THE GENERATIVE INFLUENCE OF EMOTIONS AND FEELINGS ON ORGANIZATIONAL EFFECTIVENESS
A NEW THEORY FOR THE PRACTICING OF KNOWLEDGE MANAGEMENT

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Our first intellectual obligation is to abandon the Myth of Stability that played so large a part in the modern age: only thus can we heal the wounds inflicted on Reason by the seventeenth-century obsession with Rationality, and give back to Reasonableness the equal treatment of which st was for so long deprived […] The ideals of practical thinkers are more realistic than the optimist daydreams of simple-minded calculators, who ignore the complexities of real life, or the pessimistic nightmares of their critics, who find these complexities a source of despair.

(Ilya Prigogine, *The End of Certainty*)

Abstract

"In accordance with recent research results provided by the neurobiologist Damasio and the psychologist Gigerenzer it is the aim of this paper to point out the limits of solely cognitive explanations and rational approaches to decision-making and problem-solving in the context of business and economy, and – by showing the significance of emotions and (gut) feelings in decision and problem-solving processes – to contribute theoretically to an essential improvement of the practice of Knowledge Management, which can lead to a decisive competitive advantage of an organization or an enterprise."

Key words

Knowledge Management, decision-making, problem-solving, rationality, cognitive limits, emotions, feelings, expertise, dialogue

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Introduction: Feelings in action

In order to create a "feeling" for the necessity to overcome the cognitive limits of decision-making in business and economy by taking care of the role of emotions in decision and problem-solving processes, and thus to be able to decide and solve even new/unfamiliar situations effectively (Selten, 2001, p. 17; Gigerenzer, 2004, pp. 392-393), which can lead to a decisive competitive advantage of an organization or an enterprise, let us start with a sort of sophisticated joke:

Two priests from two different world religions – and after unsuccessfully trying to convert each other – eventually had a long and intensive quarrel about woich of them might have the right approach to God and who is serving Him best. Finally, one of them in a very tolerant mood said to the other: "Let us stop our quarrel! We both serve the same God – you in your way and me in *His*."

What was the (arrogant) message of that priest? While the other should serve their God as the latter *feels* it to be correct, he himself – on the other hand – will serve God EXACTLY *in the one and only way* (i.e., un-reflected/mechanically), as he *thinks* that God wants him to do.

We can observe that the point of the joke is not too far away from *real life situations* in the context of business and economy, especially if we think of the wa, in which managers really come to MAKE and – later on – "argue" or cognitively justify their DECISIONS: We might get the impression that they also serve some God *in the one and only way* and that they *think* or *believe* their *God wants them to do* (so). Their (anthropomorphic) God is called (homo) OECONOMICUS (cf. in this respect the institutional logics approach summarized by Thornton, Ocasio and Lounsbury, 2013).

In business and economy, however, decision processes are an immensely important topic because "good" decisions (e.g., about monetary or other investments) are thought to explain and reproduce in a controlled manner the economic success of an organisation or an enterprise. As it is generally presupposed (or accepted), economic decisions rest upon the principle of *maximizing utilities* (and minimizing costs), which is usually attributed to Adam Smith. Thereby, any decision-making process should be strictly (i.e., logically) rational. This means, it should eliminate any kind of emotions and feelings.uHowever, that this is possible onl, if there does not exist any real commitment and expertise in the realm of life we are essentially referring to.

The average manager appears to act as though he would project his theories or institutional logis (Thornton, Ocasio and Lounsbury, ibid.) into decision and problem solving processes much too literally – just like the priest in the joke , and forgets about (or is not able to deploy) the corrective power of emotions/evaluative feelings within the processes of decision and problem solving (e.g., Morse, 2004). The psychologist Gigerenzer (2008, p. 4; 2004, p. 393) argues that this way of decision-making or problem-solving is based on *un-bounded* or *logical rationality*, in contradistinction to Herbert Simon's idea of real-life or bounded rationality.

(1) As soon as one accepts the idea prevalent in classical Knowledge Management that expertise and knowledge are essential factors to explain and reproduce the competitive advantage and economic success of an organization or an enterprise, one may be interested in how to foster the former. One idea to achieve this is to use documentatios and digitalization, and computers in consequence. But all of this depends upon a cognitive and rational grasping, building up and transferring of expertise and knowledge. If some kind of *success* is not achieved, this fact is attributed to a lack of knowledge, and in general to a lack of cognition.

