



THE IMPACT OF PERSONALITY TRAITS AND BEHAVIORAL PATTERNS ON THE OUTCOMES OF BUSINESS MANAGEMENT DECISION MAKING

– A Framework for an Empirical Study –

Christopher Hoeckel

Biberstraße 19, 83098 Brannenburg, Germany

Phone: +49 8034 705 88 63

E-mail: info@hoeckel.net

Keywords: decision making, intuition, rational, personality traits, efficiency

Abstract

Since decision making behavior has been in the focus of business management, both from a scientific and a professional position, there seemed to be a dispute whether rational or intuitive decision making leads to better outcomes. By now scholars agree that effective organizations do not have the luxury to choose between intuitive and rational decision making. Instead, they try to understand how different factors like personality and problem characteristics influence the decision making process. Reviewing the literature reveals that, the personality predetermination and the structure of problems (e.g. well-structured problems versus ill-structured problems) seems to have a significant impact on the decision making efficiency. Further, the review reveals that there is a lack of application oriented empirical studies in this area of research. Therefore the aim of this research paper is, to propose a framework for an empirical study on how personality and problem characteristics influence the decision making process. First, hypotheses are derived from the literature on how personality predetermination and behavioral approaches in the decision making process lead to higher social-economical efficiency within certain problem categories. Second, a causal model and a setup for a laboratory experiment are proposed to allow testing the hypotheses. Finally the conclusion provides an outlook how this research could support organizations in the decision making process.

Introduction: Research in Decision Making Behavior for Management Decisions

By now scholars agree that effective organizations do not have the luxury to choose between intuitive and rational decision making [1, p. 329] [2, p. 139]. Instead to understand how different factors like personality [3] [4] [5], task characteristics [6] [7], the decision making context [8] [9] and decision characteristics [10] [11] influence the decision making process. Sinclair & Ashkanasy [11] created a model which assumes that the behavior oriented decision making process is affected by four broad categories: 1. problem characteristics, 2. decision characteristics, 3. personal disposition, and 4. decision making context. These four categories



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

again include sets of factors which characterize more closely the content of these categories. Sinclair's & Ashkanasy's model seems to provide a vital basic foundation of the different issues that need to be addressed to give a more complete picture, when trying to explore the behavior oriented decision making process more in detail. Out of the set of factors which Sinclair & Ashkanasy have listed in their model, the personality predetermination/cognitive style [3, p. 119] [12, p. 103] [13, p. 162][4, pp. 330-331] [14, p. 4491] [5] and the ambiguity or the problem structure [15] [16] [17, pp. 18-19] [18, p. 67] [19] seem to be two of the contributors which have a significant impact on the decision making efficiency.

Like a lot of theories in this field, the model of Sinclair & Ashkanasy [11] proposes valuable theoretical advice. But it lacks to provide an application oriented approach which supports organizations to build a framework to give advice when it is more favorable to use a rational or intuitive approach in management decision making.

Therefore the aim of this paper, on the basis of relevant literature is, to determine how personality, behavioral approaches (intuitive versus rational conduct) and the ambiguity of problems influence the socioeconomic efficiency outcomes in business management decision making. In compliance with Popper's "The Logic of Scientific Discovery", scientific research is not just comprised of the formulation of cause-effect hypotheses, but also of the attempt to empirically substantiate and/or falsify the respective assumption [20, pp. 16-17]. Therefore a research design for an empirical study is also introduced which enables to falsify or support the hypotheses under "real conditions".

Intuitive Versus Rational Decision Making – Theoretical Background

The work of Jung [21] and Westcott [22] indicates that intuitive or rational types share distinct personality characteristics. Jung differentiated human behavior into four mental functions and two attitudes, allowing him to describe different types of people. He differentiated the four mental functions into sensing and intuitive types related to their preference on how they perceive information and into thinking and feeling types related to their preference on how they make judgments. The more "romantic" view [3, p. 122] [1, p. 114] [23, p. 109] [24, p. 286], that formal business planning relies on the left brain hemisphere's sequential-logical processes, whereas the less formal intuitive and creative aspects of management are accomplished by the right hemisphere, cannot be derived from psychological research [2, p. 132]. This view is also supported by neuroscience research [25] [26] as the activation of certain areas of the brain can be measured by using functional magnetic resonance imaging while working on intuitive tasks. But those areas are not necessarily located in the right hemisphere of the brain. Westcott found in his study that extreme groups to his measure had "distinguishing and coherent patterns of personality" [22, p. 148]. Woolhouse & Bayne [27, p. 160] see the difference in the level of the use of intuition in the nature of peoples exiting associations between words and concepts. The main findings in the study of Shoshana et al. [28, pp. 425-426] support the evidence that an intuitive or rational approach in decision making can be related to personality traits or cognitive styles. Within their study they show that participants with a rational thinking style were more related to normative judgements and participants with intuitive thinking style were more related to heuristic judgements. According to the Cognitive-Experiential Self Theory [29, p. 159] human beings operate on two fundamental information processing systems. The experiential



