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BIASES IN THE DECISION-MAKING PROCESS AND POSSIBILITIES OF OVERCOMING THEM

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Starting from the normative approach, a decision as the outcome of the decision-making process should represent a rational choice made by a completely informed decision-maker. With the development of the behavioral perspective of the decision-making process, certain mistakes in decision-makers' behavior have been noticed, emerging as a consequence of their limited cognitive capacities and the information asymmetry. The application of heuristics as simplified mental strategies, as well as certain deformations in decision-makers' thinking and perception, leads to the different biases that affect their attitudes and approach to problem solving. The aim of the research study is reflected in identifying the biases that most often occur in the decision-making process, as well as their causes and consequences. The qualitative methodology of the research has been applied in parallel with the relevant methods of analysis and synthesis, deduction and induction. On the basis of the conducted empirical studies, the recommendations for overcoming biases have been defined, which represents the main result of the research study. The derived conclusions with respect to the possibilities of overcoming biases can help decision-makers to improve the decision-making process in real situations.

Keywords: decision-making process, decision-makers, bounded rationality, mental strategies, biases

JEL Classification: M10, D81

INTRODUCTION

In the conditions of uncertainty, the promulgation of good decisions becomes the key factor for a company's success. The decision-making process represents a set of the activities that lead to making the final choice of one out of a set of possible actions by which the desired aim will be achieved (Babić, 1995, 14). Starting from the assumption that decision-makers are completely informed and perfectly rational beings, the development of the normative models of decision-making is the answer to the observed need to prescribe the procedures of decision-making that will enable a rational choice. However, it is observed that in real situations there are deviations in the application of the rational procedures of decision-making, and also that the behavior of decision-makers is under the

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influence of the uncontrolled factors that infringe the conditions of complete information and rationality.

In fact, research in the decision-making process in real situations implies the importance of understanding the limited cognitive capacities of decision-makers that lead to mistakes in the perspective of observing problems and negatively affect the effectiveness of decision-making (Maitland & Sammartino, 2015). As a consequence of the limitation of cognitive capacities, decision-makers apply different heuristics as mental strategies by which they simplify problems and redefine the manner of their solving (Tiwana, Wang, Keil & Ahluwalia, 2007). By introducing the concept of bounded rationality (Simon, 1955), researches in the field of strategic decision-making have been focused on the study of the cognitive abilities of decision-makers and their limits, as well as on the understanding of behavior of decision-makers and the mechanisms of overcoming the observed limitation in the process of resolving complex problems (Menon, 2018). In accordance with the abovementioned, the understanding of mental strategies, as the mechanisms of simplifying the decision-making process, represents the first step in facing complex problems (Levinthal, 2011).

Starting from the understanding that decision-makers are bounded rational individuals, the subject matter of research are the biases as heuristics that influence the judgment of decision-makers and cause certain systematic mistakes in the decision-making process. The understanding of the biases that emerge as a consequence of the influence of different social and psychological factors on decision-makers represents the current research field in the area of the decision-making theory.

In the given context, the research is aimed at showing in which way biases affect the outcome of the decision-making process and the possible ways to overcome them. In accordance with the defined subject matter and the aim of the research, the starting research hypothesis is that the application of heuristics as mental strategies by which the decision-making process is simplified negatively affects the quality of a decision as the outcome of the decision-making process.

In accordance with the abovementioned, we started from the results of the empirical research carried out by different authors who had dealt with the influence of biases on the decision-making process.

On the basis of the survey of the relevant research that includes the partial studies of certain biases, the comprehensive analysis of the identified biases in the decision-making process represents an attempt to provide an answer to the observed research gap. The quality methodology was applied in the research, based on the descriptive study and interpretation of the results of the conducted analysis. For the purpose of deriving general attitudes regarding the causes of biases and the consequences of biases for the quality of the decision-making process, the methods of analysis and synthesis, deduction and induction, have been applied as the appropriate research methods of the theoretical verification of the set analysis.

The paper is structured into three mutually related unities. In the first part of the paper, the nature of the decision-making process and the bounded rationality of decision-makers are analyzed. Starting from the behavioral perspective, special attention is dedicated to researching the direct and indirect effects of bounded rationality in decision-making. The second part of the paper is dedicated to conducting research into the biases that emerge as a consequence of the limited cognitive capacities of decision-makers. The analyzed biases determine the manner in which decision-makers process the obtained information during the decision-making process, estimate the proposed alternatives and make a choice. On the basis of the comprehensive overview of empirical research in biases, in the third part of the paper special attention is given to identifying the possibilities of overcoming them for the purpose of improving the quality of the decision-making process.