(2) In the research of the neurobiologist Damasio the same paradigm was at work: If certain people with brain damage could not solve problems in real life, this was attributed to damage to their cognitive abilities. But later on Damasio (2003) found out that this was definitelyathe wrong explanation. What those patients were lacking was the emotional and cultural experience to evaluate, select and decide upon proper actions in real-life situations. Thus, they could not cut down the host of cognitive possibilities, which they clearly understood, to a surveyable set of options for acting in accordance with their interests of survival in a social setting or world. From the perspective of modern Theory of Science and un-bounded rationality this means that the logical explanation of the success of average people by way of overemphasizing *cognition* is lopsided or ill-conceived. Our cognitive explanations, which concern *what* is the case, can be wel- turned into algorithms to reproduce certain predetermined characteristic parameter values. But they are not descriptive of *how* we come to terms with reality (via language) nor how we select meaning for actions.

(3) In the follow-up we will provide both an improved practice for a realistic and process oriented understanding and new way of documenting knowledge and expertise as well as a thorough theoretical foundation resting upon modern Model Theory, Systems Theory, Logic, as well as Theory and Philosophy of Science. As in the case of Damasio's research results mentioned briefly above, this can lead in organizational practice – despite of the fact that as an explanation it may look fairly abstract – to better efficiency in decision and problem solving processes.

(4) It isEessentia that the approach, with its underlying explanatory picture and possibilities of operationalizations supports innovation and the sustainability of an organization or enterprise. The approach takes care of the distinction between explanation and description in turning theory into practice, and allows for flexibility by way of understanding the limits of the applicability of theories in action. The core therefore is a thorough understanding of the relation between theory/language and reality, as it is mediated by *meaning* as a means to come to *terms* with reality. This relation can also provide a better understanding of how knowledge and expertise come about, and furthermore, how to build them up, implement and use them properly, especially in taking care of the limits of their application.

(5) Empirical investigations into the company Gore-Tex Hamel (2012, pp. 193–205) providsd similar principleseto those gained empirically in various business organizations and generalized theoretico-explanatorily. But while Hamel (ibid.) with respect to his research results concentrates primarily on the description of different techniques that led to the economic success of the business organizations investigated by him, we developed a model-theoretic systemic framework to *explain* thefreasons for economic success in business organizations and to make it reproducible in a controlled manner. This also means that we can deliberately create or establish the conditions that should be present in an organization to achieve this kind of success. The seeming complexity of the analytical framework we present below should not deceive us about the fact that the approach has proven successful in practice: It could be shown (e.g., Gatarik and Born, 2012) that its realization in organizational practice provides more flexibility and innovation, and a sustainable improvement of organizational efficiency. In general, the model-theoretic systemic framework can also be seen as an essential contribution to further theoretical developments in the field of *High Reliability Organizations* (Weick and Sutcliffe, 2001).

Against this background we can go into detais about the neurobiology of decision making, especiallyffollowing on from Damasio's (2003) research results.

Damasio (2003, p. 85) points out that *emotions and feelings*[1] are indispensable for thetemergence of ecologically sound/acceptable and effective decisions in the long run. Damasio (ibid.) argues: "[…] as personal experience is accumulated, varied categories of social situations are formed." On the basis of certain life experiences we create *knowledge* concerning the solution of problems in terms of emotion and feeling. "For example, did the immediate outcome of the chosen action bring punishment or reward? In other words, was it accompanied by emotions and feelings of pain or pleasure, sorrow or joy, shame or pride? No less importantly, was the future outcome of the actions punishing or rewarding, regardless of how positive or negative the immediate outcome?" (Damasio, 2003, pp. 145–146). Damasio (ibid.) emphasises orientation towards *future outcomes* as a special characteristic of human behaviour: "One of the main traits of civilized human behavior is thinking in terms of the future." Or, in other words, evaluating actions in the present.

