

Universitatea Babeş-Bolyai din Cluj-Napoca
Institute for Doctoral Studies
Faculty of European Studies

**A transdisciplinary approach to the management of
risks and of decision making processes**

- THE SUMMARY OF THE PHD THESIS -

Scientific coordinator: Acad. Prof. Univ. Dr. **Basarab NICOLESCU**, Faculty of European Studies, University „Babeş-Bolyai”, Cluj-Napoca

PhD Student: Cantemir MAMBET

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THESIS’ TABLE OF CONTENTS

SUMMARY IN ROMANIAN LANGUAGE

FOREWORD

CHAPTER 1. INTRODUCTION

- 1.1 Definition of the problematic in the current, global context
- 1.2 The problematic is of a paradoxical nature
- 1.3 The epistemological ternary objectivity-subjectivity-complexity

CHAPTER 2. PRACTICAL AND THEORETICAL FUNDAMENTALS

- 2.1 The origin of the word ‘risk’; etymological aspects
- 2.2 Current definitions. Linguistic and significance conventions
- 2.3 Example of the effect of limitations on decision-making processes. Case study.
- 2.4 Chapter’s conclusions.

CHAPTER 3. METHODS AND DETAILS ABOUT THE PRACTICAL APPLICATIONS.

- 3.1 Current methods and associated techniques
- 3.2 Disciplinary context. Perspectives and specific methods
 - 3.2.1 Classical perspective. Cost – benefit analyses.
 - 3.2.1.1 Behavioral elements and the perspective of classical economy.
 - 3.2.1.2 Incentive schemes allow the rational explanation of behaviors.
 - 3.2.1.3 „Black swan”- events
 - 3.2.2 Psychological perspective.
 - 3.2.2.1 Psychometric and prospective theories
 - 3.2.2.2 Cultural theory of risk
 - 3.2.3 Are quantitative assessments really objective? Managerial perspective and the elaboration of policies.
 - 3.2.4 Diverging and converging tendencies of disciplinary approaches
- 3.3 Necessity to approach the problematic in a transdisciplinary context

3.4 Several levels of reality identified while studying the problematic

3.5 Chapter’s conclusions.

CHAPTER 4. RISK IDENTIFICATION AND ASSESSMENT.

4.1 How are these activities performed. Problems.

4.2 Perception of hazards and opportunities.

4.3 Perception limitations and biases. Transdisciplinary approaches.

4.3.1 Overconfidence bias (A)

4.3.2 Biases in determining causality (B)

4.3.2.1 Distortions due to illusory correlations (B1)

4.3.2.2 Distortions due to the illusion of control (B2)

4.3.2.3 Distortions due to the illusion of the run

– continuity, linearity (B3)

4.3.2.4 Distortions due to the availability bias (B4)

4.3.2.5 Distortions in performance evaluation due to subjective attribution (B5)

4.3.2.6 Biases due to the fundamental attribution error (B6)

4.3.2.7 Distortions due to the hindsight bias (B7)

4.3.3 Distortions in assessing the probability and severity of consequences (C)

4.3.3.1 Distortions due to the law of decreasing marginal effect (C1)

4.3.3.2 Distortions due to the anchoring effect and insufficient adjustment (C2)

4.4 Chapter’s conclusions.

CHAPTER 5. RISK QUANTIFICATION AND PRIORITIZATION.

5.1 Current method for risk quantification and prioritization.

5.2 Role of emotions and feelings in substantiating decisions.

5.2.1 Evaluation and choice. Psychological perspective.

5.2.2 Evaluation and choice. Neuroeconomical perspective.

5.3 The epistemological ternary intellect-body-feeling/emotion

5.3.1 „Sharing” the uncertainty. Time and duration.

5.3.2 „Sharing” the uncertainty. Number of decision makers.

5.4 Chapter’s conclusions.

CHAPTER 6. RISK MANAGEMENT. DECISIONAL PROCESSES.

6.1 Finding and selecting solutions. Resource allocation.

6.2 Current approach

6.2.1 Human factors. HFACS framework.

6.2.2 Human factors. “ETTO” and the role of stress.

6.2.3 Entrepreneurship. Alternative theories.

6.3 The transdisciplinary approach in practice.

6.4 Chapter’s conclusions.

CHAPTER 7. CASE STUDY

7.1 Decisional process for the identification of risks and of preventive actions.

The improvement of this process.