BOUNDED RATIONALITY IN DECISION-MAKING

Although there are different approaches in the conceptual defining of the decision-making process,

their mutual characteristic is that the decision-making process implies all of the activities of making the choice of one among the proposed options that include identifying problems, and the generation and choice of the alternative (Zlatanović & Nikolić, 2017). In a broader sense, decision-making is observed as a set of the activities used in order to find and apply the course of action that will lead to the realization of the set aim. In a narrower sense, decision-making represents the choice of one out of a set of the considered options (Babić, 1995, 15). The essence of the decision-making process is the choice of the best decision. A good decision has to satisfy two main criteria: effectiveness and efficacy. An effective decision is that leading to the complete fulfillment of the set aim, whereas an efficient decision is that shaping all of the actions oriented towards the given aim so that the minimum of available resources are used (Howard & Abbas, 2016, 30). A good decision emerges as a result of the correct understanding of problems and the defining of the aims, the creative development of alternatives, the objective evaluation of the alternatives and a consistent choice (Harrison, 1996). In order to define the procedures that will lead to making a good decision, the normative models of decision-making have been developed.

According to the normative models of rational choice, decision-making can be characterized as a rational, predictive and deterministic process. The behavior of decision-makers within the mentioned activities included in the decision-making process is characterized by rationality and the choice of the optimal solution. The problems that are resolved are well-structured and choice is consistent (Simon, 1959). The abovementioned characteristics are derived from the understanding that decision-makers, as the actors of the decision-making process, are ideally rational individuals who implement the comparative evaluation of alternatives and perform the choice of the optimal alternative on the basis of rational procedures and the rules of decision-making (Sklad & Diekstra, 2014). In fact, according to the economic theory of a company, as the representative of the normative perspective of the study of the decision-making process, the behavior of decision-makers represents the explicit choice based on logic, deductive conclusions, whereby all the limitations arising from human nature are completely disregarded. On the basis of complete information, decision-makers make a calculation of the expected usefulness of the options, depending on the estimated probabilities of the relevant events and the usefulness of all of the possible outcomes of the analyzed options (Wang, 1996). A completely informed and rational decision-maker chooses the option that maximizes the expected usefulness (Levinthal, 2011).

However, contrary to the theoretical assumptions of the normative approach, the complete rationality is unattainable for the following reasons: firstly, in the case of most decisions, the list of the potential consequences of each option is very long, with many unknown outcomes, which means that the idea of complete information is not real; secondly, the possibilities of different outcomes are usually unknown and in the best case can only be roughly estimated, by which the ability of decision-makers to make a rational choice is challenged; thirdly, decision-makers do not always behave compliantly with the principle of maximizing. This type of thinking, which implies the optimization, cannot resolve complex social problems since it ignores the different perceptions, values and interests present in organizations (Zlatanović, 2010). Starting from the observed limitations of the normative approach, the perspectives in the study of the decision-making process are changed. The rationality of decision-makers is observed through the prism of the interdependence of objective, rational behavior and the behavior conditioned by the behavioral factors that shape the perception and judgment of decision-makers (Zlatanović & Nikolić, 2017). With the development of behavioral theory, it is observed that in real situations the behavior of decision-makers is characterized by bounded rationality, since their capacities are limited in relation to the problem that is being solved (Simon, 1959).

In fact, the behavioral perspective leads to the understanding of the fact that the behavior of the actors of the decision-making process in real situations often significantly differs from rational choice and is based on the application of the simple

decision-making rules. These conclusions have led to the assumption about the bounded rationality of decision-makers that arises as a consequence of the problem related to the information asymmetry and the limited cognitive capacities of the actors of the decision-making process. As the founder of the concept of bounded rationality, Simon (1955) describes the limitations arising from human nature and the inability of rational decision-making. The foregoing means that the quality of decisions is determined by the degree of the limitation of the decision-maker's cognitive abilities (Huber, 1980, 25). This attitude originates from the understanding of the fact that a decision-maker can only consider a limited number of information at one moment; that he/she has to make a decision in a limited period of time, and also that a decision-maker cannot possess all of the relevant pieces of information. In the stated context, it is more difficult for decision-makers to find satisfying, not optimal solutions (Simon, 1959). Starting from the concept of bounded rationality, a conclusion can be drawn that decision-makers act on the basis of the simplified mental models shaped under the influence of personal attitudes, perceptions and biases. In fact, research in the decision-making process in real situations implies the discovery of the different perceptions or understandings of the world, as well as the manner in which these perceptions change over time and differ between the actors of the decision-making process (Zlatanović, 2010). It means that ambiguity, inconsistency and independence become the key characteristics of the decision-making process, which leads to the confirmation of the assumption on the bounded rationality of decision-makers.

In order to overcome the limitation of cognitive capacities, decision-makers often simplify decision-making, relying on the application of heuristics (De Neys, 2010). In many cases, these "mental shortcuts" lead to a rough approximation related to the optimal solution (Pavličić, 2015, 301). In accordance with the above-stated, one of the direct effects of bounded rationality is related to the attitude that in real situations decision-makers do not make the optimal choice (Campitelli & Gobet, 2010). In fact, they use the simplified procedures and rules of decision-making. One such rule is the choice of the satisfying alternative, which means that the alternative that satisfies decision-makers' demands is chosen, whereas only in exceptional cases do decision-makers opt for searching for and selecting the optimal alternative (March, 1994, 18). Also, as a consequence of bounded rationality, decision-makers often make only the minimum of the incremental adjustment necessary to reduce the problem to such a degree at which the difference between the wanted and the existent aims is acceptable. Such an approach can be efficient in the short-term, but observed in the long-term, such a behavior can cause unwanted consequences.

