

GDK 791.2 + 791.4

Prispelo / Received: 12.11.2003

Sprejeto / Accepted: 24.11.2003

Izvorni znanstveni članek

Original scientific paper

## INTUITIVE DECISION-MAKING IN A MODEL OF INTEGRAL DECISION-MAKING SCHEME

Leon OBLAK\*, Igor LIPUŠČEK\*

### Abstract

A model of integral decision-making scheme is presented, combining positive attributes of contemporary approaches. Intuitive decision-making was integrated into the model as well. With the aid of analysis carried out in twelve wood industry enterprises in Slovenia, we tried to establish on what basis the managers of Slovene woodprocessing firms make their decisions and what is their knowledge as far as the possibility of using intuition in decision-making is concerned. A comparison of the obtained results with the current world trends in the sphere of decision-making has shown that the process of decision-making in Slovene woodworking companies is fairly conservative and that with additional training of the existing management the decision-making processes could be substantially improved.

**Gljučne besede:** wood industry, intuitive decision-making, model of integral decision-making scheme

## INTUITIVNO ODLOČANJE V MODELU CELOSTNE ZASNOVE ODLOČANJA

### Izveček

*V raziskavi smo oblikovali model celostne zasnove odločanja, ki integrira dobre lastnosti sodobnih pristopov, pri čemer smo v model vgradili tudi intuitivno odločanje. S pomočjo analize, ki je bila opravljena v dvanajstih lesnoindustrijskih podjetjih v Sloveniji smo proučevali, na osnovi česa se managerji v slovenskih lesnoindustrijskih podjetjih odločajo in kakšno je njihovo poznavanje možnosti uporabe intuicije pri odločanju. Primerjava dobljenih rezultatov s trendi na področju odločanja v svetu je pokazala, da je proces odločanja v lesnoindustrijskih podjetjih v Sloveniji dokaj konzervativen in da se lahko z dodatnim izobraževanjem sedanjega managementa procesi odločanja bistveno izboljšajo.*

**Key words:** lesna industrija, intuitivno odločanje, model celostne zasnove odločanja

---

\*

Biotehniška fakulteta, Oddelek za lesarstvo, Rožna dolina, C.VIII/34, 1000 Ljubljana, SVN

**VSEBINA**  
**CONTENTS**

|          |   |     |
|----------|---|-----|
| <b>1</b> | <b>INTRODUCTION AND THEORETICAL<br/>BACKGROUNDS</b> ..... | 183 |
|          | UVOD IN TEORETIČNA IZHODIŠČA                              |     |
| <b>2</b> | <b>THE RESEARCH OBJECTIVES AND METHODOLOGY</b> ..         | 184 |
|          | CILJI IN METODOLOGIJA RAZISKAVE                           |     |
| <b>3</b> | <b>THE RESEARCH RESULTS</b> .....                         | 185 |
|          | REZULTATI RAZISKAVE                                       |     |
| <b>4</b> | <b>MODEL OF INTEGRAL DECISION-MAKING SCHEME</b> ..        | 189 |
|          | MODEL CELOSTNE ZASNOVE ODLOČANJA                          |     |
| <b>5</b> | <b>DISCUSSION AND CONCLUSIONS</b> .....                   | 193 |
|          | RAZPRAVA IN SKLEPI  |     |
| <b>6</b> | <b>POVZETEK</b> .....                                     | 194 |
| <b>7</b> | <b>REFERENCES</b> .....                                   | 196 |
|          | VIRI  |     |

## **1 INTRODUCTION AND THEORETICAL BACKGROUNDS**

### **UVOD IN TEORETIČNA IZHODIŠČA**

In the last few years, some great changes have taken place in the sphere of technology development, organisation and philosophy of company management. In spite of the highly developed technology, the decision-making is still in the hands of people, who with their knowledge, capacity and experience manage various business systems. In the conditions of a limited availability of production factors and the existing operational conditions we can exert influence on business performance mainly through improved autonomous part of the management process – the process of decision-making.