7.1.1 Research objectives.

7.1.2 Participants.

7.1.3 Procedure.

7.1.3.1 Planning

7.1.3.2 Resource allocation

7.1.3.3 Customizing the session to the specific project/
decisional situation to be assessed

7.1.3.4 Hazard and opportunity identification

7.1.3.5 Quantification and prioritization of associated risks

7.1.3.6 Defining the activities needed for risk treatment

7.1.3.7 Assessing the risk level after treatment

7.1.4 Studies’ results.

7.2 Conclusions of the case study.

CONCLUSIONS

General conclusions.

Conclusions. Critical evaluation of surprises arising from a transdisciplinary research.

Conclusion. Directions for further study and research.

SUMMARY IN ENGLISH LANGUAGE

SUMMMARY IN FRENCH LANGUAGE

BIBLIOGRAPHY

Primary bibliographic sources

Secondary bibliographic sources

Personal publications and conferences

ANNEXES

- A.1 Annex. Military decision making processes.
- A.2 Annex. Decisional processes in industry and business administration (areas according to chapters 4, 5, 6 are emphasized).
- A.3 Annex. Decisional processes in finance and economics. (areas according to chapters 4, 5, 6 are emphasized).
- A.4 Annex. Decisional processes in process safety and occupational safety and health (areas according to chapters 4, 5, 6 are emphasized).
- A.5 Annex. Interaction among several disciplinary approaches of the problematic.
- A.6 Annex. Conflict of interests. Prisons in Louisiana.
- A.7 Annex. Example of a model resulted from the transdisciplinary system science.
- A.8 Annex. Accuracy, Error, Precision and Uncertainty.
- A.9 Annex. Simulation for preventing and managing major incidents in complex systems.
- A.10 Annex. Cortical areas involved in processing of emotions and decision making.
- A.11 Annex. Interview with Florentina Negrescu – psychologist.
- A.12 Annex. Three frameworks for risk management.
- A.13 Annex. Case study. Improving a decision making process.

Keywords: risk, hazard, probability, uncertainty, severity, consequence, decision, compromise, decision-maker, process, evaluation, perception, priority, subjective, objective, complexity, level of Reality, included middle, Hidden Third, transdisciplinary.

SUMMARY

From a demographical, political, economic and social perspective, it can be stated that one of the main characteristics of the actual context is the feeling of uncertainty that people have towards the policies, plans and actions of the decision makers at all levels. In such a context the problematic pertaining to the management of risks and of decision making processes generates and will continue to generate debates first of all, due to the terminology in use. This fact is far from being just a theoretical problem, since people make judgments that are wrong and/or irrational even in simple situations. The research starts from the following findings:

1. Historically, from the very beginning there were several meanings for the word “risk” and the associated concepts (uncertainty, hazard, crisis, etc). During the transition periods (either historical or when changes in mentality occurred), the words in this group suffered modifications both of meaning and form.
2. Theoretical definitions outline a significant element of subjectivity associated to these notions.
3. Even if the definitions are formally accepted, a more profound knowledge of these concepts is hard to achieve for reasons beyond our current understanding.
4. Although it is currently accepted that past experiences/ facts could be starting points for the definition of probabilities and of probabilistic reasoning, even these experiences/ facts themselves are uncertain (the higher the remoteness of the experience/ fact in time and space, the higher the uncertainty).
5. It is impossible to define risk (or the associated concepts) operationally.
6. Even in simple situations and with clear formulation of the problem, human judgment could be wrong due to the poor communication that generates an incorrect understanding.
7. Even in simple situations, human judgment in appraising risks is very likely to be wrong and/or irrational.
8. Even in simple situations, although rational justification for some option exists and this option is properly communicated, it is very likely that decision makers (including experts – references from the literature and an opinion poll among experts are presented) will not be rational when making the decision.

Since the literature related to the decision making processes is quite abundant and the problematic is dealt with in several disciplines, the thesis outlines *the*

principle of a method used worldwide today. Based on this presentation of the method's principle, emphasize was put on the parts where elements of mathematics, engineering, economy, logic, probability theory, psychology, management and sociology are obvious. An important part of this research is the observation that decision makers have to **trust** the decision making process and its results. In this regard, the approach is based on the three main elements of the management of risk and of decision making processes: perception, evaluation and decision-action. Each element is studied separately and subsequent results are then harmonized.