Damasio (ibid.) emphasises the importance of those emotions and feelings which are associated with future outcomes of actions. Damasio (ibid.) argues that they "come to signal a prediction of the future" as an "anticipation of the consequence of actions": "The revival of the *emotional signal* accomplishes a number of important tasks. Covertly or overtly, it focuses attention on certain aspects of the problem and thus enhances the quality of reasoning over it. […] A *gut feeling* can suggest that you refrain from a choice that, in the past, has led to negative consequences, and it can do so ahead of your own regular reasoning telling you precisely the same 'Do not.' The emotional signal can also produce the opposite of an alarm signal, and urge the rapid endorsement of a certain option because, in the system´s history, it has been associated with a positive outcome. In brief, the signal *marks* options and outcomes with a positive or negative signal that NARROWS the *decision-making space* and INCREASES the *probability* that the action will conform to past experience. Because the signals are, in one way or another, body-related, I began referring to this set of ideas as '*the somatic-marker hypothesis*'" (Damasio, 2003, p. 147, our emphasis in italics and small capitals). A good metaphor to illustrate the way in which these emotional signals work is the Word program which "keeps only recently opened files in memory and 'forgets' the rest. This usually *speeds up* finding what one is looking for." (Gigerenzer, 2007, p. 24, our emphasis in italics). Speeding up decisions is also important in context of human actions, but – as we will show below – it cannot be completely reduced to classical rationality, or rather unbounded logic, and later on to algorithms taking over decision support.

1 According to Damasio (1999) *emotions* are complicated combinations of chemical and neuronal reactions in the brain. They play a regulatory role and have the original biological aim to create favourable circumstances for the survival of the organism. Emotions used the body (guts, muscle-skeleton-system) as their theatre, but still have an influence on certain brain functions. Emotions are based upon innate brain functions, which stem from a long evolutionary development. Individual learning processes and cultural influences, however, change emotions in accordance with their trigger and their expression. From these emotional changes of the body and brain functions evolve representations in the brain, which can be perceived in consciousness. For those representations of the emotional changes Damasio (2003, p. 85) reserves the concept *feelings*: "They [feelings] translate the ongoing life state in the language of the mind. […] Feelings are perceptions, and I propose that the most necessary support for their perception occurs in the brain´s body maps."

According to Damasio (ibid., p. 159), eliminating emotions and feelings from the "human picture" leads to an "impoverishment of the subsequent organization of experience". If social emotions like embarrassment, shame, guilt, contempt, indignation, sympathy, compassion, awe, wonder, elevation, gratitude, pride, and their subsequent feelings are not properly deployed, and if the relation between real life situations and "joy and sorrow" breaks down, "the individual cannot categorize the experience of events in his autobiographical memory record according to the emotion/feeling mark that confers 'goodness' or 'badness' upon those experiences. That would preclude any subsequent level of construction of the notions of goodness and badness, namely the reasoned cultural construction of what ought to be considered good or bad, given its good or bad effects" by way of evaluation based upon values inherent in some culture.

How do we come to terms with reality, and why do we need to?

The *natural (practical) way* of making decisions is not baset on un-bounded rationality, but on bounded/eco-logical rationality as stressed, for example, by Simon (1956, pp. 129–138), Gigerenzer (2007, p. 94), Gigerenzer, Todd et al. (1999), Gigerenzer and Selten (2001), Simon (1990, p. 7), Gigerenzer (2008, pp. 7–8) and Damasio (2003, p. 149). According to Gigerenzer (2008, p. 19),Bbounded or eco-logical rationality explains "the rationality of heuristics independently of optimization and content-blind norms, by the degree to which they are adapted to environments. The study of ecological rationality facilitates understanding a variety of counterintuitive phenomena, including when ONE REASON IS BETTER THAN MANY, when LESS IS MORE, and when PARTIAL IGNORANCE PAYS[2]. *Homo sapiens* hsve been characterized as tool-users. There is some deeper wisdom in that phrase. The tools that make us smart are not bones and stones, but the heuristics in the adaptive toolbox."[3]

Ecological rationality consciously expresses itself in our mind as a sort of "(gut) feeling", also sometimes called *intuition*, i.e., it is the foundation of intuitive ways of problem-solving, deciding and acting. Ecological rationality results from an attunement between the structure of environment and the structure of a heuristic/rule of thumb (Gigerenzer, 2007, p. 48). The latter makes use of our experiences/expertise. Thereby expertise is built upon the evolved capacities of the brain, e.g., recognition memory (which produces categorizations). But, as Damasio (2003, p. 148) points out, a gut feeling does not substitute proper reasoning: "It has an auxiliary role, increasing the efficiency of the reasoning process and making it speedier", which is the advantage of technical systems and heuristics.