Decision-making is the basic managerial activity at all business levels. The decision-making process and thus the quality of decisions is influenced by numerous objective factors (trading result, costs, profitability) as well as subjective factors (intuitive decision evaluation, assessment of how ethical a certain decision is, and assessment as to its quality) that cannot be quantitatively defined in full. As use of merely quantitative methods is therefore questionable, subjective evaluations must be also taken into account in decision-making, i.e. evaluations on the basis of intuition and feelings, and in combination with a logical analysis (POTOČNIK / JELAČIĆ / OBLAK 2003).

Managers often cannot make decisions in the way scientists do, i.e. on the basis of a well-planned and rational analysis, but do so on the basis of intuitive judgement. The term intuition does not denote something that is adverse to reason, but something that is outside its sphere (VILA 1998). Intuition could be also defined as direct comprehension, perception of the essence of something, independently of a rational analysis, or as an inspiration. In practice we often recognise a certain matter intuitively, but are afraid to act by our intuition. We think that we have to wait, to gather more facts, to get better acquainted with the matter, and this is why we hesitate and use too much time before making our final decision, due to which we lose a good business opportunity.

Tavčar (1995) separated managerial decision-making into routine, analytic and intuitive decision-making. Routine decision-making is performed normatively (according to certain rules). Analytic decision-making takes place on the grounds of studying the matter (based on knowledge) in more complex circumstances. Intuitive decision-making

is used directly or when all other possibilities of decision-making have failed. A foundation for this is made in the decision-maker's subconsciousness. From the aspect of managerial levels, a high share of intuitive decision-making comes from higher management, as it has to be mastered with personnel selection (capable and talented managers). At the implemental level, the share of intuitive decision-making is smaller; for here the decision-making is carried out normatively and under control.

## **2 THE RESEARCH OBJECTIVES AND METHODOLOGY** **CILJI IN METODOLOGIJA RAZISKAVE**

The research objectives were:

- To study the so far acquired cognitions in the sphere of subjective evaluations in decision-making at different management levels and to ascertain, in practice, the state of decision-making processes in twelve Slovene woodprocessing companies.
- To prepare a model of integral decision-making scheme, which would integrate the positive characteristics of contemporary approaches and in decision-making process consider the subjective, intuitive evaluations, apart from quantitative ones.

The importance of subjective evaluations in decision-making within woodworking companies was ascertained with a questionnaire, which helped us to establish the state of decision-making processes in the studied companies, and at the same time showed us the way of how to use alternative techniques in support of decision-making in wood industry enterprises. Considering that managers of this type of firms, too, are confronted with most diverse situations in decision-making, the introduction of integrated decision-making techniques is most appropriate in this branch of industry as well. The questionnaire was handed over to executive, senior and junior managers in twelve Slovene woodprocessing companies. It contained seven questions related to the use of intuition, emotional intelligence and pure intelligence in decision-making. The questions were as follows:

1. How many decisions do you make on the grounds of subjective factors (intuition, your own judgement of their ethic decency, feelings)?
2. In how many cases do you resort to emotional intelligence in problem solving (solving problems as a whole, relying upon empirical patterns, feelings)?
3. In how many cases do you resort to intuition, when dealing with high degree of uncertainty?
4. In how many cases do you resort to intuition, when no similar cases from the past are known?
5. In how many cases do you resort to intuition, when facts do not show a clear way out?
6. In how many cases do you resort to intuition, when time is limited and you are under pressure to make a quick decision?
7. In how many cases do you resort to intuition, when there are several alternatives at hand, with good arguments for each of them?

### 3 THE RESEARCH RESULTS REZULTATI RAZISKAVE

With the aid of the questionnaire, which was handed over to the management of twelve Slovene wood industry firms and, within each of them, to three managers at different levels of decision-making (36 managers), we tried to ascertain what is the role of intuition and subjective evaluations in decision-making processes at different levels of management.