There is an obvious component of reductionism in relation to the methods used in the daily practice and to their application as well. The specificity of these methods derives from the multiple types of uncertainty, from the specific perception and interests of decision makers. At the same time there are more perspectives available and surprisingly, in areas where we didn't expect (or about which our perception is distorted) one can observe that human emotions are explicitly considered as an important part of the decision making process. In these conditions, the complexity of the problematic doesn't allow just a reductionist approach but instead, implies a right combination of reductionist and holistic analyses. This necessity appears not only from the need to better understand and explain phenomena, but also from the objective evidence related to the corporate and national failures in governance and therefore, related to the dangerous economic inequities. Of course not the models themselves (deterministic or probabilistic) generate such undesired effects, but their excessive and unconscious use. Another reason to improve the methods is the need to revalidate the models based on empirical data. The cost of this revalidation shouldn't be a delicate issue (compared to the potential benefits, such costs are order of magnitude lower) however, the source of input data and the decisions taken after data processing are issues still incompletely solved.

To answer a question like „How are these results used in the decision making processes?“ and with the aim to enhance the observation and interpretation, I present several theories in relation to the elements of the ternary objectivity-subjectivity-complexity. The cultural theory of risks is presented as an example for including cultural influences in the socio-political analyses. At the same time this theory could also be considered from a managerial perspective for policy making and for the provision of one possible answer to the question above.

Based on the diverging and converging tendencies of disciplinary approaches, contact areas among theories and discipline are identified (e.g., group attitudes as described through the cultural theory of risks could result from the dynamic described in the prospect and psychometric theories, as well as the expanded cost-benefit analyses in the contact zone between the classic and the psychological theories). Such a dynamic could be formally observed externally, but it is possible that its causes and manifestations are more profound. It is therefore possible to approach both these theories and the problematic itself in a multi- or interdisciplinary manner and consequently, due to the very high and immediate material impact, several researches are in process today. In this respect the observation is made that despite the disciplinary developments both in the classical (non-psychological) and psychological areas, the disciplinary theories cannot offer the decision makers that specific trust with respect to both the risk assessment and the substantiation of their decisions; furthermore, the results don't allow for a more profound understanding that might improve the principles and methods of risk management. Such a new and better understanding would be possible only if we would have a widened perspective allowing more than a mere joint presentation of results from several disciplines. For instance, the notion of loss is proven to be more of a cultural notion than just one with an individual content. This is why consideration was given also to those psychological and anthropological approaches allowing a cultural approach of this problematic. It is important to compare what happens to what is modeled through theories of any kind and ensure that the results encourage us to continue our investigation instead of blocking it.

Related to the same principle of the method, more detail is provided in regard to the **decisions under risk**, situations in which we assume that some consequences are probable and have a measurable impact. The first step in the decisional process is **finding signals** or the identification and assessment step, an essential element of decision making processes. This step is based on the **cognitive capacity of decision makers** to assess signals for hazards and opportunities and emphasis is put on how the efforts of decision makers are limited or biased in respect to signal identification as well as in relation to finding the causes for hazards and opportunities and evaluating the severity and likelihood of their consequences.

The **importance of the time element** is also presented, i.e. the moment of signal perception in relation to the temporal scale of the entire process under

observation. The higher the **complexity of the studied scope**, the higher is the importance of this time element. In conditions of complexity, when several **unforeseen events** are likely to happen, the only possibility available is to perform **situation analyses**, a costly exercise not necessarily effective.

Day to day situations through their paradoxical nature, indicate that in order to receive a new, better understanding it is possible to introduce an approach based on the concept of levels of reality. It is possible to identify the levels of reality starting from the methodological biases, although not all biases will indicate the limit of a reality level. Using the results of psychological and sociological research it is obvious that risk perception is significantly influenced by the subjectivity of those who perceive signals and consequently, perform the analysis/ assessment. **As a result, the subjective element doesn't have to be considered as an obstacle against proper perception, evaluation and accurate decision making, but as a mandatory ingredient of the decision-making process.** Furthermore, this subjectivity refers to several levels of reality of the subject and the distortions/ biases outline the decisional domain on several levels of reality, while from a cognitive perspective such distortions/ biases might become references for determining the dynamics through these levels.

At the same time, since the problematic involves **complex systems**, the problem of a complexity is further transferred to the **object**.