Figure 1 is the graphical representation of two paths, which under normal conditions are complementary and lead to decision-making and problem-solving. Damasio (2003, p. 149) describes it in the following way: "Normal decision-making uses two complementary paths. Confronted with a situation that requires a response, path A prompts images related to the situation, the options for action, and the anticipation of future outcomes. Reasoning strategies

2 In order to prevent misunderstandings, for heuristics in general and the heuristic "partial ignorance pays" it is especially the case that if they are used by laymen with weak background knowledge in a domain of experience (and interests), they will in general lead to bad results resting upon bad decisions. On the other hand, if experts use the same rules/heuristics especially according to their long-time experience they have, (the corrective power of) their (gut) feelings/felt knowledge will guide them to good results because of good decisions (Mérö, 2002, pp. 223–224; Dreyfus and Dreyfus, 1987, p. 80).

3 Our emphasis in italics and small capitals.

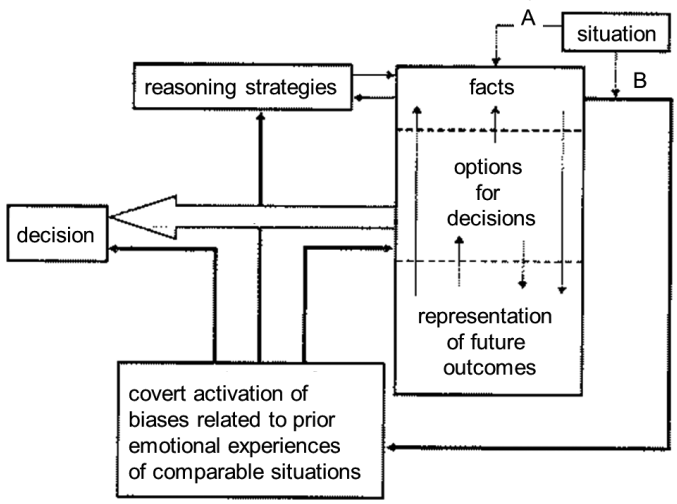

Fig. 1: Two complementary paths A and B of decision-making (Damasio, 2003, p. 149)

can operate on that knowledge to produce a decision. Path B operates in parallel and prompts activation of prior emotional experiences in comparable situations. In turn, the recall of the emotionally related material, be in covert or overt, influences the decision-making process by forcing attention on the representation of future outcomes or interfering with reasoning strategies. On occasion, path B can lead to a decision directly, as when a gut feeling impels an immediate response. The degree to which each path is used alone or in combination depends on a person´s individual development, the nature of the situation, and the circumstances."

The difference, in which both paths – (A) the plainly algorithmic and (B) some natural/ intuitive decision making patterns – bring about decisions, can be illustrated by the following story provided by Gigerenzer (2007, pp. 4–5). This story concerns how theoretical understanding is projected, and occasionally mis-projected, onto and into reality.

A young man (let us call him Harry) found himself confronted with decnding between two girlfriends, "both of whom he loved, desired and admired" (and perhaps even wanted to marre). Unable to decide, he remembered a letter by Benjamin Franklin from April 8, 1779, who tried to advice his nephew in a similar situation by providing a sort of "balance sheet":

"If you doubt, set down all the Reasons, pro and con, in opposite Columns on a Sheet of Paper, and when you have considered them two or three Days, perform an Operation similar to that in some questions of Algebra; observe what Reasons or Motives in each Column are equal in weight, one to one, one to two, two to three, or the like, and when you have struck out from both Sides all the Equalities, you will see in which column remains the Balance. […]."

Harry tried to turn this advice into reality. On seeing the result, something unexpected happened: He could not (emotionally) accept the (logically) provided result. But the logic brought to his mind that his heart had already decided otherwise – against the calculated result, i.e., in favour of the other girl.

This story tells us that decision processes concerning real life situations (both in every day and in professional life) cannot be reduced to (decision) algorithms alone (as economic theories seem to suggest in the way they are turned into practice), but that emotions and feelings are really indispensable for the acceptance of the final decision and its individual or cultural evaluation.

Summarizing the lessons to be drawn from neurobiology and psychology (with respect to a new practice of Knowledge Management)

Given the investigations of Damasio[4] we can explain how the suppression of emotion in the context of thetemergence of (economic) decisions may lead to disasters, i.e., if we completely replace *intuitive* applications of measures/actions to achieve certain aims (e.g., efficient investment) and evaluations of results (i.e., evaluations of their acceptability) both based on expertise by algorithms and weak everyday knowledge of use.