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

system which operates mainly on an unconscious level relates to experiences which have been built up in the past. The experiential system can be characterized as automatic, rapid, effortless, associative and holistic. Although the experiential system is a cognitive system it derives beliefs from emotional experiences [30, p. 121]. In contrast the rational system operates predominantly at the conscious level in an analytical, effortful, affect-free and relatively slow manner while demanding high cognitive resources [29, p. 161]. The rational system is more process orientated, logical-reason orientated and requires justification via logic and evidence. The rational system seems to be more suitable when analytic approaches are needed or considerations for long time consequences are at stake [30, p. 123]. Alter et al. [31, p. 575] support the view that people make different decisions based on their personality whether they adopt a rational systematic processing or if they rely on intuitive and heuristic processing. From their empirical study they provide evidence that when people experience difficulty or disfluency this leads them to adopt a more rational approach in information processing.

Dijksterhuis et al. [32, pp. 1005-1007] found in their studies that participants facing simple decision making situations performed well when taking a conscious, deliberate thought where as participants facing a complex decision making situation performed better when taking unconscious, intuitive thoughts. The study also showed that post choice satisfaction was greater in simple decision making situations when decision makers had taken a deliberate, rational approach. Whereas, for complex decisions the decision makers experienced greater post choice satisfaction when they had taken unconscious approaches. For Shapiro & Spence [18, p. 67] the approach of the decision making process (intuitive versus rational) depends on the nature of the task (e.g. structured or unstructured). For them tasks having a more structured nature like accounts receivable, order entering and inventory control are conducive to analytical reasoning because they have typically well-accepted decision rules. Other tasks with less structured problems like mergers and acquisitions, new product planning and corporate strategy formulation are typical for the use of intuition. Van Riel et al. [17, pp. 18-19] support this view that the decision tasks varies with the structure of the decision. They also concluded that well structured problems call for a rather rational approach as decision makers can make rational calculations. In turn, for them, ill-structured problems are not for rational decision making as they are characterized by a high degree of uncertainty about the actual and the desired situation and therefore do not have a base for rational calculations. A further major condition for the nature of the task can be the complexity of the decision making context. Problem complexity can overstrain the physical constitution of our brain and therefore rational decision making can experience great difficulty when dealing with complex problems. Conscious thoughts in this case suffer from low capacity making it less suitable for very complex problems [32, p. 1005] [17, pp. 19-20] [7, p. 236]. Dane & Pratt [6, p. 41] see the problem characteristics as one of two factors which influence the intuitive effectiveness. They postulate that the more increasingly unstructured the problems get the more effective intuitive judgment becomes versus rational analysis. For Dane & Pratt [6, p. 45] ill-structured problems are conducive to the intuitive decision making process because of the absence of well accepted decision making rules. In a more general sense there are various existing conceptualizations of problem structures. At first, there is the clarity of the problem's goal state. If the goal is not adequately specified this can produce a weakness in the structure and therefore can result in an ill-structured problem. Further, the problem structure can be conceptualized by how well it can be formulated explicitly



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

and quantitatively and how it then can be solved with well known techniques. In this sense the structure of the problem can be determined on the degree of clarity which the decision maker gets from his task. Next, the problem structure also can be conceptualized by the process. In this case a problem is ill-structured when there is no effective solution procedure to solve the problem. In the case of a well-structured problem the problem may still be difficult but there is a clear procedure on how to solve it. Finally, the structure of the problem is linked to the knowledge of the problem solver. A problem can be well-structured if the problem solver is familiar with the knowledge needed to solve the problem or, in contrast, the problem can be ill-structured if the problem solver does not have adequate knowledge of the problem. In this case, regardless, of the initial description of the structure, it is the behavior of the problem solver making the ascriptions to the structure of the problem [33, pp. 1492-1497]. Joanssen [15, p. 66] therefore clusters problems into three kinds: puzzle problems, well-structured problems and ill-structured problems. Puzzle problems for him are well-structured, have a single correct answer and all elements which are required for the solution are known. Well-structured problems for him require the use of a limited number of concepts, rules and principles, a well-defined initial state, a known goal state and a constrained set of logical operators. In contrast ill-structured problems are typically in a specific context where one or more aspects are not well specified.

