

RESEARCH ARTICLE

DO MANAGERS DECIDE COMPLEX INVESTMENT PROJECTS INTUITIVELY?

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ABSTRACT

In the current scientific discussion intuition is mostly assessed normatively and the question will be answered if intuition should be used or not. But as an unconscious process intuition cannot be directed by the decision maker. Therefore, the question if intuition should be used does not occur at all, but one should rather ask how intuition is being used by decision makers. In the present study decision makers were asked how they use their intuition and made their rational decisions in the case of complex investment decisions. With this study it can be shown which forms of decisions decision makers prefer in practice. This study can also show which influence experience has on the use of intuition. To consider the, until now unconsciously intuition into the decision-making process and make it visible for third parties, a procedure is proposed that validate and illustrate transparent the intuitive judgment process.

Key words: Intuition, Rational Decisions, Unconscious Decisions, Complex investment Decisions, Management Behavior.

INTRODUCTION

Decisions can be made rationally or following an intuition. Rational decision making processes take all available information and decision relevant variables depending on this information into account. The assessment of the possible decision results, alternatives and probability of occurrence needs time. In contrast, intuition is an automatic and unconscious process, which happens very quickly. The intuition of the decision maker is based on unconsciously perceived information and made experiences. Based on his past experiences the decision maker subjectively judges the probability with which the results of his decision will happen. (Possehl, Meyer-Grashorn, 2015, p. 11) (Laux, et al., 2014, p. 92) Thus, intuition can be defined as an unconscious decision making process in which a decision maker makes a decision based on unconsciously gathered information as well as on past experiences, without a conscious or rational conclusion. (Possehl, Meyer-Grashorn, 2015, p. 11). The differences between rational and intuitive decision making process will be explain through the Dual Process Theory from Kahneman. Kahneman distinguish between intuitive decision-making processes (System 1), which is fast, automatic, effortless, associative, implicit and often emotional and in rational decision-making processes (System 2) which are slower, serial, effortful, but likely consciously more monitored and deliberately controlled. (Kahneman, 2003, p. 698). The intuitive thinking process of the decision maker will only become conscious and be seen as implicit knowledge when forming a judgement. (Holtfort, 2013, p. 32) "Implicit knowledge results from the individual processing of lived experience that is to say from 'practice for the practice'.

That also means that the acting person often is bound to a specific context." (Hänsel, 2014, p. 3) If this context is missing then the use of intuition may lead to wrong decisions. In the case of an intuitive decision making process the experiences are saved in the unconscious and they validate implicit knowledge. The decision maker however, decides consciously if he wants to take the suddenly perceived implicit knowledge into account for his decision. The implicit knowledge is the result of the unconscious perception of information, events and emotions. Studies have shown that the unconscious perception makes a much higher processing of information possible than conscious perception. (Holtfort, 2013, p. 7) Therefore rational decisions are slower than decisions relying on intuition. (Kahneman, 2011, p. 33) The influence of rational decisions and intuition on decision can be shown in a model as follows:

The advantages of intuitive decisions are based on a higher processing capacity of decision-making variables and on a faster processing of events and information's, as by rational decisions. With the unconscious perception and information processing, decision makers are able to use a broader database to calculate the occurrence probability of future events, than with rational decisions. (Dijksterhuis, 2010, p. 62) However this can, but not must lead to more successful decisions, than by rational decisions. Nevertheless, the intuitive decision-making process is limited by the entrepreneurial and individual cognitive basic conditions at the decision time, as well as with possible cognitive biases of the decision makers. Complex decisions, such as decisions to start a direct investment, are taken in the entrepreneurial practice not only as an individual decision, but also as group decisions. Therefore an intuitive decision has to document and to proof towards to shareholders, banks, employees, group decision members, or other third parties during the decision-making process and for the

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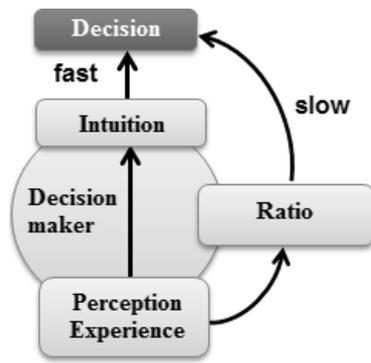