Answers to the given questions were given in % (rounded up to 10%). The analysis of their answers is presented in Tables 1-5, where arithmetic mean of the received answers, minimum and maximum values and standard deviation (which denotes variability of the answers) are given.

$$M = \frac{1}{N}(y_1 + y_2 + \dots + y_N), \quad \sigma = \sqrt{\frac{1}{N} \sum (y_i - M)^2} \quad \dots (1)$$

M – arithmetic mean  
 N – no. of data  
 $y_i$  – data values  
 $\sigma$  – standard deviation

Table 1: Decisions made on the grounds of subjective factors

*Preglednica 1: Odločitve, sprejete na podlagi subjektivnih dejavnikov*

| Management level / <i>Raven managementa</i>         | M (%) | Y <sub>min</sub> (%) | Y <sub>max</sub> (%) | σ (%) |
|---|-------|----------------------|----------------------|-------|
| Strategic management / <i>Strateški management</i>  | 24    | 10                   | 30                   | 7     |
| Tactical management / <i>Taktični management</i>    | 18    | 10                   | 30                   | 6     |
| Operative management / <i>Operativni management</i> | 16    | 10                   | 40                   | 12    |
| Arithmetic mean / <i>Aritmetična sredina</i>        | 19    |                      |                      | 8     |

At all management levels, decisions are made mostly on the grounds of objective factors (explicit numerical indicators, costs, business result, etc.), and only in 19% (on average) on the grounds of subjective factors. As expected, the subjective factors are to the greatest extent present in decision-making at the strategic level, although the percentage (24%) is very low. Standard deviation indicates the actual deviations between the respondents. The greatest deviation was noted between the evaluations of the managers who make decisions at the operative level.

Table 2: Use of emotional intelligence in problem solving

*Preglednica 2: Uporaba čustvene inteligence pri reševanju problemov*

| Management level / <i>Raven managementa</i>         | M (%) | Y <sub>min</sub> (%) | Y <sub>max</sub> (%) | σ (%) |
|---|-------|----------------------|----------------------|-------|
| Strategic management / <i>Strateški management</i>  | 26    | 10                   | 50                   | 15    |
| Tactical management / <i>Taktični management</i>    | 15    | 10                   | 30                   | 7     |
| Operative management / <i>Operativni management</i> | 18    | 10                   | 30                   | 9     |
| Arithmetic mean / <i>Aritmetična sredina</i>        | 20    |                      |                      | 10    |

At all management levels, use of pure intelligence in problem solving (through their breaking-down to subproblems and dealing with them in logical sequence) prevails over emotional intelligence. Quite interesting, however, are the answers given by the managers, who make decisions at the strategic level. The standard deviation, which is very high (15%), clearly indicates that some managers are aware of the meaning of use of emotional intelligence and that some are not. To wit, two managers answered that they use emotional intelligence in no less than 50%, one in 40%, three in 30% and two in 20%, while four managers rely upon empirical patterns and feelings in problem solving only in 10% of the cases. It is also interesting that managers, who are responsible for

problem solving at the operative level, make use of their emotional intelligence more often than those at the tactical level.

Table 3: Use of intuition as an aid in decision-making at the strategic level

*Preglednica 3: Uporabe intuicije, kot pomoč pri odločanju na strateškem nivoju*

| Cases when intuition is used / <i>Primeri uporabe intuicije</i>   | M (%) | Y <sub>min</sub> (%) | Y <sub>max</sub> (%) | σ (%) |
|---|-------|----------------------|----------------------|-------|
| When dealing with high degree of uncertainty /<br><i>Ko gre za visoko stopnjo negotovosti</i>           | 71    | 60                   | 80                   | 8     |
| When no similar cases from the past are known /<br><i>Ko ni znanih podobnih primerov iz preteklosti</i> | 69    | 60                   | 80                   | 9     |
| When facts do not show a clear way out /<br><i>Ko dejstva ne kažejo jasne poti</i>                      | 64    | 60                   | 80                   | 7     |
| When time is limited /<br><i>Ko je čas omejen</i>   | 73    | 60                   | 90                   | 13    |
| When several good alternatives are at hand /<br><i>Ko obstaja več dobrih alternativ</i>                 | 72    | 60                   | 90                   | 10    |
| Arithmetic mean / <i>Aritmetična sredina</i>  | 70    |                      |                      | 9     |