Hence, referring to the epistemological ternary objectivity – subjectivity – complexity, these limitations/ errors/ illusions are very useful as these describe the frontier of the decisional domain and additionally, allow the observation that this **decisional domain crosses several levels of reality**. As a consequence, risk signals originate from these multiple levels. This is why disciplinary methods can be approached in a transdisciplinary manner while being considered in their dynamics, with reference to elements of the epistemological ternary *objectivity – subjectivity – complexity*. How signals are processed influences also the assessments and the consequence analysis.

The problematic of decisional processes cannot be discussed in the absence of signals and their related problematic, which in its turn is mainly related to consciousness. At the same time, it has to be emphasized that while studying consciousness, the impact of emotions must be taken into account.

Empirical evidence indicates that an emotion can stimulate the generation of other emotions and consequently generates some events. Although it is impossible to decide and act without emotions, the emotions interfere with the decision making process and affect its quality. Neuroeconomic research identified physical traces for two types of emotional functioning: emotions (S1) and feelings (S2). Both emotional functionings (S1 and S2) allow the recognition of a different level of reality, different than the one corresponding to probabilistic reasoning. Also since on the level of reality corresponding to the probabilistic reasoning the biases and distortions are frequently repeated, the idea of repeatability and applicability of the law of big numbers becomes relevant on this latter level of reality.

These observations allow the use of the ternary *intellect – body – emotions/feelings* in relation to quantifying and prioritizing some decisions. There is a level of reality where contradictory states on another level of reality are reconciled. Contradictions are most often expressed by means of the important decision we were unable to make, because these create often a more persistent memory.

It is not the lack of motivation that prevents success, but the fear of making important decisions, due to the fact that we assume not being able to live with the results of our decisions. Simplifying, it can be said that the fear to make important decisions prevents us from fulfilling our dreams. By means of emotions and feelings we have access to a level of reality where there is no repetition and where a new experience is more likely and accessible.

At the same time, the quantification and prioritization are affected by situations when individuals are exposed to different manners of “sharing the uncertainty”. Although there is objective evidence in this respect (e.g., “sharing the uncertainty reduces fear”) such psycho-sociological observations, generated and confirmed through experience are still impossible to explain scientifically, only by means of strictly disciplinary methods and at the current given level of disciplinary knowledge. On the other hand, one cannot neglect the surprising and worrying element related to the poor quality of decision resulting from such contexts. This is why the presence of emotions during decision making is a fact that must be mandatorily considered; this is possible through the openness and understanding allowed by the transdisciplinarity. People have limited capacities to process and use emotions and therefore have limited capacity to act. Using both epistemological ternaries (*objectivity – subjectivity – complexity* and *intellect – body – emotion/*

feeling) it becomes possible to understand the action of The Hidden Third. Psychological numbing related to the role of emotions and feelings indicates a lack of consideration if not an oblivion of The Hidden Third.

The thesis outlines situations from business management, where expectations from investors and/ or managers might become true or not. Special emphasis is put on situations that are definitely problematic and as a result, corrective actions are suggested and resources allocated. It is shown how decisional processes both individual and at group level are affected by several tendencies e.g., human factors, over-specification of events in complex systems, preference for too sophisticated and expensive solutions versus simpler and more effective ones. The opposite tendencies, towards over-simplification are also outlined. Overall, such tendencies become visible when analyzing the speed needed to transform the decision into action. The connection between the assessment and decision/ action phases is presented based on the limitations arising while prioritizing the treatment actions, as well as on the necessity to make some compromise. Stress affects decision makers since it affects the quality of the compromise and consequently, the quality of decision.

Usually the conclusions related to improving the quality of the management of risks and of decision making processes could be limited to the reduction of causality distortions/ errors using the root-cause analysis. At the same time based on these findings, decision makers should look for alternatives and act. This approach makes sense for deterministic models, where decisions are appraised only in accordance to the quality of results. However the majority of problems are complex and in terms of complexity and of management under risk, the deterministic models are not anymore applicable and the assessment will consider not only process' results, but also to which extent the decisional process was followed according to a new approach. Deriving from complexity, the following problems are relevant: definition of the threshold for action, possibilities to use models originating from the HFACS framework (the “Swiss cheese” model), as well as considering the effects of stress on the quality of compromises and consequently of decisions made by the decision makers.

This is why decision makers need a structured decisional process, in order to improve the decision on an intuitive basis, for situations where rational solutions are not sufficient anymore. The major threat for decision makers is to be doomed to a perpetual lack of inspiration “if the Gods ignore them”. As a consequence, the attitude

of decision-makers should be one **allowing the manifestation of intuition**. This attitude should be part of a culture of experimentation and be employed in the context of a structured decision making process. This process should provide a way towards wisdom, beyond those limits of knowledge where wisdom becomes possible.