Fig. 1. Model of rational decisions and intuition,
source: self-illustration

implementation of the decision. But the unconscious decision-making process of an intuitive decision cannot prove and document towards to third parties. These significant requirements and entrepreneurial basic conditions for the practical use and implementation of intuitive decisions are rarely considered in the scientific discussion. The individual cognitive basic conditions of the decision makers are influenced by their experience. In complex decision situations, decision makers use their experience to recognize the pattern of known or similar decision situations. (Simon, 1992, pp. 150–161) With increasing experience decision makers can recognize and use more patterns for intuitive decisions. (Kahneman, Klein, 2009, p. 520) However, decision maker use their experience even in complex decision situations to which they have only similar and subjective as comparable perceived experiences. This decision process is called representativeness heuristic. The representativeness heuristic is a heuristic judgment for rapid and simplified assessment of future probabilities of events. A decision will assume the probabilities of events as more likely; the closer these events are in a factual or situational context of the decision. (Keuper, Hogenschurz, 2010, pp. 118-119) According to the Ellsberg Paradox, decision makers assume events with a known probability distribution as more probable; than events with an unknown probability distribution and this also even the risk have the probability of occurrence is the same. (Ellsberg, 1961, pp. 643-669) However, decisions which based on similar decision situations, not always lead successful decisions, because different decision situations also lead different and not comparable results. In addition, decision maker use their knowledge to evaluate complex decision situations. But this knowledge can lead, through an overconfidence of experienced decision makers, to a unilaterally assessment of complex decision situations. (Zeuch, 2010, p. 83) Such these cognitive biases of the decision makers can cause wrong decisions.

Decision makers will only use their intuition for intuitive decisions, if they trust their intuition. (Gigerenzer, Gaissmaier, 2016, pp. 19-42) Therefore define the confidence of the decision makers in their intuition, the individual cognitive basic conditions. In addition, the individual cognitive basic conditions are defined by the experiences of the decision makers with intuitive decisions. If decision makers have already experienced negative experience with intuitive decisions, decision makers use their intuition limited. In contrast, positive experiences lead a greater use of intuition. But a positive attitude to the intuition does not lead the use, when the entrepreneurial basic conditions requires to document and to proof the decision process. Complex decisions are influenced by a multitude of variables and relationships.

(Feess, 2016) Decision makers use heuristics when the knowledge and information's are limited in complex decision situations. Therefore, decision makers use with heuristics easily accessible pattern and easily understandable information to analyze and decide complex decision situations. Due to limited resources, decision makers strive with heuristics only satisfactory decisions. (Taschner, 2013, p.23) With intuitive decisions processes, decision makers use heuristics unconsciously. However, heuristics limited through the disregard of decision variables the decision matrix of the decision-making. Therefore are wrong decisions can be possible. Another disadvantage can be based on the intuitive perception of decision makers. According to a study of Chabris and Simons concentrating decision makers their perception on some significant events in their environment and will be blind for unusual events, such as a bouncing Gorilla. Through the so-called "Monkey Business Illusion" effect, selective perception causes that events and decision conditions can be overlooked. (Chabris, Simons, 2011, pp. 16-25) (Chabris, Simons, 1999, pp. 1059-1074) See also Figure 2.

In the scientific research as well as in the entrepreneurial practice is the opinion divided if decision makers should make use of their intuition when coming to a decision. Thus, e.g. psychologist Klein strictly favours trusting the intuition of experts, as experts are able to identify weak signals and possible anomalies concerning a decision problem due to their experience and the unconscious processing of additional information. (Klein, 2004, p. 104) In entrepreneurial practice top managers increasingly make use of their intuition to come to a decision. (Rausch, 2013, p. 16) In contrast, other scientist, such as e.g. Kahneman, take position against using intuition to come to a decision, as unconscious heuristics and cognitive distortions may influence the intuitive decision negatively and may lead to wrong decisions. (Kahneman, 2011, p. 289-293) Apart from the manipulation of information or persons, intuitive decisions can also be misunderstood or misinterpreted by the decision maker and thus wrong decisions may arise. (Kahneman, 2011, pp. 139-330)

Therefore based the controversial discussion on the normative idea of scientists, how decision makers should make decisions. Either decision makers only decide rationally, or decision makers decide subjectively and thus intuitively. Starting with those normative assumptions intuitive decisions are either seen as critical and error-prone, or as additionally usable instrument of decision making. But this discussion cannot explain why decision makers use intuition in operational practice with differing intensity. Therefore it should not ask whether decision makers use their intuition but rather how decision makers use intuition when making decisions.