Table 4: Use of intuition as an aid in decision-making at the tactical level

*Preglednica 4: Uporabe intuicije, kot pomoč pri odločanju na taktičnem nivoju*

| Cases when intuition is used / <i>Primeri uporabe intuicije</i>   | M (%) | Y <sub>min</sub> (%) | Y <sub>max</sub> (%) | σ (%) |
|---|-------|----------------------|----------------------|-------|
| When dealing with high degree of uncertainty /<br><i>Ko gre za visoko stopnjo negotovosti</i>           | 61    | 50                   | 80                   | 11    |
| When no similar cases from the past are known /<br><i>Ko ni znanih podobnih primerov iz preteklosti</i> | 62    | 50                   | 80                   | 11    |
| When facts do not show a clear way out /<br><i>Ko dejstva ne kažejo jasne poti</i>                      | 63    | 50                   | 80                   | 9     |
| When time is limited /<br><i>Ko je čas omejen</i>   | 71    | 60                   | 80                   | 7     |
| When several good alternatives are at hand /<br><i>Ko obstaja več dobrih alternativ</i>                 | 68    | 60                   | 70                   | 4     |
| Arithmetic mean / <i>Aritmetična sredina</i>  | 65    |                      |                      | 8     |

Table 5: Use of intuition as an aid in decision-making at the operative level

Preglednica 5: Uporabe intuicije, kot pomoč pri odločanju na operativnem nivoju

| Cases when intuition is used / Primeri uporabe intuicije  | M (%) | Y <sub>min</sub> (%) | Y <sub>max</sub> (%) | σ (%) |
|---|-------|----------------------|----------------------|-------|
| When dealing with high degree of uncertainty /<br><i>Ko gre za visoko stopnjo negotovosti</i>           | 44    | 30                   | 50                   | 7     |
| When no similar cases from the past are known /<br><i>Ko ni znanih podobnih primerov iz preteklosti</i> | 43    | 40                   | 50                   | 5     |
| When facts do not show a clear way out /<br><i>Ko dejstva ne kažejo jasne poti</i>                      | 51    | 30                   | 70                   | 13    |
| When time is limited /<br><i>Ko je čas omejen</i>   | 69    | 60                   | 80                   | 8     |
| When several good alternatives are at hand /<br><i>Ko obstaja več dobrih alternativ</i>                 | 53    | 40                   | 80                   | 12    |
| Arithmetic mean / <i>Aritmetična sredina</i>  | 52    |                      |                      | 9     |

The results show that in certain situations of decision-making managers resort to intuition as well. At all levels of decision-making (strategic, tactical and operative), intuition is most often used when the time for decision-making is limited. At the strategic level, no less than 73% of intuitive decisions are made in such situations. A high percentage of intuitive decisions are made by managers also in situations when several good alternatives for solution of a problem are at hand.

The answers also confirmed our thesis that most of the intuitive decisions are made at the strategic level and least at the operative level, where in spite of the situations in which intuitive decision-making would be advisable, only half of the decisions are made in this manner.

The standard deviations noted in certain questions indicate great deviations in the answers, which means that some managers resort to intuitive decision-making much more often than others. The answers to all seven questions are graphically presented in Figure 1, where line delineates the arithmetic mean of the answers at separate management levels, while whiskers indicate minimum and maximum values of the answers to the given questions.



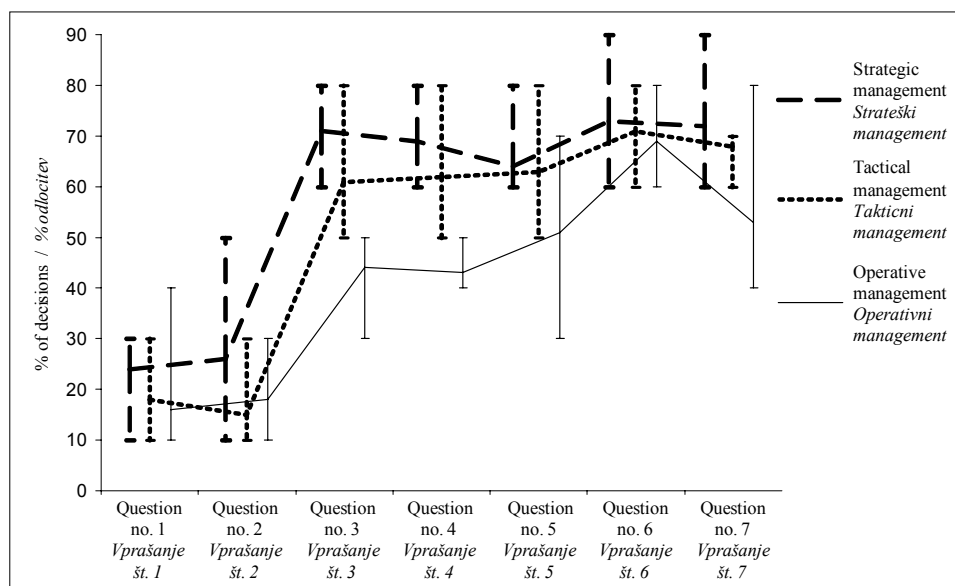


Figure 1: Presentation of the share of intuition used in decision-making at all management levels