Outcomes or results in decision making in business management can be characterized by different dimensions of efficiency. For Gzuk [34, p. 5], to achieve efficiency in the decision making process there are two conditions which need to be fulfilled: First, a decision must realize the most efficient ratio between output and input and second, a decision must bring results which ensure that the aimed objectives will be achieved. To determine and to measure efficiency in the decision making process for Gzuk [34, pp. 54-57] it is therefore necessary to split the total construct of efficiency into single dimensions. He advocates for three components which allow describing the dimensions of efficiency the best: The first component is described by the target of the process or the object, the second component by the input which means what resources are allocated to the process or the object and the third component the output which stands for the result of a process or the object. This brings Gzuk [34, p. 57] to a multi-dimensional model. Using this multi-dimensional model allows Gzuk to measure various single efficiency dimensions and then by combining them, to determine the total efficiency. Neuert [4, p. 115] supports this view, by describing as one dimension the material efficiency where the measurement is a realistic input and output in commercial activities which can be measured with objective criteria like earnings, profitability, growth and independence. Bronner [35, pp. 39-40] refers to this part of efficiency as the economical efficiency. In contrast, for Neuert [4, p. 117], in addition to the material efficiency, the personnel efficiency has rather subjective results on the decision making processes. As subjective results he understands expected team results like identification with the team work, self reflection of the group behavior and the individual role within the group. In summary he characterizes the personnel efficiency as the subjective evaluation of decision makers, concerning their results of the decision making process as to their self reflection on their behavior during the decision making process. For Bronner [35, p. 40] it is not possible to measure the personnel efficiency on an objective base. He advocates measuring it via the personal activity of the decision maker within a decision making process. As a third dimension Neuert [4] sees the formal efficiency, which characterizes the comparison of the aimed target or the desired situation with the current situation. In this sense a higher coincidence between the targeted and the current



state/situation indicates a higher efficiency and in turn a lower coincidence between the targeted and the current situation which indicates lower efficiency.

Personality predetermination/cognitive styles are mostly measured by psychological self report instruments. Some of the most well known and most used measures for the cognitive style or intuitive/rational behavior [36, p. 15] [37] [38, p. 17] [39] [5] [40] [27] include the Cognitive Style Index [3], the Agor Intuitive Management Test [41], the Rational-Experiential Inventory [42] and the Myers-Briggs Type Indicator [43]. The Cognitive Style Index (CSI) was designed by Allinson & Hayes [3] to assess individual preferences on information processing. It distinguishes between two different cognitive styles: an intuitive style which emphasizes feelings, openness and global perspective and an analytical style which emphasizes reasoning, detail and structure. With a relatively small amount of items (38 items with 3-point ratings) the CSI is convenient for administrating within large scale organizations. To test the use of intuition in management decision making Agor [41] started in 1981 testing executives from a wide range of organizations with the Agor Intuitive Management Test (AIM). The AIM is a self report questionnaire including two parts. The first part reflects the ability to use intuition and consists of twelve questions which were taken from the Myers-Briggs Type Indicator (MBTI[®]). Depending on the answer of the questioner the first part gives an indication on the preferred cognitive style (intuitive or rational). The second part of the AIM test consists of ten questions and measures the actual use of intuition. Epstein introduced with the Rational-Experiential Inventory (REI) a measurement to assess the preference for rational versus intuitive thinking on the basis of the Cognitive-Experiential Self Theory (CEST) [42]. The REI distinguishes between two cognitive styles: a rational style which is measured by items being adapted from Need for Cognition (NFC) scale [44] and an experiential style which is measured by the Faith in Intuition scale. These scales are again divided into subscales of ability and favorability. The ability subscale reflects the individuals' belief in their ability on using rational or experiential thinking and the favorability subscale reflects the preference to engage in this kind of information processing [5]. The Myers-Briggs Type Indicator (MBTI[®]) is one of the widely used measures of intuitive traits [39]. The MBTI[®] is a self-reported personality construct which is based on the Jungian theory [21]. The MBTI[®] identifies basic preferences on four dichotomies. Those basic preferences describe different ways of how people perceive information (Sensing-Intuition dichotomy) and different ways of making judgments (Thinking-Feeling dichotomy) in combination with different attitudes (Extraversion-Introversion and Judging-Perceiving dichotomy). From a theoretical point of view there are two mental functions, the Sensing/Intuition (S-N) scale which measures the holistic nature of intuition and the Thinking/Feeling (T-F) scale which measures the affective nature of intuition [5]. The MBTI[®] identifies 16 different personality types which result from the interactions between the four dichotomies [43].