The here considered entrepreneurial decisions are mostly decisions under uncertainty and is caused due to the uncertain corporate environment: Non-transparency and complexity – two aspects which don't necessarily but quite often correlate – require decisions for which the probability of occurrence and the result of the decision are not completely known. (Neumer, 2009, p. 10) This uncertainty is perceived as risk by the decision makers and causes risk-averse decision behaviour. Thus next to rational arithmetic risk assessment of a decision is also influenced by the subconscious process of intuition. If a decision maker uses intuition making his decision depends on his attitude towards intuition. (Hänsel, 2014, p. 13)

Fig. 2. Basic conditions of intuitive decisions, source: self-illustration

Basic conditions of intuitive decisions		
Entrepreneurial basic conditions	Individual cognitive basic conditions	Possible cognitive biases
Proof towards third parties	Lack of experience	Due to heuristics
Documentation of the decision	Lack of trust in intuition	Monkey Business Illusion effect

Table 1. Survey results on intuitive decision making behaviour, source: self-illustration

	It is not true	It is probably not true	It is per-haps true	It is quit probably true	It is certainly true
For complex decisions, such as a direct investment I make only factual founded decisions	3%	3%	21%	41%	33%
My decision about a direct investment based only on the result of an investment appraisal	3%	2%	24%	41%	31%
Intuitions ensure successful decisions	24%	29%	35%	12%	0%
I can rely on my intuition	9%	32%	37%	21%	1%
In complex situations, such as a direct investment, I decide complete intuitively	62%	16%	15%	6%	0%
For complex decisions, such as a direct investment my final decision based on my intuition	50%	16%	24%	10%	0%
If I am unsure about the success of a direct in-vestment, I only trust my intuition	42%	35%	17%	5%	1%

Table 2. Attitude of decision makers towards intuition, source: self-illustration

I can rely on my intuition	1-5 years	5-10 years	> 10 years
It is not true	27,3%	26,1%	22,1%
It is probably not true	27,3%	26,1%	30,9%
It is perhaps true	31,8%	34,8%	35,3%
It is quit probably true	13,6%	13,0%	11,8%
It is certainly true	0,0%	0,0%	0,0%
For complex decisions, such as a direct investment I make only factual founded decisions	1-5 years	5-10 years	> 10 years
It is not true	4,5%	4,3%	1,5%
It is probably not true	4,5%	0,0%	2,9%
It is perhaps true	18,2%	17,4%	23,5%
It is quit probably true	36,4%	43,5%	41,2%
It is certainly true	36,4%	34,8%	30,9%

Table 3. Variance analysis: influence of experience on the attitude towards intuition, source: self-illustration

ANOVA: Intuitive decision behavior							
Source	QS	df	VAR	F	P Value	F Critical	α
Between Groups(SSB)	0,6	2	0,3	0,4	0,7	3,1	No
Within Groups(SSW)	95,4	110	0,9				
ANOVA: Rational decision behavior							
Source	QS	df	VAR	F	P Value	F Critical	α
Between Groups (SSB)	1,7	2	0,8	0,9	0,4	3,1	No
Within Groups(SSW)	104,1	110	0,9				

The study

The study is based on the decision making situation concerning a direct investment in Brazil. A direct investment in Brazil is a complex investment and the investment result depends on a large number of corporate intern and extern influencing factors. (Autschbach, 2013, p. 4) In addition, the results of a direct investment can only be predicted with uncertainty, the market entry is connected with relatively high transaction costs and a direct investment is a longterm investment. The participants in the survey are decision makers in the management board of small and medium-sized enterprises (SMEs). For this study, decisionmakers in SMEs are of interest, as 95.6% of SMEs are the only or predominant livelihood and income source of the entrepreneurs and their families. (Müller, 2013, p. 6).