Another direct effect of bounded rationality is the application of the inadequate models of decision-making. It means that, due to limited cognitive capacities, decision-makers use an approximate, simplified model of a real situation (Bresnick & Parnell, 2013, 33). The application of such models helps decision-makers to solve complex problems through the application of the different "mental shortcuts" that enable their simplification (Levinthal, 2011; Menon, 2018). The models of decision-making based on heuristics are less efficient than the optimization models whose application in solving problems implies the collection of all of the relevant pieces of information, as well as the mathematical specification of alternatives. Contrary to that, the application of heuristics is based on "ignoring information" for the purpose of faster and simplified decision-making regarding the application of optimization methods (Maitland & Sammartino, 2015). The application of the simple rules and inadequate models of decision-making as a direct consequence of the phenomenon of the bounded rationality of decision-makers leads to a decrease in the quality of a decision. The stated consequences of bounded rationality can be related to certain psychological factors that affect decision-makers in the process of collecting and analyzing the information relevant to the decision-making process. Psychological factors, such as the ungrounded self-confidence of decision-makers, excessive bonding to the initial information, connecting alternatives with stereotypes, giving support to wrong choices and dependence on the form of displaying problems can, to a great extent, shape the perception of decision-makers in the decision-making process and the final

outcome (Bresnick & Parnell, 2013, 35). It is about the biases arising as a consequence of the cognitive limitation of decision-makers and causing the filtrated collection and subjective evaluation of information in favor of those who confirm their attitude about certain problems, ignoring the information contrary to their opinions. In accordance with the said, the influence of the information asymmetry leads to the information barriers that cause the filtrated collection of information. Under the influence of information barriers, decision-makers form their own personal preferences that can lead to a distortion in the information analysis (Jamieson & Hyland, 2006). Also, the amount of information available to decision-makers often exceeds their cognitive abilities necessary for processing information. Due to cognitive limitations, decision-makers are incapable of processing all of the relevant pieces of information, but under the influence of biases as mental shortcuts to the solution of the problem, they do process them by simplifying the decision-making process. In the stated context, decision-makers make a choice based on the application of the simplified rules and inadequate models of decision-making, which negatively affects the outcome of the decision-making process (Figure 1).

BIASES AS THE BEHAVIORAL ASPECTS OF THE DECISION-MAKING PROCESS

For the purpose of discovering the causes and consequences of the biases arising under the influence of certain mental mistakes, certain authors have been researching this field for more than two decades now. Making general conclusions is not a simple process, since it is necessary that not only the economic, but also the psychological dimension of certain phenomena and occurrences, as well as the personal characteristics of decision-makers that can influence their behavior, should be perceived. Starting from numerous empirical studies in this field (Tversky & Kahneman, 1974; Kahneman & Tversky, 1979; Chi & Fan, 1997; Busenitz & Barney, 1997; Hodgkinson, Maule, Bown, Pearman & Glaister, 2002; Roxburg, 2003; Korte, 2003; Forbes, 2005; Hammond, Keeney & Raiffa, 2006; Jamieson & Hyland, 2006; Chira, Adams & Thornton, 2008; Henman, 2008; Maqsood Finegan & Walker, 2008; McKenzie, van Winkelen & Grewal, 2011; Sklad & Diekstra, 2013; Bresnick & Parnell, 2013; Riaz & Iqbal, 2015; Fiedler & von Sydow, 2015; Howard & Abbas, 2016; Mustilli, Piccolo & D'Angelo, 2018), the framing effect, the availability bias, representativeness, the anchoring effect and adjustment, the status quo, the sunk costs effect, a confirmation, a false consensus, overconfidence and

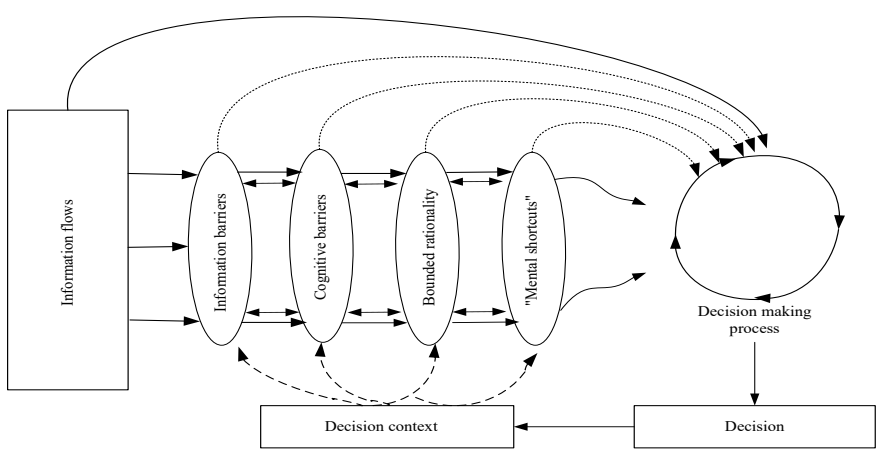

Figure 1 Bounded rationality in decision-making

Source: Author, based on Jamieson & Hyland, 2006

the illusion of control have been identified in this paper as the most common biases that shape the outcome of the decision-making process.