Damasio found that people with certain brain deficiencies, either of an organic or educational/cultural origin, are still perfectly able to argue and analyse in "laboratory situations", i.e., disengaged from reality. In real life situations, however, they are unable to apply their insights to produce effective problem solutions. In short, this means that the so called "expert knowledge" or "expertise" is based on emotions and feelings, and thus *constrains* the set of possible solutions that will be acceptable in the future. If we just concentrate on emotion-impoverished (cognitive) solutions, we will be unable to correct and stick to calculated results solely, which proves to be threatening in the long run! The usual way is that the calculated results are evaluated and corrected with the help of emotions and feelings.

According to Damasio (2003, p. 143), for a long time scientists were searching in the wrong direction: They thought that it was "a lack of knowledge", or rather a lack of cognitive understanding and logical information processing that was responsible for the poor decision making of patients with prefrontal damage in their brain, which cut them off from their emotional experience memory: their working memory was considered to be inefficient. In the end, however, scientists found out that these patients did have all the necessary cognitive information

4 Damasio (2003, p. 145) summarizes his research in the following way: "Decisions made in […] emotion-impoverished circumstances led to erratic or downright negative results, especially so in terms of future consequences." Furthermore, decisions made in emotion-impoverished circumstances do not make us generally happy as relevant research proves: In one study people were asked *how* they decide in everyday situations, e.g., which TV program to watch or what to buy in a department store. Those people who reported to (consciously) use a decision matrix as basis for an action were considered as *maximizers* because they (consciously) tried to get the best from an economic or logically rational point of view. Others who reported to be engaged in a limited search and to settle quickly with the first (acceptable) alternative as a "good enough" solution were called *satisficers* (cf. *satisficing*, Simon, 1957) because they tried to become (emotionally) satisfied. The latter were more successful in practice than *maximizers* who excelled in depression, perfectionism, regret, and self-blame. The *satisficers* on the other hand were more optimistic and had higher self-esteem and life satisfaction (Gigerenzer, 2008, pp. 6–7).

and knew how to navigate such knowledge *logically*. But in reality they were at a loss. In practice, we need knowledge stored in connection with life experiences. We need especially to understand the outcome of a (problem) solution in terms of emotion and feeling. We have to be able to think "in terms of the future", which sometimes is called an ecological check, i.e., the future must not simply be imagined, it should be felt!

Feelings cannot be reduced to decision matrices, as (many) economists and managers seem to believe – both from a professional point of view as well as according to their personal attitude ("maximize your utility!"). In this context Gigerenzer (2007, p. 55) writes that he once met a man, an economist, who actually did apply the balance-sheet method by Benjamin Franklin mentioned above to choose a partner. "By the way, he is now divorced" Gigerenzer (ibid.) remarks meekishly.

If in (economic) decision situations we say, or eventually really believe, that we are compelled to act strictly in accordance with rules predetermined from outside, in this external framework we will reduce the set of possible solutions that can result from the world of emotions of an internal framework. If emotions are involved in decision processes, we can also recognize the limits of the application of algorithms reflecting the results emotionally. Algorithms as such can explain and reproduce decisions ex post facto, but not really in advance, i.e., in order to predict an uncertain future.

The discussed topic was supposed to show both sides of bringing about (decisions leading to) effective solutions to (real) problems – the (plainly neutral) cognitive side and the emotional one. Now, we should be clear about the fact that besides possible theories or omnipresent action guiding ideas in everyday life, we also have to consider the feelings, which in everyday-life practice accompany our actions, if we are to use those theories or advice for making real decisions.

Meta-theoretical reflection and a conceptual framework for/of organizational effectiveness: The interrelation from causes and reasons, and the corrective power of dialogue

In the following, we want to give both (1) a meaning to the research results of Damasio and Gigerenzer in context of managing organizational effectiveness, and (2) a greater chance for their practical application and reflection within organizations. Furthermore, we want to help to identify the place or rather space where the use of expertise and its communication are essential for creating organizational effectiveness as far as we regard organizations in the sense of *complex adaptive systems* (e.g., Allee, 2002).