Slika 1: Prikaz deleža uporabe intuicije pri odločanju na posameznih nivojih managementa

#### 4 MODEL OF INTEGRAL DECISION-MAKING SCHEME MODEL CELOSTNE ZASNOVE ODLOČANJA

On the basis of the so far gained cognitions, our own study of decision-making processes and results of the questionnaire implemented amongst the managers of twelve Slovene woodprocessing firms, a model of integral decision-making scheme was prepared. The model (Figure 2) differs from till now known decision-making models (HUDEJ/ZIDARN 2000, OMLADIČ 2002, POTOČNIK at all 2003) in the simple fact that alternatives are separately dealt with in its module, where intuitive decision-making is taken into consideration on equal footing.

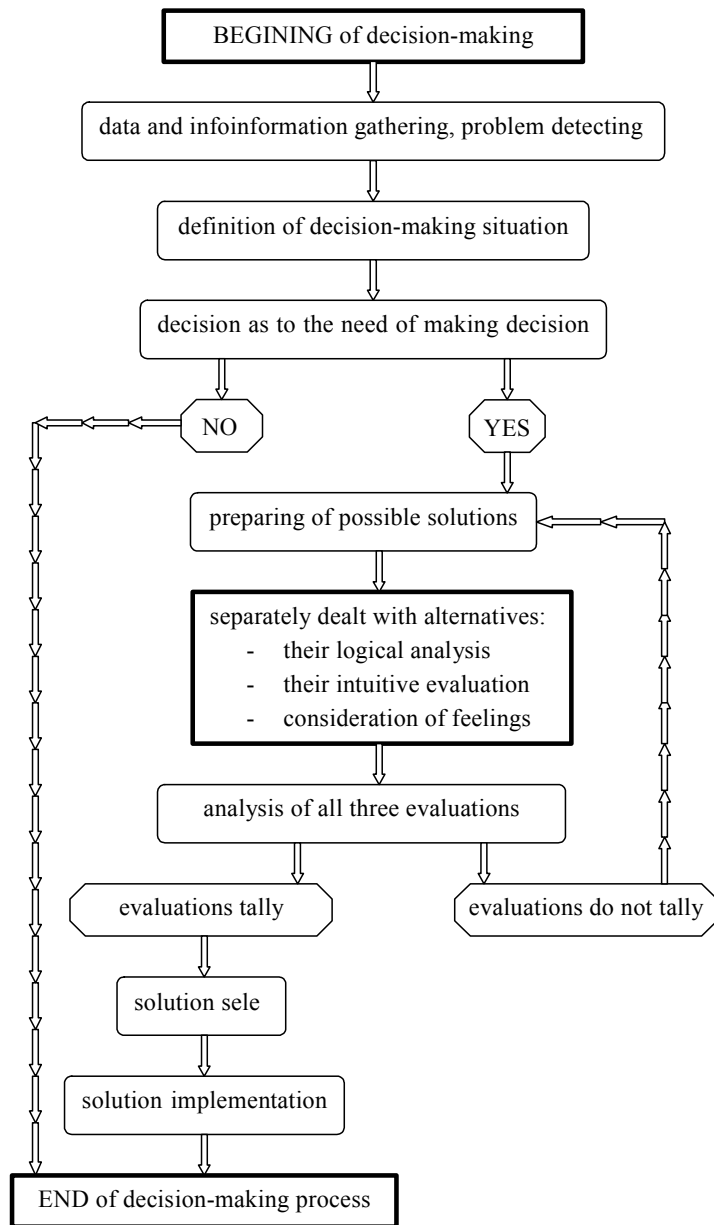
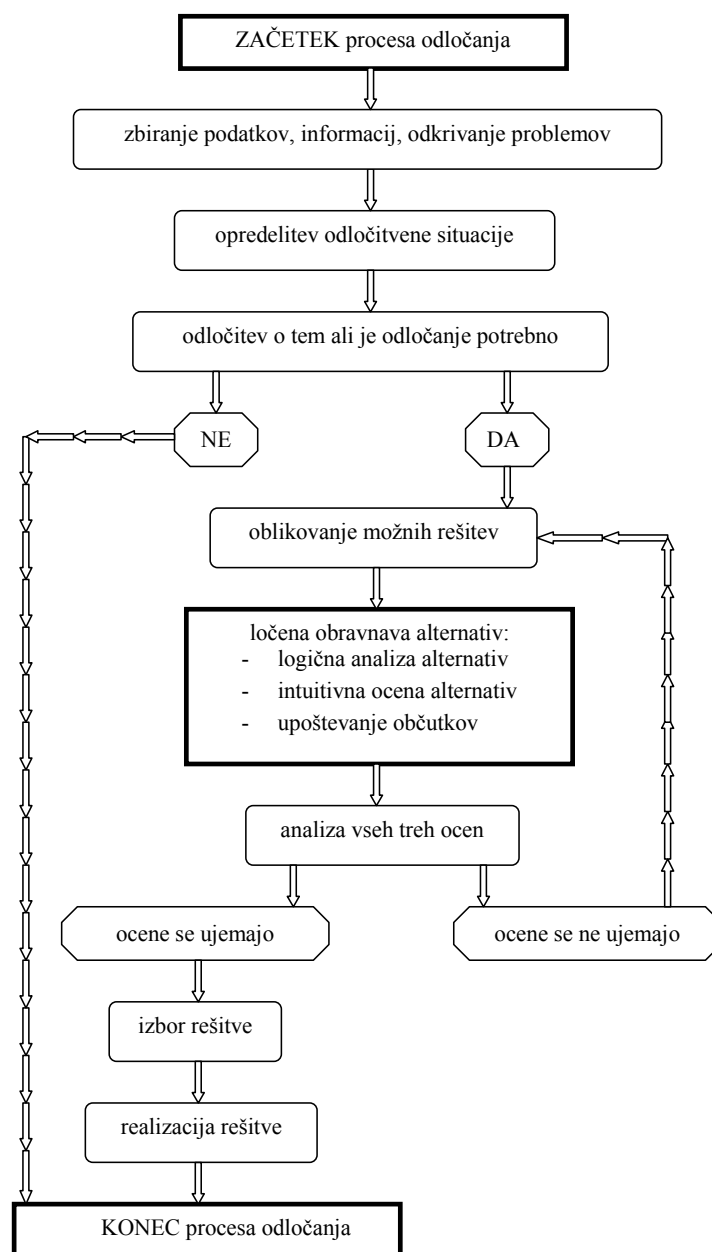