Hypotheses for the Decision Making Behavior and Efficiency Outcomes in Management Decisions Making

When taking the theoretical background into account, it seems that individuals facing simple decision making situations perform well when taking rather conscious, deliberate thoughts where as participants facing complex decision making situations perform better when taking unconscious, intuitive thoughts. There seems to be a clear link between the cognitive style and the



structure of the problem. The more increasingly unstructured the problems get the more effective intuitive judgment becomes versus rational analysis. Ill-structured problems therefore are conducive to the intuitive decision making process because of the absence of well accepted decision making rules and vice versa [6] [32]. Intuitive behavior can be characterized as automatic, rapid, effortless, associative and holistic, using heuristics to solve problems which leads to the conclusion that intuitive behavior seems to be more appropriate and therefore more efficient when solving ill-structured problems. In contrast, rational behavior can be characterized as process orientated, logical-reason orientated and requires justification via logic, using analytic approaches to solve problems which leads to the conclusion that rational behavior seems to be more appropriate and therefore more efficient when solving well-structured problems.

Based on this conclusion the following hypotheses are formulated:

- H₀: Intuitive behavior in the decision making process leads to higher socioeconomic efficiency within certain problem categories
- H₀₁: Intuitive behavior in decision making process leads to higher efficiency within ill-structured problems than rational behavior
- H₀₂: Complimentary intuitive and rational behavior in the decision making process leads to a higher efficiency in mid-structured problems than sole intuitive or rational behavior
- H₀₃: Rational behavior in decision making processes leads to higher efficiency in well-structured problems than intuitive behavior
- H₀₄: Rational behavior in decision making processes leads to lower efficiency within ill-structured problems than intuitive behavior
- H₀₅: Intuitive behavior in decision making processes leads to lower efficiency in well-structured problems than rational behavior

Causal Model for the Empirical Investigation

Based on the theoretical background and on the hypotheses, a path analyses is used to select the relevant causal factors and to establish the relationships between the independent and dependent variables, allowing then the setting up of a causal model (Figure 1). The latent exogenous measurement variables x_1, x_2, x_3 and x_4 provide information about the nature of the latent exogenous independent variable X (personality predetermination). The independent structural variable X influences the intervening variables $Z_w \dots Z_i$ and the dependent $Y_w \dots Y_i$ variables. These dependent variables ($Y_w \dots Y_i$) again are operationalized and measured by the latent endogenous variables $y_{w1} \dots y_{i3}$.

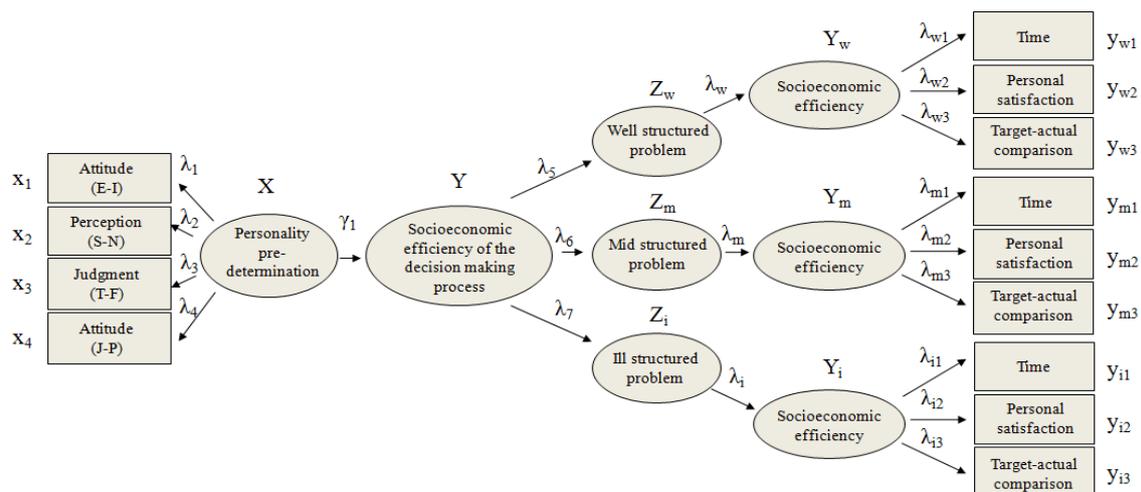
The Myers-Briggs Type Indicator is chosen for the determination of the personality/cognitive style, as the MBTI[®] has proven to be a valid and reliable instrument as many studies have been published. And especially because the MBTI[®] shows strong relationship with four out of five scales of the big five model of personality, measured by the NEO-PI [45]. According to Jung's [21] and Briggs Myers et al. [43] theory, the four dichotomies will be used to assess the personality predetermination. The intervening variable (Z), the problem structure, is operationalized by devoting three different kinds of structures with the well-structured problem (WSP), the mid-structured problem (MSP) and the ill-structured problem (ISP). Based on the theoretical background the three different structures (WSP, MSP and ISP) are characterized by the following definitions. **Ill-structured problems (ISP)** can be specified by the following elements: 1) goals are defined vaguely