As a failed direct investment can influence the livelihoods of a decision maker negatively, one may assume that the decision makers are risk averse. On the one hand decision makers have to take the individual economic risk into consideration in their decision making process, on the other hand there is the economic risk of a direct investment. The particular economic structures and the complex and substantial investment are therefore particularly suited to validate the influence of intuition on decision making. 113 decision makers of the management board in SMEs which are also members of the IHK Wuppertal – Solingen – Remscheid (Chamber of Industry and Commerce) in Germany were interviewed. The confidence level was 95.4%. The participants were categorized according to their professional experience: 1-5 years = n 22, 5-10 years = n23 and > 10 years = 68.

Thus, an evaluation according to experience is possible. The questions were answered in a 5-part Likert scale.

Do managers decide rationally or intuitively?

The participants were asked if they exclusively made rational decisions in the case of a complex investment decision as, e.g., a direct investment. 73% of the decision makers who were asked stated that they made their decisions quite certainly or almost certainly exclusively based on rational investment calculation. Only a minority of 3% is of the opinion that they don't make fact-based and rational decisions. Thus of the majority of decision makers in SMEs make rational decisions in the case of complex decisions. This corresponds with the fact that 72% of the decision makers quite certainly or certainly make decisions based on the result of an investment calculation. 53% of the decision makers assume that intuition certainly or quite certainly doesn't assure successful decisions in the case of complex business decisions. In addition, only 1% of the decision makers hold the opinion that they can certainly rely on their own intuition. Obviously, decision makers lack the trust in their own intuition to use intuition in a decision making process. The most approaches to intuitive decision making processes assume that decision makers only realize intuitive decisions into actions when these are accepted rationally. (Metz-Göckel, 2011, p. 202) Also the current study confirms this assumption, because decision makers use their intuition only in a subordinate extent, due to the lacking trust in their intuition. If decision makers cannot trust their intuition, they will subjectively assume a higher probability of occurrence of a wrong decision, than they confirm in their intuition. Therefore, decision makers behave according to the Ellsberg Paradox. In addition, decision makers assume that their own intuition does not guarantee successful complex decisions. Therefore, 78% of decision makers prefer not making complex decisions exclusively based on intuition. In the case of complex decisions like as direct investments, at 66% the final decision is not based on the intuition of the decision maker. Also, none of the questioned decision makers would finally make a complex decision intuitively. The answer is consistent in the eye of the decision makers, as the majority of decision makers cannot rely on their intuition in the case of complex decisions. The lack of trust in their own intuition also has the consequence that 77% of the decision makers do not trust their intuition in the case of uncertain success of a direct investment. Altogether the answers provide a coherent picture and in addition they show a mostly unified basic attitude of decision makers towards intuition. As the majority of the decision makers do not trust their own intuition, decision makers use intuition only to a limited extent. The following table shows the results of the survey on intuitive decision making behaviour of decision makers in the case of complex investment projects: See table 1.

Survey results on intuitive decision making behaviour

According to this study in practice decision makers prefer rational decision processes. One reason why decision makers prefer investment calculation methods can be explained with the disadvantage of intuitive decisions. Intuitive decisions cannot be completely reconstructed by a third party, as neither the subconscious decision process nor the unconscious selection of decision alternatives can be explained by the decision maker. Thus intuitive decisions lack transparency.

“The big advantages of applying investment calculation methods lie in the reduction of the complexity of a decision making situation and the transparency of the way of planning. Only in this way complex entrepreneurial decision making situations can reach a rational ripeness for decision, whose consequences a management would not be able to oversee due to its complexity.” (Poggensee, 2015, p. 32) Thus, investment calculations allow a decision maker to reduce insecurity in the decision making process. Another important reason why decision makers prefer rational finding decision processes is, that decision makers can plan structured an investment object. In addition documented an investment calculation the investment decision and disclosed this decision to all parties concerned. (Poggensee, 2015, p. 32). In the case of complex decisions under insecurity, as for example with a direct investment in Brazil, wrong decisions are also possible. Such a wrong decision would have serious consequences for the enterprise thus the investment has to be justified and substantiated to involved third parties. (Gigerenzer, Gaissmaier, 2016, p. 20) In these situations decision makers can justify their decisions with the used investment calculation, because they can argue, that the results of the objective investment calculation were positive and thus the negative developments could not be foreseen. In contrast, with intuitive decisions decision makers do not have inter subjective replicable reasons for justification. Thus no decision maker, according to this study, would make a final intuitive decision in the case of complex investment decisions.