The Framing Effect

The first step in the decision-making process is the formulation of the problem that is to be solved. The manner in which decision-makers identify the problem can depend on the influence of the manner in which "the problem is being framed" (Henman, 2008; Pavličić, 2015, 314; Howard & Abbas, 2016, 357). The most common obstacle to an objective insight and a correct problem diagnosis, as the basic steps in the phase of the problem identification, is the shaping of the decision-maker's perception depending on the manner in which the information has been presented (Bresnick & Parnell, 2013, 36). This effect is also known as the axiom of invariance, according to which the redefining of the problems will not affect the result of the choice, which means that the preferences of decision-makers are independent of the manner in which problems are described (Tversky & Kahneman, 1974). However, the axiom of invariance is often disputed, since the preferences are variable, and when comparing alternatives, it often leads to the variation of the attributes that are being subjected to consideration, which all taken together affects the occurrence of the intransitivity of preferences. In practice, a fact has been established that decision-makers prefer the positive to the negative frame of the problem formulation, and that, together with a change in the manner of the interpretation of information, they also change their attitudes (Tversky & Kahneman, 1974; Kahneman & Tversky, 1979; Jamieson & Hyland, 2006; Hammond *et al*, 2006; Chira, Adams & Thornton, 2008; McKenzie *et al*, 2011; Bresnick & Parnell, 2013, 36). As the the frame in which possible outcomes have been shown changes, the reference point changes as well, which leads to the shaping of the preferences of decision-makers and their relation to the risk (Božović & Gvozdenović, 2009). The observed aversion towards losses is related to a greater tendency of decision-makers to avoid a loss rather than realize a gain (Tverski & Kahneman, 1979). The tendency towards risky decisions will also be more expressed when the problem is "negatively framed". A. Tverski and D. Kahneman (1974) are first to have confirmed that losses are emotionally experienced twice as strongly in comparison to comparable gains, which can distort the perception of decision-makers in the phase of the problem identification.

The Availability Bias

Under the influence of the availability bias, decision-makers estimate the probability of one event depending on their own memory, namely depending on the extent to which they can remember similar events (Hammond *et al*, 2006; Sklad & Diekstra, 2013). If the same or a similar event often occurred in the past, decision-makers can more easily imagine its occurrence, while they remember rare events with more difficulties. Consequently, a high probability of occurrence is attributed to the event that frequently occurred in the past, whereas a low probability of occurrence is attributed to the event that rarely occurred in the past (Pavličić, 2015, 301). The consequence of such a perception is a distorted opinion of the decision-maker's and the unbiased estimation of the probability of events, due to which he can make wrong choices (Korte, 2003). The estimation of future events, as well as risks, is more dependent on the memory of decision-makers than on the unbiased evaluation of possible events (Fiedler & Sydow, 2015). Decision-makers predict the frequency of some event depending on the information available in their memory, the one which shapes their judgment and leads to a selective perception (Hammond *et al*, 2006; Henman, 2008; Maqsood *et al*, 2008; Bresnick & Parnell, 2013, 37). The foregoing means that decision-makers wrongly estimate and predict the probabilities of future events which the outcome of decision-making depends, under the influence of the selective memory of past events (Howard & Abbas, 2016, 351).

Representativeness

Representativeness is the application of mental shortcuts in determining conditional probabilities on the basis of the estimation of the extent to which some

event is a result of a certain process, i.e. of the extent to which a certain process generates the analyzed event (Maqsood *et al*, 2008; Sklad & Diekstra, 2013; Fiedler & von Sydow, 2015). In fact, it is about the estimation of the probabilities of conditional events often based on the incorrect similarity and connection of certain events and occurrences (Howard & Abbas, 2016, 352). Representativeness was for the first time described by A. Tverski and D. Kahneman (1974), who described it as one of the most common biases. These authors indicated the occurrence in which, in certain situations, decision-makers show a tendency to generalize the conclusions on the observed phenomenon on the basis of the analysis of but a few attributes or selective observations regarding a certain occurrence. Certain studies dealing with the examination of the influence of representativeness have shown that decision-makers tend to ignore the basic information about a certain occurrence (Chi & Fan, 1997). Decision-makers underestimate the possibility of an error with such estimations, as well as the unreliability inherent to small data samples. In fact, a special form of representativeness is related to the readiness of decision-makers to generalize the attitudes on the basis of the examinations based on small samples or personal experience (Busenitz & Barney, 1997).