Figure 2: Model of integral decision-making scheme



Slika 2: Model celostne zasnove odločanja

The model presented in Fig. 2 is based on modern approaches to decision-making, supplemented with central phase, where the alternatives are dealt with separately by considering the following three approaches: logical analysis, intuitive evaluation and consideration of feelings. The first phase in the implementation of the process is problem detection, followed by a clear definition of the situation for which a decision is to be made. The selected business problem is to be studied from a wider aspect and then the problem, about which a decision is to be made, is to be clearly and unequivocally defined, to enable us to easily understand what is to be decided upon. Once the problem is clearly defined, it must be determined whether a decision in its respect is indeed necessary. This means that managers are to ascertain whether they will, by looking for the best possible solution, indeed solve the problem at all. Namely, it happens quite often that decisions are made about matters that are not relevant at that time at all or that decisions are being made in respect of unclear problems. On the grounds of objectives and purpose of decision-making, alternatives or possible solutions are delineated. Then the best possible decision is selected, which is the central part of the decision-making process and of greatest significance for a truly good decision. As soon as delineating possible solutions, a selection of the most appropriate solution with separate treatment of alternatives begins. Here it is important that intuitive evaluation of alternatives is separated from logical analysis of alternatives and consideration of feelings. In the first step, a logical analysis of the alternatives with a soft or »fuzzy« goal programming is therefore to be made. From the spectre of alternatives, 2 or 3 most appropriate solutions as per quantity criteria can be most often chosen. In the second step, an intuitive evaluation of alternatives is to follow, where a good knowledge of the intuition's functioning is necessary. With an indepth look into the matter and inspiration we can very well assess especially the highly complex problems, where it is impossible for us to clearly stipulate a solution with logical analysis. In the third step, the selected alternatives are assessed on the grounds of feelings. Here the decision-makers' emotional intelligence prevails. This means that they can yield themselves to the feelings experienced when they become totally absorbed in a problem and that they are capable of distinguishing these feelings. Once a separate analysis of the alternatives is made, the evaluations can be analysed. This means that we have to objectively establish whether the evaluations tally or, if this is not the case, what is the reason for the differences between them. If all three evaluations tally, we can more or less safely claim that the selected solution is indeed the best. If deviation of the intuitive evaluation is too great or if the feelings are bad, then the