The influence of experience on the attitude towards intuition

The experience of a decision maker influences the attitude of a decision maker to his intuition in two ways: On the one hand decision makers use their experience in intuitive and rational decisions to evaluate the probability of decision results and on the other hand the attitude towards intuition relies on experience with intuitive decisions. As decision makers use their already made experience for intuitive and rational decision making processes, experience influences the forecast of future decision results, independent of the fact if an intuitive or a rational decision was made. (Götz, 2014, p. 21-23) For the use of experience in decision making processes it is decisive, if the experiences of the decision maker are related to the decision making situation. (Gigerenzer, Gaissmaier, 2016, p. 21) Whether decision makers use their intuition depends at all on their experience with intuition. Thus, with intuition experience influences the attitude of the decision maker regarding intuition. It can be assumed, that the attitude towards intuition depends on past results of intuitive decisions. Only if decision makers made sufficient positive experiences with intuitive decisions, decision makers can develop trust in their intuition. This raises the question whether increasing experiences indeed built up trust into intuition and that therefore the attitude towards intuition will be changing. In order to answer this question, the answers of the survey participants stating “I can rely on my intuition” and “For complex decisions, such as a direct investment I make only factual founded decisions” are analyzed according to their professional experience. Through the analysis of the two questions it is possible to analyse the rational and intuitive decision behaviour of decision makers. Table 2 shows that decision makers of all three age categories of experience assessed the reliability of their intuition with almost the same percentage distribution. See Table 2.

Thus the attitude of decision makers is stable regarding intuition and concerning all levels of experience. It stands out that almost no decision maker surely relies on his intuition. It is also striking that the majority of decision makers are not sure if they basically may rely on their individual intuition. Depending on the age categories of experience, the statements range from 34% to 45%. According to the responses from the table 1, use the majority of decision makers by complex investments quasi no intuitive decisions. The reasons are, that decision makers are not possible to justify intuitive decisions to third parties and that decision makers in majority subjectively not rely on their intuitive decisions. The rational decision behavior of decision makers is therefore affected by the low level of trust in their intuition. Because, decision makers get the experience that they cannot rely on their intuition, decision makers decides irrespective to their quantitative experience with a scope of 72% to 78% solely rational decisions.

In a next step it is validated, whether the attitude of the decision makers to their intuitive and rational decisions alter significantly with their increasing professional experience. As shown in the next table, results the ANOVA for question 1 and 2 no significant variations between and within the groups of different kinds of quantitative experience. The use of intuition is also depending to the conditions and circumstances at the decision point. It is for example, required to document the profitability of an investment against to a bank or to shareholders due to an investment appraisal; the use of intuitive decisions is not possible. Therefore it can be assumed, that decision makers have a stable basic attitude to their intuition and the use of intuition is also dependent on the circumstances at the decision point. See table 3.

Ratio versus intuition?

If we follow the normative discussion described above, intuitive decisions are either to be rejected or to be necessarily used. According to the present study, in practice decision makers prefer rational decisions and only use their intuition to a limited extent in complex investment decisions. The discussion could be over at this point as in practice the majority of decision makers decide rationally. However, intuitions come into existence unconsciously and suddenly. This leads us back to the question asked at the beginning. How can decision makers use their intuition to make the best possible decision? To answer this question the possible decision results of rational and intuitive decisions have to be analysed. In the case of the here investigated investment decisions, rational as well as intuitive decisions can lead to a positive or negative assessment of an investment object. From this follow four possible decision results.

In decision situation 1 the decision maker judges the investment result with the help of an investment calculation positive: The capital value of the investment is clearly positive and the repayment period is short. Nevertheless, the decision maker intuitively feels disturbed. Therefore, in decision situation 1 rational and intuitive decision results diverge. The intuitive disturbing emotions can differ in intensity. In decision situation 2 the decision maker intuitively and rationally judges the investment to be positive. Both investment assessments agree the same result and the decision maker sees his intuition as a positive affirmation of his rational investment calculation. Decision situation 3 is the opposite of decision situation 1.