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

or not at all, 2) the problem description is not clear or well enough defined, 3) has no single objectively correct solution, 4) information to solve the problem is not within the problem statement, 5) the problems are in a special context where one or more aspects are not specified, 6) in between-domain transfer capabilities are needed, 7) there is no execution program or algorithm available to solve the problem in a routine, and finally 8) solutions may not be final, rather a plan is put in place to find out if the solution works in reality based on the implementation and evaluation. Problem solving in this case becomes an iterative process. In contrast **well-structured problems (WSP)** can be specified by the following elements: 1) have well defined initial state and well defined goals, 2) have a single correct answer, 3) all elements which are required for the solution are known, 4) problem solving requires using rules and strategies like logical, algorithmic processes which ensure a correct answer, and 5) the current state of the problem can be consistently compared with the goal state. For **mid-structured problems (MSP)** the following definitions are adopted: 1) have a defined initial state, 2) goals are known, but as information, findings and data might be implicitly embedded in the problem and must be formulated and found by the individual, 3) require the use of a limited number of concepts, rules and principles, and 4) knowledge of skills of how to solve well-structured problems is needed (metacognition).



Legend of the causal model:

- X = Independent structural variable (Personality predetermination)
- Y = Dependent structural variable (Socioeconomic efficiency of the decision making process)
- Y_w...Y_i = Socioeconomic efficiency of the decision making process depending on the problem structure (well-structured, mid-structured, ill-structured)
- Z_w...Z_i = Intervening structural variable (structure of the problem)
- x₁...x₄ = Latent exogenous measurement variables (personality predetermination)
- y_{w1}...y_{i3} = Latent endogenous measurement variables (socioeconomic efficiency)
- γ_1 = Correlation degree between the latent exogenous and latent endogenous variable
- λ_1 ... λ_{13} = Correlation degree between the structural and measure variable

Figure 1. Causal analytical model for the relationship of personality traits, behavioral approaches and socioeconomic efficiency in decision making



The determination of the socioeconomic efficiency can be accomplished by various constructs. Especially the choice of the efficiency dimensions is always related to the judgment of the observer. To operationalize the dependent latent endogenous variables the socioeconomic efficiency will be split into three dimensions: the formal efficiency, the material efficiency and the personal efficiency [4, p. 114]. By definition the decision making process can be understood as a target orientated process (target-output relationship) where from a current/actual state we aim to reach a future/target state. In this sense the decision making with its various sub processes can be seen as a formal instrument for solving problems by taking choices when selecting between alternatives [34, p. 24]. The comparison between those alternatives can be described as formal efficiency. The level of formal efficiency can be determined by comparing the aimed target or the desired situation with the current situation. The material efficiency in decision making relates to the economic results and can be understood as an input-output relationship of corporations which is measured by criteria like profit, growth, rate of return, etc. Management science has created a series of key indicators to display the material efficiency in decision making. Mostly these are measures which indicate economical activities as input-output relationships with performance indicators like profitability, cost and returns or cost and benefits. The formal and the material efficiency deal rather with the “hard facts” and reflect more the economical and therefore the objective detectable and reproducible side of decision making. The personal efficiency reflects more the social psychological and subjective part in decision making and therefore deals with results which can be considered as “soft facts” and are related to the emotions, feelings, acceptance and satisfaction of individuals.