The generative influence of emotions and feelings upon organizational effectiveness comes into play when all the knowledge components depicted in the framework in Figure 2 are interconnected dynamically, i.e., when the top-level in Figure 2 illustrating justifying arguments **H = {E, F, K, M}; S→R** and the bottom-level illustrating causality between individual events or situations **P==>Q** are connected properly, and the need for a switch between the knowledge roles expertise **E**, user knowledge **F**, rules **K** and meta-knowledge **M** all as components of background knowledge **H** is considered, as well as the need for an endeavour/an active and constructive striving to understand something well, and not just to wait for a translation into one's own epistemic world.

The meta-theoretical framework in Figure 2 can furthermore be understood as a general elaboration and theoretical justification of an idea, or rather remark by Bateson (1979, p. 63) concerning the relation between logic and causality: "the *if…then* of causality contains time,

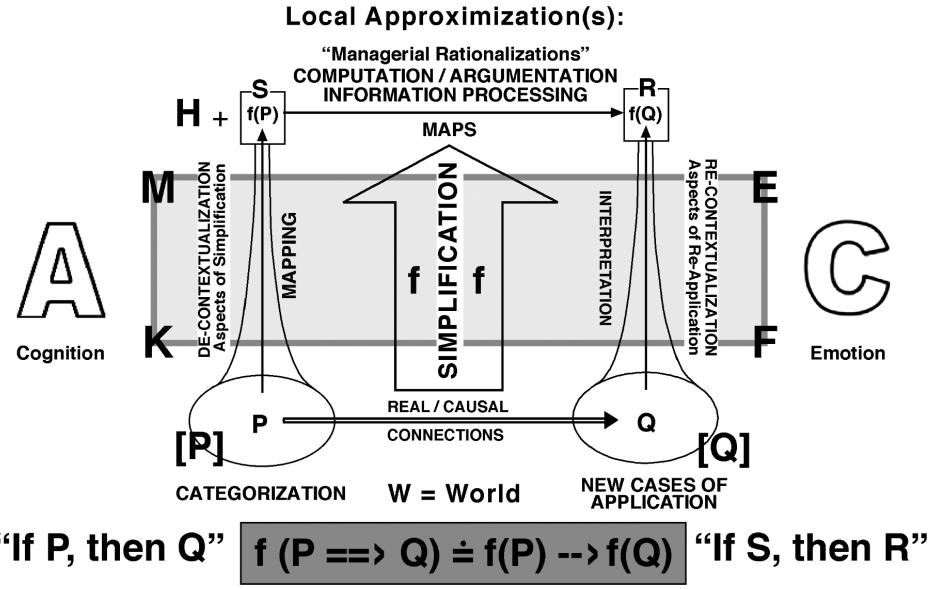

Fig. 2: The core of the model-theoretic systemic framework of analysis LIR (Language – Information – Reality) as a meta-theoretical backbone for a new practice of Knowledge Management in organizations

but the *if…then* of logic is timeless". In the given framework, the *if…then* of causality corresponds to the ground-level illustrating causality between sets of quasi-similar events or situations **[P]** ==> **[Q]**, the *if…then* of logic corresponds to the top-level **H; S→R** respectively.

In Figure 2, P at the bottom-level of the analytical framework LIR (Language – Information – Reality, basic ideas first published in Born, 1982; further developments, for example, in Born and Gatarik, 2012) designates a given or constructed or assumed problem or any kind of initial situation that should either be transformed causally or by the application of systematic means of production into some real-world result or situation designated as Q or some proposed solution in *quest* of which we are acting. The abstract mapping from the bottom (the reality part) to the top level designated as f signifies the use of some means of representation (a language, or a map) and especially the simplifications which we use to map reality onto these means. Thus, via *feedback* from the environment we create with the help of our emotions empirical (quasi-) equivalence classes (categorization) of similar cases in reality by bracketing them into a set of similar problems [P] or, similarly, into a set of solutions [Q]. This kind of reductionistic approach is an epistemic technique leading to a *de-contextualization* of the original problems up to the top level in the framework. This idea should not be mixed up with ontological or rather causal approaches on the bottom line.