In this case the decision maker sees the investment intuitively as advantageous. However, the investment calculation in decision situation 3 either comes up with a negative investment result or the expected investment result is worse than the requirement of the decision maker. As a result the decision maker will abolish the investment as rationally disadvantageous. These differences between rational and intuitive assessment of the investment can be perceived with differing intensity by the decision maker. Decision situation 4 is the opposite of decision situation 2. Both the rational as well as the intuitive investment assessment lead to a rejection of the investment. Because of this accordance intuition and ratio confirm each other and the decision maker will reject the investment.

Possible rational and intuitive decision situations

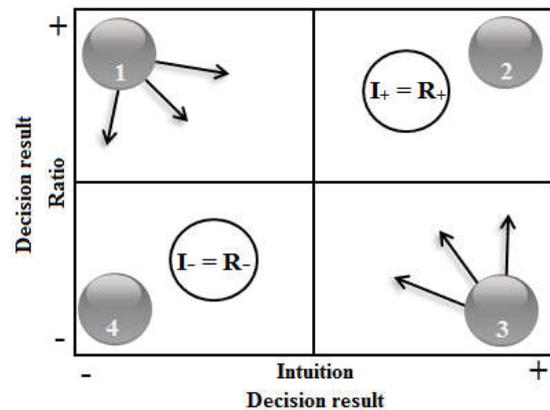


Fig.3. Possible rational and intuitive decision situations, source: self-illustration

The intuitive investment assessment in decision situations 2 and 4 do not cause a conflict for the decision maker when finding a decision, as the intuitive decision results in both decision situations confirm the rational decision result. In decision situations 1 and 3 the decision maker must decide if he wants to take the diverging intuitive decision results into account or whether he should ignore them. As the study has shown that the majority of the decision makers lack trust in their intuition it can be assumed that in practice decision makers will no longer take their intuition into account when intuitive and rational decision results diverge. But this can cause wrong decisions as in decision situations 1 and 3 decision makers may overlook risks as well as miss chances.

In decision situation 1 the investment calculation assesses the investment as positive, while the intuition advises against the investment. When a decision maker in this situation is asked why he rejects the obviously positively assessed investment, the decision maker cannot give an answer replicable by a third party, as intuition is an unconscious process. (Gigerenzer, Gaissmaier, 2016, p. 3) But in this decision situation intuition subconsciously has recognized risks which were not included by the investment calculation. An investment calculation is a model of the investment reality which can copy reality only incompletely. (Kruschwitz, 2014, p. 20). In decision situation 3, the investment is assessed negatively by the investment calculation and positively by the intuition of the decision maker. Therefore is the decision maker in a dilemma: Should a decision maker reject the investment and thus lose possible chances, or should the investment be made due to a vague advantage which cannot be determined closer?

Here the answer also can only be that the decision maker needs additional rational and transparent decision data for the final decision. As the decision maker has a positive intuitive attitude towards the investment, but the rational investment calculation has not come to a positive result for the investment, additional success potentials are required, that the investment will become success. To validate the positive intuition the decision maker can therefore look for further chances and different strategies. Strategic advantages result from innovative changes and have a long-term impact on the value of the enterprise. (vanSomeren, 2015, p. 145) If the decision maker finds new strategic advantages, which have not been taken into account, these strategic advantages have to be considered in a further investment calculation. Whether a decision maker implementing the investment after the recalculation, depends on the result of the new calculation. It can be assumed that in the case of a positive result of the re-investment calculation a modified investment will be implemented and in the case of a negative result the investment will be finally rejected.