best choice, as far as suitable selection is concerned, is to re-examine the alternatives that were dealt with separately. With a repeated selection, matters become much clearer, while the possibility that we shall gain some new cognitions, which would make the selection of the solution easier, becomes greater. If the evaluations, however, totally differ between each other, mistakes must have been made in the decision-making process, which may be the result of unsuitably prepared alternatives or their perfunctory treatment. In such a case it is necessary to go back to the drawing board and to prepare the possible solutions anew, as well as to repeat the selection of the most appropriate solution. The process of decision-making is concluded with the implementation of solution or decision. Within the framework of direct implementation, the selected solution is then transformed into a decision-making action, prepared for implementation and finally carried out.

## **5 DISCUSSION AND CONCLUSIONS**

### **RAZPRAVA IN SKLEPI**

Good decision-making is today a demanding task due to the ever-changing conditions, lack of sufficient information, limited decision-making time, high degree of uncertainty, etc. And this means that the decision-maker's subjective evaluations are increasingly gaining weight. Although the majority of authors, who write about management and decision-making (LESKOVAR 2000; OBLAK / ZADNIK STIRN 2000; KUO 1998), acknowledge the meaning of subjective evaluations (intuition and feelings) in decision-making process, intuition is rarely used in practice. In long-term decisions it is impossible to explicitly point at the best solution with quantitative methods only. Lack of sufficient information, limited time for decision-making and high degree of uncertainty are the major reasons for the quantitative methods to become, in many cases when talking about long-term decisions, fairly unreliable. And this is why we designed a model of integral decision-making scheme, which is based on contemporary approaches to decision-making and attempts to engage, particularly in most demanding decisions, all available means.

The results of the questionnaire carried out in twelve studied Slovene woodworking firms indicated an expected situation in decision-making processes. Human influence, in the

form of subjective factors, is not sufficiently exploited in decision-making, emotional intelligence (and pure intelligence) is insufficiently integrated into problem solving, the possibility of use of intuition is still totally unclear and in most cases also wrongly interpreted. Already during the selection of personnel (especially for the leading positions in a firm) we should take into consideration these people's capabilities of dealing with people, their emotional intelligence, their values and capacities of having a visionary look on the future. The existing personnel should be educated in this particular direction and given a chance to develop. Greater knowledge and experience would enable, on the other hand, better decisions to be made also in compliance with the integral decision-making scheme.

Our model of integral decision-making scheme includes, apart from logical analysis, subjective evaluations in decision-making. As the decisions made for longer periods of time are mostly intuitive, the presented model is particularly applicable for the higher levels of management, where it is important that all available means are integrated into the decision-making process.

## 6 POVZETEK

*V zadnjih letih so se zgodile velike spremembe na področju razvoja tehnologije, organizacije in filozofije vodenja podjetij. Kljub visoko razviti tehnologiji je odločanje še vedno v rokah človeka, ki s svojim znanjem, sposobnostmi in izkušnjami upravlja poslovne sisteme. Na odločitveni proces in s tem na kakovost odločitve vplivajo številni dejavniki, ki jih ne moremo v celoti kvantitativno opredeliti. Pomanjkanje zadostnih informacij, omejen čas za odločanje in visoka stopnja negotovosti so pglavitni razlogi, da je uporaba zgolj kvantitativnih metod vprašljiva, zato je pri odločanju potrebno upoštevati tudi subjektivne ocene, to je ocene na podlagi intuicije in občutkov v kombinaciji z logično analizo.*