Regardless of the uncertainty or risk type and of the subsequent organizational architecture, decision making processes should be structured in such a way that participants **keep their awareness and vigilance** in respect to the entire decisional context; this is the only way for decision makers to nurture the feeling of being able to live with the results of their decisions, as well as of acting in an effective and efficient manner. This approach should consider several aspects e.g., how decision makers act after having made a decision, as well as the need for a structured process. One element for structuring this process would be the allocation of a specific time for decision making. Another element relates to an attitude allowing the intuition to manifest. The decision maker should have an intuition, learn to trust in it, use it as practicable and (as one of the most important abilities) be in full agreement with the solution resulted from intuitive reconciliation.

From a transdisciplinary perspective, this process should allow the accessibility of real information in the discontinuity of the Hidden Third. Solutions, indications towards one or another option originate only from there, as the transmission of information is produced only in connection to the Hidden Third. As a consequence, it is of particular importance that decision makers are sensitive and able to accurately transmit this information, while avoiding any temptation to manipulate the information or its transmission channels.

For a better practical justification, I presented a case study that resulted from a systematic application of an identification, assessment and decision making process. The thesis outlines the results of a three-year research consisting of multiple sessions in various organizations and groups in several countries. As a consequence, it was possible to describe the fundamental improvement due to the transdisciplinary approach, an improvement both of the procedural sequence and of the process communication. The case study refers to the necessity and possibility to obtain the best possible decision at a given moment, **within a group** of employees, **for this** group of employees, in a corporate context. After the case study was performed, it is possible to trace the improvement steps based on a transdisciplinary approach, as the main objective of this case study was to allow the definition of a decisional process

overcoming the limitations of the decision making processes today. Although it cannot be said that such a process was found, a transdisciplinary approach creates a real possibility for improvement and when the subjectivities of decision makers reach a certain type of accord/ agreement, the decisional process in that form, at a given moment, enables really good decision making.

The research on the improvement of this decisional process being longitudinal, with a significant number of iterations and applied to a large number of decision makers, allowed also an appraisal of the quality of decisions at a larger timescale. All the decisions proved to be acceptable, i.e. no losses occurred due to these decisions. This fact could be explained through the asymmetric reaction of decision makers in relation to gains or losses, i.e. participants managed to prevent very well the identified consequences with potentially negative outcome (“unknown knowns”). In very few cases the situations were completely unexpected (“unknown unknowns”) but their impact was insignificant and easily absorbed through agreed contingencies.

To summarize, current practices and procedures have proven their validity for usual levels of uncertainty. However, besides normal practice, **the fact that decision makers applied and improved the process allowed them to better trust their decisions.** This element is very important when completing the treatment actions. The effectiveness and efficiency of **managerial action is significantly enhanced when accompanied by trust in what is being achieved.** In a mysterious way, such trust reduces the severity level of the threat itself and not only (as it can easily be inferred) the perception of a certain severity level. Of course, considering also what was said in chapter 5 about the S1-type functioning, the temptation to underestimate the hazards can manifest immediately, together with a reduction in the vigilance of decision makers. This is why during the session one of the (invisible) efforts consists of **maintaining the vigilance of decision makers** regarding the entire decisional context.

Each improvement step is based on what was presented throughout the thesis. Firstly, the improvement of “Planning” (step 7.1.3.1) was founded by the need to BLOCK a specific time and duration for a certain type of decisions, as presented in subchapter 6.3. This need became obvious after the first 11 sessions and observing this requirement contributed highly to the improvement process. Another important aspect relates to **limiting the duration of the session**, as indicated in chapter 5, i.e. S2 functioning cannot be indefinitely maintained. From a time management

perspective the session shouldn't exceed 90 – 120 minutes; if the decisional situation is highly complex two successive sessions could be organized the same day, with at least 30 minutes break in-between.

Secondly, for step 7.1.3.4 “Hazards’ and opportunities’ identification”, based on subchapter 4.3.2.4 and chapter 5 in relation to the availability of information and visual integration techniques, it can be concluded that the reversed fishbone-diagram is a very strong knowledge surfacing method. **S1 functioning is in no way disturbed by the decisional process** but on the contrary, it is used on this purpose. Decision makers are allowed “to see” how the possible future would look like and could accurately identify the potential consequences. In addition to this, there is also an **element of participation**: all are capable to influence the future or have an opinion about it. Although initially the decision makers were reluctant towards the process and their interest was minimal (just curiosity for “another method”) gradually a favorable emotional element began to manifest related to an enhanced perception of signals. Some situations appeared less frequently, when such emotional element got amplified and had to be tempered.