If the intuitive investment assessment diverges from the rational assessment, a decision maker has not considered certain information's and causes in the first investment appraisal. Nevertheless, a decision maker is in this situation in a dilemma, because intuitive decisions are not quantifiable. A decision maker can therefore only constitute the intuitive decision values as subjectively perceived quantitative values. To consider the intuitive knowledge to the investment decision, a decision maker has to transfer the intuitive knowledge in quantitative values. Therefore it is possible to consider the intuitive knowledge into an investment appraisal. However, this is not an easy task, because the intuitive decision does lead to an acceptance or rejection of the rational decision, but rarely provides a justification for the intuitive decision. To consider the possible consequences of the intuitive decision as extensively as possible, a decision maker can use the scenario technique. The scenario technique enables the description of possible future developments of the investment. A scenario is therefore not possible to forecast future events, but is used to evaluate the occurrence probability of future expected results and causal processes of an investment.

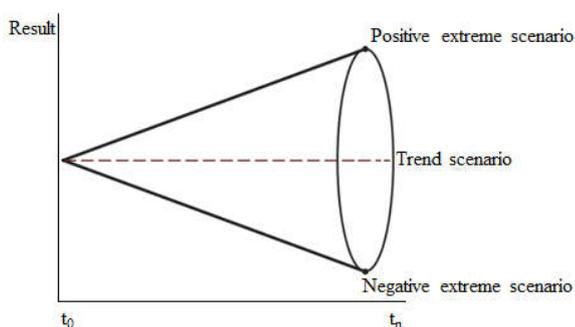


Fig. 4. Funnel model for representing scenarios, source: self-illustration based on Mißler-Behr

The possible scenarios can be represented according Mißler-Behr as a funnel model: (Mißler-Behr, 1993, p. 4). The average expected investment results are represented by the trend scenario. If a decision maker values an investment rationally positively, but intuitively negatively, the positive extreme scenario corresponds to the rationally expected results and the negative extreme scenario intentional to expected results.

The extreme scenarios reversed when decision makers evaluate the investment intuitively positively and rationally negative. For example, a decision maker can consider his intuition for the investing scenario, by using intuitively based and expected revenues, costs or risk premiums as extreme values. According to a study by Ashenfelter, significantly better prognoses of investments are possible if besides the investment calculation additional quantitative variables are taken into account and if these variables show cause-effect-relations relevant to the result. (Ashenfelter, 2007, p. 1 – 21) To solve the dilemma between positive investment calculation and negative intuition the decision maker may use additional quantitative variables which allow for a forecast of future proximate causes. This way, the result of the investment calculation is expanded with additional decision data. The advantage of this approach is that the additional quantitative data can be used interpersonally to assess the investment. Which quantitative data are useable, depends on those factors which influence of the decision to be made. Thus each decision situation has its unique cause-effect-relation. The study is based on the decision concerning a direct investment in Brazil. A direct investment is a lasting investment in a foreign market. (OECD, 2012, p. 100) The decision maker does have knowledge about the home market, his products and the competition, but the decision maker needs – as far as available – further quantitative data about the micro- and macro-economic market structures as well as knowledge about the behaviour of the political agents in the foreign market. (Tristram, 2013, p. 18). To validate the intuitive disturbing emotions additional quantitative data are to be assessed according to whether the intuitive disturbing emotions are to be confirmed or to be rejected. The additional quantitative data can lead to three possible results:

- The intuitive disturbing emotions is confirmed
- The intuitive disturbing emotions cannot confirmed clearly
- The intuitive disturbing emotions is not confirmed

If the results of the additional quantitative data confirm the intuitive disturbing emotions of the decision maker, the decision maker has to decide whether the previously unrecognized negative effects of the investment are an acceptable risk. Therefore changing the objective assessed additional risks the risk sensitiveness of the decision maker. If a decision maker implements the investment in spite of the new risks, depends on the risk aversion of the decision maker. It can be assumed, that a risk-averse decision maker in doubt will reject the investment as too risky. If the additional consideration of decision-relevant quantitative data cannot confirm the intuitive disturbing emotions conclusively, the decision maker will take this information only into account for decision-making, if the information has a subjectively expected influence on the investment for the decision maker. (Gleißner, 2011, p. 10) However, the intuitive disturbing emotions are not confirmed by the additional quantitative data; it can be assumed that the intuition of the decision maker is cognitively distorted and thus the negative intuitive investment assessment was caused. As, according to the study, the majority of the decision makers does not trust their intuition it may be assumed that decision makers will make no further use of the additional quantitative data in this decision situation. It should be noted, that through consideration of additional information and variables, as well as through transfer of intuitive decision-making into quantitative extreme values, an intuitive decision not change into a rational decision.