Research Method for the Empirical Investigation

The assessment of the personality predetermination by the MBTI[®], which will also reflect the behavioral aspects of our hypotheses, will be done before the laboratory experiment. This will allow the pre-selection of the participants in accordance with their personality/cognitive style (rational versus intuitive decision making styles). Within the laboratory experiment the participant will receive one out of three tasks with a dedicated structure (well-, mid- or ill-structured problem) and will be asked to solve the problem according to the description of the problem statement. This will allow testing every one of the three problem structures with participants having rational and intuitive decision making styles (Figure 2).

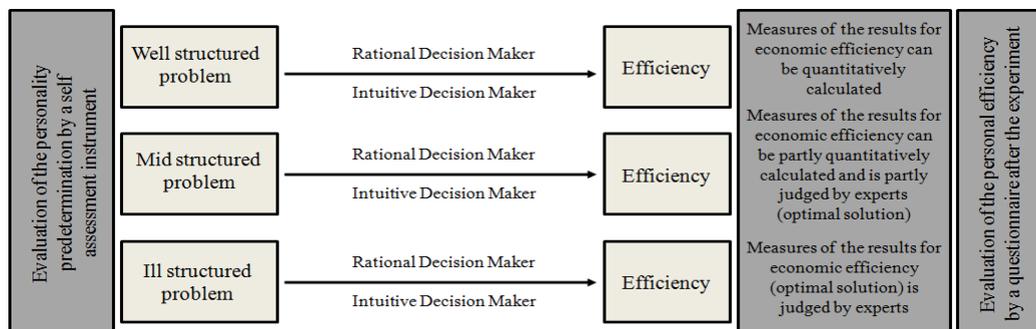


Figure 2. Structure of the empirical experiment



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

According to the causal model (Figure 1) the time (also as an indirect indicator for costs) will be the measurement variable to track the material efficiency dimension. So the time consumption to fulfill a certain task will provide information about the material efficiency. The formal efficiency will be tracked by comparing the results of problem solutions of the participants to the “optimal results”. As the well-structured tasks, by definition, are tasks which can be solved quantitatively by a mathematical algorithm, the indicator for an optimal result for a well-structured problem task will be a correct figure done by a calculation. For the ill-structured tasks where by definition the problem constellation cannot be calculated by a mathematical algorithm and might not have an objective result, the optimal result will be determined by the judgment of experts. For the mid-structured problem tasks, which are characterized by having a part within the problem structure which can be determined by a calculation and another part which might have no objective solution, the optimal result will be a combination of both, a calculation of a figure and a judgment of experts (Figure 2). The personal efficiency will be tracked with a questionnaire after the participants have finished their problem solving task. A questionnaire was chosen as a data gathering method for personal efficiency measurement; as in this case personal attitudes (like satisfaction, self reflection, etc.) are hard or almost impossible to track by observing participants in an empirical experiment.

Conclusion – Next Steps

Theoretical implications from a literature review give clear evidence that individuals facing simple decision making situations perform well when making conscious and deliberate thoughts. Whereas participants facing complex decision making situations perform better when making unconscious, intuitive thoughts. Theory establishes here a clear link between the cognitive style and the structure of the problem. The more increasingly unstructured the problems get the more effective intuitive judgment seems to become versus rational analysis. Ill-structured problems therefore are conducive to an intuitive decision making process due to the absence of well accepted decision making rules and vice versa [6] [32].

To proof these theoretical implications in a next step an empirical study according to the proposed setup (Figure 2) should be conducted and evaluated by the causal model (Figure 1). This allows falsifying or supporting the hypotheses and provides a deeper insight if these theoretical implications can be transferred into application orientated approaches.

If the hypotheses are supported by the empirical experiment, this could in a further step allow to build an application orientated approach for organizations on how to use problem type categories as guidelines to advice when to use intuitive, rational or complementary approaches in the decision making process. This could support organizations having clearer specifications and more security when it comes to delegation of decisions. Organizations could also introduce intuitive judgments as a part of their decision making culture without running the risk of having decisions made by random selection of choices.

References

1. Henry Mintzberg. The Fall and Rise of Strategic Planning. *Harvard Business Review*, January-February, 1994, pp. 105-114.
2. Herbert A. Simon. *Administrative behavior. A study of decision-making processes in administrative organizations*. 4th ed. New York, USA: Free Press, 1997, 368 p.