Reaching consensus is easier when the reference is objective, i.e. “in front of our eyes”. This possibility, emphasized during the 23rd session (drawing diagrams using specialized software) allowed an optimization of the allocated time, while ensuring a better clarity and aesthetic quality of diagrams. Interesting however, in some organizational cultures decision makers preferred that diagrams be manually drawn without using software solutions, as this generates a more “natural” sensation together with a feeling that risks are more likely to be assumed.

Thirdly, at step 7.1.3.5 it became possible to supplement the sessions with more specific and detailed assessments, in relation to a specific issue. Compared to what was said at 7.1.2, the number of participants could be significantly increased (78 was the maximum). Besides the above mentioned diagram it became possible to use sticky notes/ tickets. This element enforced the feeling of participation, but also the understanding (S2-type) that although the decision seems to be collective, individual identities are not dissolved during decision making. **Although they obey the same rules altogether, decision makers keep deciding individually and their individual opinion matters while being visible to anyone else.** The use of quantitative methods (e.g., the results of Monte Carlo simulations allow the entire team to **see** what the risks and opportunities are and adjust their conclusions based on these results

however, special care should be given to prevent the anchoring effects, as mentioned at 4.3.3.2).

Summarizing the above, it can be said that regardless of process improvements or of the quality of procedures and technical capabilities, **the right decision is obtained only when among decision makers an accord/ agreement of a special nature is reached**. Such an accord could be described as „**openness towards the Hidden Third**”.

Among the conclusions of the thesis it is said that the transdisciplinary approach is the most appropriate way towards the possibility of a new understanding and therefore, towards improving the disciplinary methods, especially because its finality doesn't consist of stating and discovering a super-method, meta-theory/ discipline or in the arising of a new combination of disciplines. Consequently, the conclusions of the thesis refer to those instances of business activities when both the assessor and its customer neglect/ forget to consider the initial objectives and agreed methods, as well as to the type of questions that should direct the approach towards re-defining priorities and re-adjusting the methods. These conclusions are as follows:

1. The terminology currently used generates and will still generate debates.
2. Disciplinary perspectives cannot provide a better understanding of the problematic related to the management of risks and of decision making processes.
3. The problematic is approached in a transdisciplinary manner by means of the epistemological ternary objectivity-subjectivity-complexity (to expand the observation and interpretation horizon, disciplinary methods could be considered in their dynamics, with reference to the epistemological ternary objectivity-subjectivity-complexity).
4. The subjective element doesn't have to be considered as an obstacle against proper perception, assessment and decision making, but on the contrary, as a mandatory ingredient of the decision-making process. The decisional domain crosses several levels of reality.
5. Signals for threats and risks appear at several levels of reality. There are three main elements of the management of risk and of decision making processes: perception, evaluation and decision/ action.
6. The role of emotions in the decision making process is studied through the ternary intellect – body – emotions/ feelings.

7. To improve the decision making processes an organizational culture encouraging experimentation, as well as a structured decision making process are necessary.

Also among conclusions, the thesis includes a critical evaluation of surprises that appeared during this transdisciplinary research. At the beginning of this research I considered that this problematic could be approached strictly in an objective manner. However, the daily practice of the decisional processes allowed me (to my surprise) to find out that although the solution originates from the Hidden Third, there is a big temptation to alter that information through manipulation. The best times to recognize this temptation occurred when I had to communicate the identified threats and risks. At the same time it is necessary to encourage the feeling of openness towards the unknown, because it is very interesting to discover what I don't know and what I can do further. Compared to the initial objectives, the effect of uncertainty on my initial objectives was spectacular and generated several questions in relation to what can be perceived, observed and encountered.

In respect to the new directions of research, these refer mainly to what I called “sharing of uncertainty” (as mentioned at 5.3.1 – 2) as well as to the continuation of the transdisciplinary approach towards improving the decisional process described at chapter 7, through a better integration of quantitative methods in the assessment and quantification steps. Last but not least, the improvement has to deal with the communication aspects, i.e. both the communication needed to support the process – in the absence of which it is impossible to reach the accord/ agreement of decision makers – and the communication of results after completing the decisional process.

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