The intuitive decision remains subjective. However, the decision maker has now the possibility to consider the intuitive knowledge as quantitative values for an investment appraisal. Additionally, a decision maker can therefore indirectly document the intuitive knowledge. Through consideration of additional information, variables and intuitively perceived extreme values for a rational investment appraisal, a decision maker can use his intuition, even if he has only a low confidence in his own intuition. With the proposed method it is possible to integrate indirectly the intuition of decision-makers into a rational decision-making process. Therefore, the question whether decision makers should use their intuition for complex investment decisions is superfluous, because the intuition is integrated in rational decision-making process. Because a decision maker integrates his intuitive knowledge into the rational decision process, it is possible to validate and document the intuitive knowledge to third parties. Even if a decision maker does not transfer completely his intuitive knowledge into a rational decision process, possible cognitive distortions through intuition can be reduced.

In summary it can be stated, that in the case of positive or negative intuitive deviations from rational investment calculation processes the search for additional quantifiable and result-relevant data can fill this gap. If these additional quantitative data will be taken into account for a new investment calculation, thus the intuitive investment rating can be validated. In this way it is possible to make the intuition of decision makers interpersonally transparent and with a (rational) investment calculation method visible.

Conclusion of the study

In summary it can be stated that decision maker in general decides intuitively because intuition is an unconscious process. However, decision makers hardly use their intuition for complex investment decisions. Therefore, the study shows that the majority of decision makers decide in favor of rational decision methods at complex investment decisions. Reasons are possible cognitive distortions of the decision makers as well as the entrepreneurial and individual cognitive basic conditions which a decision maker has to take into account with intuitive decisions. Through the study it is possible to explain the influence to the individual cognitive basic conditions of decision makers. The individual cognitive conditions are defined by the experience of the decision makers and the confidence of decision maker into their intuition. But further research needs about the entrepreneurial basic conditions and about the possible cognitive distortions of the decision makers is necessary.

Additionally, the attitude of a decision maker regarding to the intuition is independent of the quantitative professional experience and does not change with increasing experience. Whether a decision maker considered his intuition in a decision-making process, depends also on the individual experiences with the intuition. The survey result shows, that decision makers independently from their scope of quantitative experience believe, that they cannot rely on their intuition. Thus, the attitudes of the decision makers towards to their intuition are stable over all experience levels. Additional shows the survey result that no decision maker believes that he can certainly rely on his intuition.

The rational decision behavior of the decision makers is influenced through the low level of trust of the decision makers in their intuition. Because the decision makers have made the experience that they cannot rely on their intuition, decision makers take, independently of the level of their quantitative experience, predominantly rational decisions. If decision makers cannot trust their intuition, a subjectively higher probability of occurrence of a wrong decision is assumed, as if decision makers trust of their intuition. Therefore, decision makers behave according to the Ellsberg paradox. Intuitions can confirm or contradict rational decisions. If intuitive and rational decisions diverge, can this lead that decision maker either overlooks risks, or awards chances. In both cases wrong decisions are possible. To make the best possible decision, it can recommend taking additional quantitative data into account. Therefore, a decision maker can consider previously unrecognized cause-effect-relations in the decision process and can also consider the intuitive disturbing emotions with a recalculation for the investment. Thus a rational and transparent validation of the subconsciously expiring intuition is possible. In addition due to this approach, intuitive as well as rational decisions can be taken into account in the decision process.

The intuitive decision of a decision maker can be used by integration of additional information, variables and intuitively perceived extreme values into the rational decision-making processes. Besides this, a decision maker transfers his intuitive knowledge in quantitative values and calculates the investment new under consideration of this additional information, variables and intuitively perceived extremes. Thus, a decision maker can also use his intuition in rational decision making processes, consider the intuitive decisions, document, validate and reduce possible cognitive distortions by the intuition. Because a decision maker integrates his intuitive knowledge into the rational decision process, it is possible to validate and document the intuitive knowledge to third parties. Even if a decision maker does not transfer completely his intuitive knowledge into a rational decision process, possible cognitive distortions through intuition can be reduced.

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