The Anchoring Effect and the Adjustment Bias

The bias known in theory as the "anchoring effect" is that related to the shaping of the decision-maker's perception depending on the available information and the initial attitude (Maqsood *et al*, 2008; Howard & Abbas, 2016, 355). Decision-makers' initial estimations have a greater specific weight in relation to the pieces of information collected in a later course, due to which decision-makers become biased in judgment (Hammond *et al*, 2006; Henman, 2008; McKenzie *et al*, 2011; Sklad & Diekstra, 2013; Pavličić, 2015, 302). It means that the chosen value representing the so-called anchor is the starting point, only to subsequently be corrected, depending on other relevant factors. The adjustment process is most often such that the judgment of decision-makers depends on the initial anchor (Fiedler & von Sydow, 2015). The anchors can have different forms. One of the most common types of anchor is a past event or trend (Hammond *et al*, 2006, 119). Old data have the anchors corrected by decision-makers, whereby the need for an objective adjustment to a new situation is disregarded (Bresnick & Parnell, 2013, 37). In the conditions characterized by fast changes on the market, the application of the anchor leads to bad predictions and wrong choices (Roxburg, 2003).

The Status Quo

Decision-makers demonstrate a strong bias towards the alternatives that support the *status quo*, especially in the situations when changes need to be implemented (McKenzie *et al*, 2011). Decision-makers prefer the *status quo* state as a less risky alternative, due to which taking actions whose implementation would disturb such a state is often avoided (Samuelson & Zeckhauser, 1988; Hammond *et al*, 2006; Henman, 2008). The change of the *status quo* state means taking actions, and therefore assuming responsibility and the consequences that occur as a result of the taken action (Maitland & Sammartino, 2015). Maintaining the *status quo* state is in the majority of cases an easier way to solve problems since it implies a lesser risk, due to which fact decision-makers most often look for reasons which they can call upon to justify such a behavior of theirs (Bresnick & Parnell, 2013, 37). Still, it does not mean that the choice of the *status quo* state is always wrong. It is really challenging for decision-makers to make a difference between the *status quo* option, which at a certain moment is a rational choice, and the *status quo* option which is the resulting aversion towards risk and changes (Roxburg, 2003).

The "Sunk Cost" Effect

The effect of sunk, i.e. unjustified costs is a consequence of the observed phenomenon that decision-makers often try to justify the outcomes of their bad decisions in the past by presenting new choices (Roxburg, 2003; McKenzie *et al*, 2011; Pavličić, 2015, 315). It means it comes to the favoring of the choice of the alternative that supports the decisions

promulgated earlier, even when they are not justified. In that way, past decisions become what is defined as sunk costs, i.e. "old investments that cannot be restored". The costs that occur as a consequence of the decisions made in the past are irrelevant for future decisions, and yet they determine the decision-making process and its outcome. The sunk cost effect is related to the phenomenon of an aversion towards risk, which leads to the decisions whose application means the minimization of the already lost resources, not the maximization of the expected usefulness. This manner of decision-making is most frequently present in a situation when a decision-maker has to take responsibility for the bad outcome. In other words, there is a significant correlation between the taken responsibility and the amount of the invested assets in a certain design (Chira *at al*, 2008). The sunk cost effect appears because decision-makers consciously or unconsciously do not want to admit their own mistake and take responsibility (Hammond *et al*, 2006; Henman, 2008). It most often arises together with the *status quo* effect, if the *status quo* alternative is precisely the one which a decision-maker has excessively invested in and which he/she wants to justify.

The Confirmation Basis

The need for confirmation implies a search for information supportive of the decision-maker's attitude, whereas the information that indicates possible mistakes and a bad outcome is ignored (McKenzie *et al*, 2011). This bias arises as a consequence of the tendency of decision-makers to find arguments that confirm the established problem diagnosis, while those arguments against the acceptance of such an attitude are rejected, even if they are convincible and rational (Pavličić, 2015, 372). It means that the need for confirmation leads to a biased choice to be made by decision-makers, i.e. the one based on the unreal confirmation of the original attitude or the decisions already made (Bresnick & Parnell, 2013, 37). This effect often occurs as a consequence of the excessive self-confidence of decision-makers with respect to the correctness of a decision and their infallibility when the estimation of alternatives is concerned. A selective and biased analysis of the content of information which the initial attitude is supported by commonly occurs in the decision-making process (Jamieson & Hyland, 2006; Hammond *et al*, 2006). Decision-makers only accept the information that justifies the decisions they have made in a prior period and reject and/or have a critical and negative attitude towards the pieces of information that could question their prior choices (Chira *et al*, 2008).

A False Consensus

Decision-makers subjectively and biasedly estimate the degree to which their associates follow and support their attitudes and beliefs (Hammond *et al*, 2006). Such a behavior is only positive if decision-makers make a rational choice. The research studies have shown that there are many factors whose influence causes the abovementioned effect (Roxburg, 2003, 26): the tendency of decision-makers to only accept the opinions and arguments that support their attitudes, ideas and suggestions; selective memory, i.e. the habit of only remembering the facts and experiences that strengthen the original assumptions; a biased evaluation, i.e. the fast acceptance of proofs in favor of the set hypotheses, whereas contradictory proofs are exposed to rigorous evaluation and almost certain rejection; a group opinion, i.e. pressure to reach a high level of consent within a single group. High cohesion encourages the occurrence of a group opinion and can negatively affect the rationality in the judgment of the group members as decision-makers, since it reduces their ability to objectively perceive the problem under the influence of the opinion expressed by the other members (Henman, 2008; Pavličić, 2015, 439).