*V praksi se pogosto dogaja, da intuitivno razpoznamo neko zadevo, vendar pa se bojimo ravnati po intuiciji. Mislimo, da je treba počakati, zbrati več dejstev, bolje spoznati zadevo, zato se obotavljamo in za končno odločitev porabimo preveč časa, s tem pa zamudimo poslovno priložnost.*

*V raziskavi smo proučili dosedanja spoznanja na področju subjektivnih ocen pri odločanju na različnih nivojih managementa, praktično smo preverili stanje odločitvenih procesov v slovenskih lesnoindustrijskih podjetjih in oblikovali model celostne zasnove odločanja, ki integrira dobre lastnosti sodobnih pristopov, v odločitvenem procesu pa poleg kvantitativnih, upošteva tudi subjektivne, intuitivne ocene.*

*Rezultati ankete, ki smo jo izvedli v dvanajstih podjetjih kažejo na to, da si managerji pri odločanju v določenih situacijah pomagajo tudi z intuicijo. Na vseh ravneh odločanja (strateškem, taktičnem in operativnem nivoju) je najpogostejša uporaba intuicije, ko je čas za sprejemanje odločitev omejen. Na strateškem nivoju se v takih situacijah sprejme kar 73% intuitivnih odločitev. Visok odstotek intuitivnih odločitev sprejmejo managerji tudi v situacijah, ko za rešitev določenega problema obstaja več dobrih alternativ. Standardni odkloni pri nekaterih vprašanjih kažejo na velika odstopanja v odgovorih, kar pomeni, da nekateri managerji uporabljajo intuitivno odločanje bistveno pogosteje kot drugi. Primerjava dobljenih rezultatov s trendi na področju odločanja v svetu je pokazala, da je proces odločanja v lesnoindustrijskih podjetjih v Sloveniji dokaj konzervativen in da se lahko z dodatnim izobraževanjem sedanjega managementa procesi odločanja bistveno izboljšajo.*

*Model celostne zasnove odločanja, ki smo ga oblikovali, temelji na sodobnih pristopih k odločanju. Poleg logične analize vključuje tudi subjektivne ocene pri sprejemanju odločitev, saj je dopolnjen z osrednjo fazo, v kateri alternative obravnavamo ločeno ob upoštevanju treh pristopov: logične analize, intuitivne ocene in upoštevanja občutkov. Odločitve, ki se sprejemajo za daljše časovno obdobje so predvsem intuitivne, zato je predstavljeni model uporaben zlasti za višje ravni managementa, kjer je pomembno, da se v proces odločanja integrira vsa razpoložljiva sredstva.*

## **7 REFERENCES**

### **VIRI**

- HUDEJ, F. / ZIDARN, J. 2000. Odločitveni modeli.- Novo Mesto, Visoka šola za upravljanje in poslovanje, 159 p.
- KUO, F.Y. 1998. Managerial intuition and the development of executive support systems.- Decision support systems, 24: 89-103.
- LESKOVAR, R. 2000. Forecasting models and intuition in group decision making - the publishing company case study.- Kidlington (Oxford), Automated systems based on human skill 2000: 167-170.
- OBLAK, L. / ZADNIK STIRN, L. 2000. The possibility of solving economic and environmental problems in wood industry companies by the application of the method of fuzzy goal programming.- Ekologia Bratislava, 19, 4: 409-419.
- OMLADIČ, V. 2002. Matematika in odločanje.- Ljubljana, DMFA – založništvo, 184 p.
- POTOČNIK, A. / JELAČIČ, D. / OBLAK, L. 2003. Importance of subjective evaluation at decision-making process and a model of a whole decision making scheme in a wood enterprise.- Ljubljana, Wood, 55, 5: 133-138.
- TAVČAR, M. 1995. Obvladovanje dejavnosti managerjev.- Organizacija: revija za management, informatiko in kadre, 28, 9-10: 509-522.
- VILA, A. 1998. Odločanje in intuicija. V: Florjančič J. (ur.). Operativni management.- Kranj, Moderna organizacija, Bia: 438-463.