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

3. Christopher W. Allinson, John Hayes. The Cognitive Style Index: A Measure of Intuition-Analysis for Organizational Research. *Journal of Management Studies*, Vol. 33, No. 1, 1996, pp. 119-135.
4. Josef O. Neuert. Planungsgrade. Eine experimentelle Untersuchung zum Zusammenhang zwischen Planungsverhalten und Planungserfolg. Spardorf: Rene F. Wilfer, 1987, 358 p.
5. Jean E. Pretz, Kathryn S. Tetz. Measuring individual differences in affective, heuristic, and holistic intuition. *Personality and Individual Differences*, Vol. 43, 2007, pp. 1247-1257.
6. Erik Dane, Michael G. Pratt. Exploring intuition and its role in managerial decision making. *Academy of Management Review*, Vol. 32, No. 1, 2007, pp. 33-54.
7. Eberhard, Witte. *Innovative Entscheidungsprozesse. Die Ergebnisse des Projektes "Columbus"*. Tübingen, Germany: Mohr, 1988, 324 p.
8. L. J. Bourgeois III, Daniel W. McAllister, Terence R. Mitchell. The effects of different organizational environments upon decisions about organizational structure. *Academy of Management Journal*, Vol. 21, No. 3, 1978, pp. 508-514.
9. Kathleen M. Sutcliffe, Gerry McNamara. Controlling Decision-Making Practice in Organizations. *Organization Science*, Vol. 12, No. 4, 2001, pp. 484-501.
10. Dan Ariely, Dan Zakay. A timely account of the role of duration in decision making. *Acta Psychologica*, Vol. 108, 2001, pp. 187-207.
11. Marta Sinclair, Neal M. Ashkanasy. Intuitive decision-making amongst leaders: More than just shooting from the hip. In Pre Print Version. Later published in *Mt Eliza Business Review*, 2002, pp. 1-17.
12. Werner Kirsch. *Entscheidungsprozesse II. Informationsverarbeitungstheorie des Entscheidungsverhaltens*. Wiesbaden, Germany: Betriebswirtschaftlicher Verlag Dr. Th. Gabler, 1971, 232 p.
13. Werner Kirsch. *Entscheidungsprozesse III. Entscheidungen in Organisationen*. Wiesbaden, Germany: Betriebswirtschaftlicher Verlag Dr. Th. Gabler, 1971, 287 p.
14. Josef O. Neuert. The Impact of Intuitive and Discursive Behavioral Patterns on Decision Making Outcomes: Some Conjectures and Empirical Findings. *WDSI Annual Conference Readings, Lake Tahoe, USA*, April 6-10, 2010, pp. 4471-4496.
15. David H. Jonassen. Instructional Design Models for Well-Structured and Ill-Structured Problem-Solving Learning Outcomes. *Educational Technology Research & Development*, Vol. 45, No. 1, 1997, pp. 65-94.
16. Hyejoo Lee, Younsong Cho. Factors Affecting Problem Finding Depending on Degree of Structure of Problem Situation. *The Journal of Educational Research*, Vol. 101, No. 2, 2007, pp. 113-124.
17. Allard C. R. van Riel, Hans Ouwersloot, Jos Lemmink. Antecedents of Effective Decision Making: A Cognitive Approach. *The IUP Journal of Managerial Economics*, Vol. 6, No. 4, 2006, pp. 7-28.
18. Stewart Shapiro, Mark T. Spence. Managerial intuition: A conceptual and operational framework. *Business Horizons*, Vol. 40, No. 1, 1997, pp. 63-68.
19. Herbert A. Simon. The Structure of Ill-Structured Problems. *Artificial Intelligence*, Vol. 4, 1973, pp. 181-201.
20. Karl R. Popper. *Logik der Forschung*. 11th ed. Edited by Herbert Keuth. Tübingen, Germany: Mohr Siebeck, 2005, 601 p.
21. Carl G. Jung. *Psychological Types*. London, Great Britain: Routledge, 1921/1971, 617 p.
22. Malcom R. Westcott. *Toward a Contemporary Psychology of Intuition. A Historical, Theoretical, and Empirical Inquiry*. New York: Holt, Rinehart and Winston, 1968, 228 p.
23. Vicki L. Sauter. Intuitive decision-making. *Communications of the ACM*, Vol. 42, No. 6, 1999, pp. 109-115.
24. Ivan Sarmany-Schuller. Decision Making under Time Pressure in regard to preferred cognitive style (analytical-intuitive) and study orientation. *Studia Psychologica*, Vol. 52, No. 4, 2010, pp. 285-290.
25. Liebermann, M. D., Jarcho, J. M., Satpute. Evidence-Based and Intuition-Based Self-Knowledge: An fMRI Study. *Journal of Personality and Social Psychology*, Vol. 87, No. 4, 2004, pp. 421-435.
26. Kirsten G. Volz, Yves D. von Cramon. What Neuroscience Can Tell about Intuitive Processes in the Context of Perceptual Discovery. *Journal of Cognitive Neuroscience*, Vol. 18, No. 12, 2006, pp. 2077-2087.