Overconfidence

Overconfidence is related to the high self-confidence that affects decision-makers when they estimate personal abilities and knowledge boundaries. Under the influence of too high a level of the self-confidence based on the attitude that their abilities are exceptional, decision-makers as limitedly rational individuals

have a tendency to overestimate their ability to make good decisions, and make hasty and imprudent decisions instead (Chira *et al*, 2008; Riaz & Iqbal, 2015). In fact, when decision-makers have an unrealistically high opinion of their own abilities and think they know more than it is objective, they most often make bad decisions that arise as a result of the biasedly estimated probabilities and outcomes of future events (Roxburg, 2003; Hammond *et al*, 2006). Overconfidence relates to the overestimation of favorable against unfavorable outcomes without observing and without an analysis of all of the relevant pieces of information (Busenitz & Barney, 1997; Jamieson & Hyland, 2006; Chira *et al*, 2008). The estimation of the probability of events and the predicting of future outcomes are not completely reliable; they are often the result of the overconfidence that arises when decision-makers either do not notice the dangers or ignore them (Golden, Milievicz & Herbig, 1994). This effect has negative consequences to the development and implementation of long-term strategies, since most of them are based on unreal, optimistic estimations of future events (Roxburg, 2003; Henman, 2008). However, although overconfidence can be observed as a widely spread cognitive bias, certain research studies have confirmed the fact that the level of self-confidence and optimism varies between individuals and can be related to the personal characteristics of decision-makers, such as their sex, age and education (Simon & Houghton, 2003; Forbes, 2005).

The Illusion of Control

The illusion of control occurs when decision-makers overestimate the level at which the outcomes of a decision are under their own control. It is related to the overestimation of decision-makers' personal ability to successfully solve complex problems and make effective decisions. The abovementioned effect is most often manifested with decision-makers who have made good decisions in a prior period. Decision-makers are often under the influence of the illusion of control, while simultaneously ignoring the uncontrolled factors that can affect their final choice (Jamieson & Hyland, 2006; Henman, 2008). The illusion of control can be understood as a tendency of individuals to unrealistically believe that they can control and/or affect the outcomes in the situations that are beyond their own control. The mentioned bias makes decision-makers believe they can affect the outcome, even when it is impossible (Chira *et al*, 2008; Pavličić, 2015, 401). This bias is related to decision-makers' ungrounded self-confidence and optimism, since the influence of overconfidence encourages the occurrence of the illusion of control, i.e. an excessive belief in personal success, even when it is contrary to the objective facts (Riaz & Iqbal, 2015).

RECOMMENDATIONS FOR OVERCOMING BIASES IN THE DECISION-MAKING PROCESS

Pursuant to the review research of the influence of biases on the decision-making process, it is possible to conclude that mistakes in individual decision-making arise due to routine problem solving, the irregular application of heuristics and different deformations in thinking caused by certain psychological factors (Table 1). Starting from the negative effects of the analyzed biases, one of the basic research challenges in the field of strategic decision-making is that related to the exploration of the possibilities of overcoming them. The basic assumption of the mitigation of the systematic mistakes that lead to bad outcomes is that decision-makers prevent the negative effect of biases.

It is primarily necessary for everyone to be aware of the influence of biases on the ability to judge and predict a future event, and also to apply a critical approach in the decision-making process. On the basis of the analysis of the causes of the identified biases, the possibilities of overcoming them have been identified (Table 1). The collection and analysis of all of the relevant pieces of information which the outcome of the decision-making process depends on, as well as the raising awareness of decision-makers regarding their opining that their own decisions can be wrong is the starting point in the process of overcoming the identified biases (Hodgkinson *et al*, 2002; Roxburg, 2003; Hammond *et al*, 2006).

For the purpose of overcoming the negative influence of the framing effect, decision-makers should observe a problem from different perspectives in order to notice all of the relevant aspects of the set problem. When the manner of the formulation, i.e. presentation of a problem is concerned, one should think of it in all the phases of the decision-making process, not only in the problem identification phase. For the purpose of finding new alternatives for problem solving, in the final phase of the decision-making process it is purposeful to return to the initial problem identification phase and change the perspective of observation. The stated recommendation is in accordance with the understanding that the "problem frame" determines the decision context in which a problem is subjected to observation and shapes the choice of the elements that are important in the analysis of the problem. Since the decision-making process is a cyclic process, not a set of linear activities, a change in the problem frame can affect the course of decision-making.

The negative influence of the availability bias and representativeness can be reduced if decision-makers determine the probability of events on the basis of an objective analysis of the relevant data, regardless of the frequency of their arising in the past. The basic assumption is one's possession of the necessary knowledge and skills, as well as a rational analysis of the related events and processes independently of the decision-maker's prior experience. In fact, it is necessary to give less importance to the pieces of information already collected in relation to the need for collecting new information that can lead to changes in predicting the probability and the outcome of future events.

One of the ways to eliminate the anchoring effect is to apply the alternative approaches in the process of problem solving that do not rely on decision-makers' past experiences. Decision-makers should be open to new ideas and suggestions. It is desirable to hear different opinions in order to expand the original ideas and the approach in exploring the problem that should lead to the best solution. Also, decision-makers should be objective when considering their associates' suggestions, and should not impose their own ideas as possible solutions.

