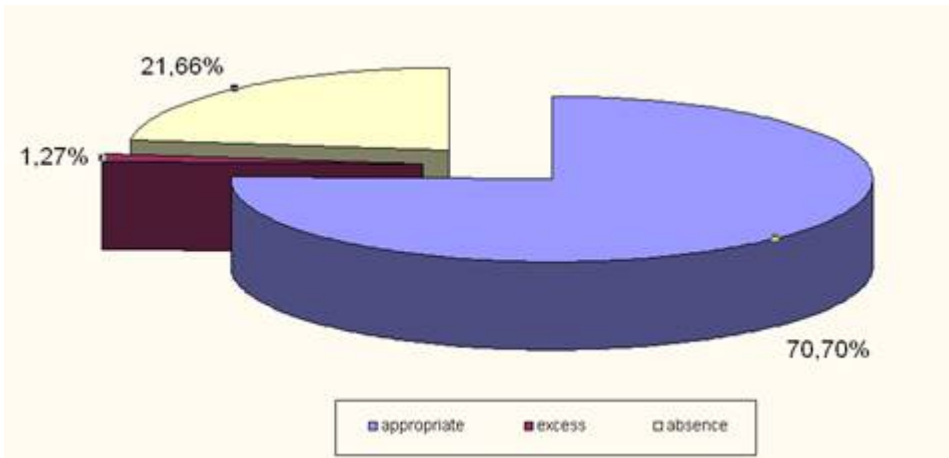
**Fig. 3. Resources of information for managerial decision making (Szabo, 2008)**

From survey results it follows that managers rely in biggest extent on themselves, they prefer own experience and intuition. From their statements it also follows that they acquire more than a half of information from external environment if company independently of levels they are working in (fig. 4).



**Fig. 4. Ratio of internal and external sources of information for decision making process in % (Szabo, 2008)**

From fig. 5 it follows that more than three fourths of managers consider available amount of information for decision sufficient. Some of surveyed managers feel that part of given information is not relevant for them and it unnecessarily loads them. In this relation also results of other surveys become interesting which say that not every additional information brings about a better decision.



**Fig. 5. Amount of information for making a decision (Szabo, 2008)**

The survey has been detecting also the way how managers use information systems (table 1).

| Type of information system                 | IS are available<br>(no. of managers) | IS are used by<br>(no. of managers) | Relative use of<br>IS (use/availability in %) |
|--|---------------------------------------|-------------------------------------|---|
| Company information system<br>(PIS)        | 217                                   | 213                                 | 98,04   |
| Managerial information system<br>(MIS)     | 91                                    | 75                                  | 82,81   |
| Decision supporting system<br>(DSS)        | 45                                    | 39                                  | 87,50   |
| Group decision supporting<br>system (GDSS) | 13                                    | 12                                  | 88,89   |
| Expert system (ES)                         | 18                                    | 11                                  | 61,54   |
| Executive information system<br>(EIS)      | 10                                    | 7                                   | 71,43   |

**Table 1. Availability and use of IS to support decision-making processes (Szabo, 2008)**

Based on answers it also followed that as many as 91,07 % of companies has IS, but they are using in small extent additions for support of decision making (some managers are not using it at all).

Based on further similar surveys it follows that these are possible reasons of incorrect company decisions:

- ✦ low possibility of finding whether company uses all its opportunities in management and deciding,
- ✦ not sufficient availability or abilities of suitable "decision makers",
- ✦ communication problems,
- ✦ in some cases still remaining not sufficient support form company management,
- ✦ lack of compelling vision/strategy,
- ✦ IT/IS are not used for supporting decision making,

- ✦ No use of “simulation environment” in decision making, simulation is still being done on real models however simulation would significantly decrease costs in incorrect decisions,

“decision makers” are not trained enough for methods for supporting decision making, vast majority of them decides “only” based on their own experience and knowledge, etc.

## Conclusion

Managers at present time are oriented to solving operational problems, which bring immediate effect for company. For solving of company decision making problems, e.g.: optimal production management, optimal stock management, creating of company information database and others, traditional deterministic models of operational analysis are being used. That is the reason why it is important to prepare managerial employees for the practice by teaching them how to use available methods which would make them do right decisions.

Many universities has in their study programs subjects which teach and prepare graduates to do decisions they will face in their professional lives. Students/graduates then are able to decide not only based on recommendations from their environment, but after using a suitable exact method they can confirm/contradict correctness of their decision.

Fields, where exact methods are being used, are continually extending, they are e.g.: planning and management of production, optimisation of production program, optimisation of transportation, management of a group of complex and each other following activities etc. Therefore, it would be suitable to create conditions for implementing/use also for companies which are not using exact methods yet, by:

- ✦ to create an environment for communication to business practice about need and advantages of use of exact methods in their decision making,
- ✦ to extend the use of exact methods (methods of operational research) in business practice and at universities,
- ✦ to create conditions for training employees/decision makers and ensure consultancy support,
- ✦ to extend and make more detailed the preparation of qualified employees for the practice,
- ✦ to extend co-operation between universities and leading Slovak and foreign companies,
- ✦ to extend research in field of new methods and ensure fast transformation of suitable methods into conditions of business practice.

Aforementioned findings open up new research possibilities, because it would be suitable to find out whether companies in Slovakia (abroad) are using quantitative/exact methods and how they use them, which areas of management they appear most often in, what is the ratio of respective quantitative/exact methods on solving decision making tasks at companies etc.

## Acknowledgement

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Autor článku:

[Ing. Dagmar Babčanová, PhD.](#)

[Ing. Henrieta Hrablik Chovanová, Ph.D.](#)