New Challenges of Economic and Business Development – 2012

May 10 – 12, 2012, Riga, University of Latvia

27. Leanne S. Woolhouse, Rowan Bayne. Personality and the Use of Intuition: Individual Differences in Strategy and Performance on an Implicit Learning Task. *European Journal of Personality*, Vol. 14, 2000, pp. 157-169.
28. Shiloh Shoshana, Salton Efrat, Sharabi Dana. Individual differences in rational and intuitive thinking styles as predictors of heuristic responses and framing effects. *Personality and Individual Differences*, Vol. 32, 2002, pp. 415-429.
29. Seymour Epstein. *Cognitive-experiential self-theory of personality*. In: T. Millon & M. J. Lerner (Eds.), *Comprehensive Handbook of Psychology*, Volume 5: Personality and Social Psychology. Hoboken NJ, USA: Wiley, 2003, pp. 159-184.
30. Seymour Epstein. *Cognitive-experiential self-theory: An integrative theory of personality*. In: R. C. Curtis (Ed.), *The Relational Self, Theoretical Convergences in Psychoanalysis and Social Psychology*, New York, USA: Guilford Press, 1991, pp. 111-137.
31. Adam L. Alter, Daniel M. Oppenheimer, Nicholas Epley, Rebecca N. Eyre. Overcoming intuition: Metacognitive difficulty activates analytic reasoning. *Journal of Experimental Psychology: General*, Vol. 136, No. 4, 2007, pp. 569-576.
32. Ap Dijksterhuis, Maarten W. Bos, Loran F. Nordgren, Rick B. van Baaren. On Making the Right Choice: The Deliberation-Without-Attention Effect. *Science*, Vol. 311, 2006, pp. 1005-1007.
33. Gerald F. Smith. Towards a Heuristic Theory of Problem Structuring. *Management Science and Engineering*, Vol. 34, No. 12, 1988, pp. 1489-1506.
34. Roland Gzok. *Messung der Effizienz von Entscheidungen*. Tübingen: Mohr, 1975, 490 p.
35. Rolf Bronner. *Entscheidung unter Zeitdruck*. Tübingen, Germany: Mohr, 1973, 180 p.
36. Stephen C. Harper. Intuition: What Separates Executives from Managers. *Business Horizons*, Vol. 31, No. 5, 1988, pp. 13-19.
37. Gisle Henden. *Intuition and its Role in Strategic Thinking*. Thesis (PhD). BI Norwegian School of Management, Oslo, 2004, 189 p.
38. Gerard P. Hodgkinson, Janice Langan-Fox, Eugene Sadler-Smith. Intuition: A fundamental bridging construct in the behavioral sciences. *British Journal of Psychology*, Vol. 99, 2008, pp. 1-27.
39. Janice Langan-Fox, Debbie A. Shirley. The nature and measurement of intuition: cognitive and behavioral interests, personality, and experiences. *Creativity Research Journal*, Vol. 15, 2003, pp. 207-222.
40. William J. Ritchie, Robert W. Kolodinsky, Karen Eastwood. Does Executive Intuition Matter? An Empirical Analysis of its Relationship with Nonprofit Organization Financial Performance. *Nonprofit and Voluntary Sector Quarterly*, Vol. 36, No. 1, 2007, pp. 140-155.
41. Weston H. Agor. How Top Executives Use Their Intuition to Make Important Decisions. *Business Horizons*, Vol. 29, 1986, pp. 49-53.
42. Rosemary Pacini, Seymour Epstein. The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology*, Vol. 76, No. 6, 1999, pp. 972-987.
43. Isabel Briggs Myers, Mary H. McCaulley, Naomi L. Quenk, Allen L. Hammer. *MBTI manual. A guide to the development and use of the Myers-Briggs type indicator*. 3rd ed. Palo Alto CA, USA: Consulting Psychologists Press, 2003, 420 p.
44. John T. Cacioppo, Richard E. Petty. The Need for Cognition. *Journal of Personality & Social Psychology*, Vol. 42, No. 1, 1982, pp. 116-131.
45. Robert R. McCrae, Paul T. Costa. Reinterpreting the Myers-Briggs Type Indicator from the Perspective of the Five-Factor Model of Personality. *Journal of Personality & Social Psychology*, Vol. 57, 1989, pp. 17-37.