The choice of the *status quo* option can, in certain situations, be the best solution, but it does not mean that it should always be followed. The *status quo* should not be observed as the only alternative, but it is necessary for decision-makers to identify and analyze a greater number of different options, carefully evaluating the advantages and disadvantages of each of them. In situations when decision-makers support the *status quo*, they should ask themselves the question whether they would choose such an alternative if it meant a certain level of risk. Except for the abovementioned recommendation, decision-makers should also reconsider the set aims in order to objectively observe whether they are satisfied with the existing state or it is necessary that certain changes should be made regardless of the effort and the costs demanded by such changes.

The decisions that have a certain "history" are very hard to objectively observe since certain psychological factors that determine their ability to judge and the manner of decision-making affect decision-makers. In that sense, overcoming the effect of sunk costs is based on respecting the opinion and suggestions of those actors of the decision-making process who were not included in making previous decisions. A decision-maker should reconsider the reasons why he/she does not want to admit the mistake and bear relevant consequences. Most often, the key reason is the damaged reputation and self-respect of decision-maker. In that sense, the culture that causes the fear of failure and leads to the fact that decision-makers do not want to admit their mistakes should be discouraged.

The influence of confirmation is possible to overcome if decision-makers are ready to critically reconsider the decisions made earlier. One should primarily check whether all of the alternatives are assessed on the basis of the same criteria and then examine the arguments that support the suggested alternative. Decision-makers should objectively analyze the personal motives that support the decision made. The recommendation is that a decision-maker should observe whether he/she collects information for the purpose of improving the quality of choice or his/her basic motive is to confirm the chosen course of

Table 1 The review research of the influence of the biases on the decision-making process

RESEARCH OF BIASES	MEANING OF BIASES	RECOMMENDATION FOR OVERCOMING BIASES
Framing effect		
Tversky & Kahneman, 1974; Kahneman & Tversky, 1979; Hammond *et al*, 2006; Henman, 2008; Chira *et al*, 2008; McKenzie *et al*, 2011; Bresnick & Parnell, 2013; Howard & Abbas, 2016	The preferences of decision-makers are independent of the ways of describing problems. Different approaches in defining the problem lead to change in decision-makers' preferences.	In the problem identification phase, decision-makers should observe the problem from different perspectives. In the final phase of the decision-making process, it is purposeful to return to the initial problem identification phase and change the perspective of observation in order to generate new options.
Availability bias		
Tversky & Kahneman, 1974; Korte, 2003; Hammond *et al*, 2006; Henman, 2008; Maqsood *et al*, 2008; Bresnick & Parnell, 2013; Sklad & Diekstra, 2014; Fiedler & von Sydow, 2015; Howard & Abbas, 2016	The estimation of future events, as well as their outcomes, is more dependent on the decision-maker's memory than on the unbiased evaluation of possible events.	Determine the probability of events on the basis of an objective analysis of the relevant data, regardless of the frequency of their arising in the past and the decision-maker's experience. It is necessary to give less importance to the already collected information.
Representativeness		
Tversky & Kahneman, 1974; Chi & Fan, 1997; Busenitz & Barney, 1997; Maqsood *et al*, 2008; Sklad & Diekstra, 2014; Fiedler & von Sydow, 2015; Howard & Abbas, 2016	Determine conditional probabilities on the basis of the estimation of the extent to which some event is a result of a certain process, i.e. the extent to which a certain process generates the analyzed event.	Determine conditional probabilities on the basis of an objective assessment, not on the basis of a subjective conclusion. Examine the causal connection between conditional events.
Anchoring effect		
Roxburg, 2003; Hammond *et al*, 2006; Henman, 2008; McKenzie *et al*, 2011; Bresnick & Parnell, 2013; Sklad & Diekstra, 2014; Fiedler & Sydow, 2015	The shaping of the decision-maker's perception depending on the available information and the initial attitude, which have a greater specific weight in relation to the information collected later.	Apply alternative approaches in the problem solving process. Decision-makers should be open to new ideas and suggestions that may affect change in the initial state.
Status quo		
Samuelson & Zeckhauser, 1988; Roxburg, 2003; Hammond *et al*, 2006; Henman, 2008; McKenzie *et al*, 2011; Bresnick & Parnell, 2013; Maitland & Sammartino, 2015	Decision-makers show a strong bias towards the alternatives that support the *status quo* state as a less risky alternative. It can be associated with risk aversion and the implementation of changes.	The *status quo* option should not be seen as the only alternative, but it is rather desirable to develop a number of options and carefully evaluate their benefits. Examine whether the *status quo* is really the best option when it means a certain level of risk.

Sunk costs effect		
Roxburg, 2003; Hammond *et al*, 2006; Chira *at al*, 2008; Henman, 2008; McKenzie *et al*, 2011	Decision-makers are trying to justify the outcome of earlier bad decisions made by the new choices – the favoring of the choice of the alternative that supports the decisions made earlier in the past.	The culture that causes the fear of failure and leads to the fact that decision-makers do not want to admit their mistakes should be discouraged. Engage individuals who have not been involved in making previous decisions.
Confirmation		
Hammond *et al*, 2006; Jamieson & Hyland, 2006; Henman, 2008; McKenzie *et al*, 2011; Bresnick & Parnell, 2013	Biased information gathering and decision-makers' choice based on the unrealistic confirmation of the original attitude or the decisions already made.	Check whether all of the alternatives are assessed on the basis of the same criteria. Examine the arguments supportive of the suggested alternative and also encourage a critical view of the choice of the best alternative.
False consensus		
Roxburg, 2003; Hammond *et al*, 2006; Henman, 2008	Decision-makers subjectively and biasedly estimate the degree to which their associates follow and support their attitudes and beliefs.	Creating a culture that encourages a creative conflict. The actors of the decision-making process should encourage constructive criticism.
Overconfidence		
Golden *et al*, 1994; Busenitz & Barney, 1997; Roxburg, 2003; Simon & Houghton, 2003; Forbes, 2005; Hammond *et al*, 2006; Jamieson & Hyland, 2006; Henman, 2008; Chira *et al*, 2008; Riaz & Iqbal, 2015	Overconfidence relates to the overestimation of favorable against unfavorable outcomes. It occurs when decision-makers unrealistically and optimistically overestimate future events without analyzing all of the relevant pieces of information.	The application of a rational approach to the prediction and evaluation of the probabilities of events. It is necessary to reconsider the justification of one's personal assumptions and estimation of outcomes. Reconsider the established cause and effect relations resulting from decision-makers' too high self-confidence.
Illusion of control		
Jamieson & Hyland, 2006; Henman, 2008; Chira *et al*, 2008; Riaz & Iqbal, 2015	Decision-makers overestimate the level at which the outcomes of a decision are under their control.	The encouragement of the critical reconsideration of personal abilities and the power on the part of decision-makers.

Source: Author

action. The incentive for a decision-maker's critical attitude is the necessary assumption of overcoming the mentioned influence.

The best way to mitigate the false consensus influence is to create a culture that encourages a creative conflict. The actors of the decision-making process should encourage constructive criticism, as well as new creative suggestions. A critical approach should be observed as useful and desirable, not as "an act of the enemy". The recommendation is that, for each argument in favor of the chosen option, a counterargument should be presented; this is also desirable for the purpose of carrying out a comprehensive and objective analysis.

One of the recommendations for the purpose of overcoming overconfidence is the application of a rational approach in the prediction and evaluation of probabilities. All decision-maker's assumptions should carefully be examined and compared with relevant data in order to reduce the influence of

personal impressions. The recommendation for decision-makers is not to be biased in the process filtration and the analysis of the collected information. It is necessary to reconsider the established cause and effect relations that are often the product of decision-makers' too high self-confidence as well as the justification of their personal assumptions and attitudes. Starting from their interconnectedness of overconfidence and the illusion of control, a similar approach to overcoming the negative consequences of the illusion of control is recommended. The encouragement of the critical reconsideration of one's personal abilities and the power that decision-makers have is considered as the basic assumption of the mitigation of the abovementioned negative effects of the illusion of control that can cause the promulgation of bad decisions.

CONCLUSION

In spite of the effort indicating that the rational models of choice should be applied, decision-makers often make bad decisions. The basic reasons for making bad decisions are a lack of the commitment and the bounded rationality of decision-makers. The effects of bounded rationality determine the manner in which decision-makers make a choice. Depending on the context which decisions are made in, different behavioral factors shape the manner in which decision-makers collect, filtrate, process and analyze information in the decision-making process and make choices. The abovementioned means that, due to the limitation of their cognitive capacities, decision-makers lean on the simplified solving of complex problems through the application of mental shortcuts. Cognitive limitations lead to predictable and consistent mental mistakes caused by such a simplified collection, analysis and processing of information. Some of the defined cognitive limitations refer to the formulation of a problem, others are related to the evaluation of the probabilities of relevant events, whereas there are those that arise as a consequence of the wrong perception of decision-makers' personal abilities. Decision-makers consider a problem through the prism of their own subjective opinions and beliefs, relying on prior events and the existing information.

This kind of opinion refers to the conclusion that mistakes in decision-making arise due to having problems solved in a routine manner, the application of heuristics as mental shortcuts and the different deformations in thinking caused by certain psychological factors, by which the starting hypothesis is confirmed. In accordance with the foregoing, the contribution of the paper in the theoretical sense reflects in the identification of different biases and the understanding of their influence on the outcome of the decision-making process. In the practical sense, the defined recommendations for the mitigation of the negative influence of the biases on decision-makers' perceptions and attitudes can help decision-makers improve the decision-making process in real situations. Also, the derived conclusions stand for a good basis for the implementation of the research study, by which the causes and consequences of the analyzed biases would empirically be tested. Still, the basic limitation of the research study is reflected in drawing conclusions on the basis of the literature review and the secondary data, without the implementation of the original empirical research. In accordance with the above-stated, the directions of a future research study rely on the development of a research model based on the drawn conclusions of the implemented quality analysis of the influence of the identified biases for the purpose of the empirical verification of the set hypothesis.

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