The top-level of Figure 2 uses background knowledge **H** (H for hypotheses) consisting of all, or one or more of the explanatory knowledge components "invented" to classify our knowledge and to process information encoded in feelings or signs (also parameter values if they stem from measurements), i.e., **H = {E, F, K, M}**. But the processing of information corresponds only in a "middle realm" to the complex causal connections of an (organizational) reality which is expressed by the abstract picture or formula **f(P==>Q)** on the top-level corresponding approximately to the formula **f(P)→f(Q)** also on the top-level to capture the locally approximative homomorphism (i.e., a structure preserving mapping between causality in the real world and rational or rather logically based argumentation on the representational top-level). In practice, this homomorphism is generated by our feelings, which mediate between abstractions or the abstract level **H; S → R** and the realm of reality **[P] ==> [Q]** (creating "meaning" as a mediator), and which enable us to *come to terms* with the world (to orientate and organize our actions).[5]

In Figure 2 as explication of the core of the introduced meta-model, the most important point is the re-application or projection of the representational top-level onto the bottom-level. Whereas the relation expressed as arrow between the set of similar problems [P] and some characteristic value S or f(P) from bottom to top is, mathematically speaking, **many-to-one**, the relation between R or f(Q) and a factorized set of similar problem solutions [Q], i.e., top-down, is **one-to-many**. This means that we need a "corrective" interpretation of the application of the calculated results R in applying, projecting or expecting them in the causal world of reality. This can be provided by experience and expertise of people in knowledge role **E** who are using rules K, and especially by DIALOGUE between experts in **E** and users in knowledge role **F** (to enrich the pre-given background knowledge F in applying rules **K**).

According to Tsoukas (2005) it is important to think through the difference between verbs and nouns, i.e., between processes **K** via **E** or **F**, and explanatory structures **M**. In Figure 2, this is expressed as the relation between knowledge components **E** (experience/expertise) and **M** (structural and meta-models), or in general the operative right side of communal or commons-knowledge **C** comprising layman knowledge **F** and expert knowledge **E**, and the left side of the framework, i.e., of abstract or explanatory knowledge **A** comprising rules or measures **K** and meta-knowledge **M**.

Figure 2 is also in some sense the elaboration of the famous quote by Bateson ("The map is not the territory."), which goes back to Korzybski: It elaborates the idea of (1) how to understand the generative influence of emotions and feelings on decision making and problem solving, (2) how to know where the limits of some of those techniques are we are usually told to be inescapable, as well as (3) how to overcome these limits.

Thus, we have to take into account all the relevant factors in Figure 2 to reach effective decisions in the long run with the chance to correct our actions **P==>Q**, if their (1) results Q, (2) means **K** to provide acceptable results, and especially (3) "explanations" (i.e., justifications/argumentations) **M** of the success or failure of the actions are not really acceptable in terms of our feelings. These three *levels of reflection and possible correction(s)* or *levels of analysis, evaluation and correction* are depicted in Figure 3.

5 This roughly means that the picture f(P==>Q) of the *causal* connection (*if…then*) between P==>Q as elements of reality in a sort of middle realm corresponds to the *logical* connection (*if…then*) between the pictorial elements f(P) and f(Q) designated as f(P)→ f(Q).

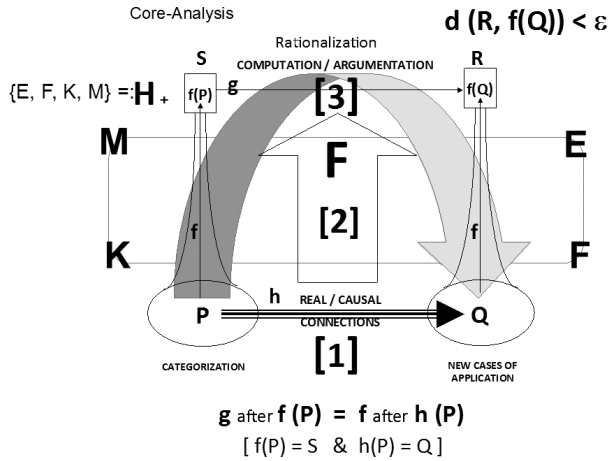

Fig. 3: Levels of reflection in the model-theoretic systemic framework of analysis LIR (Language – Information – Reality)[6]

The framework provided can also be used for the evaluation of technological impact, as well as the identification and development of knowledge for dealing with unexpected situations, and last but not least, for the systematic development of understanding and cooperation within and between organizations for coordinated action.

Finally, with the help of the proposed conceptual framework we can provide arguments why emotions and feelings or intuitions have generative influence on decision making and problem solving in organizations. We can *explain* that influence, and not just infer it from some cases where it is successful in order to discover later that these cases have not been well identified. With the help of the proposed conceptual framework we can – roughly speaking – also recombine classical approaches in business and economics with new techniques, technologies, and an understanding of the limits of their application. In this way, the introduced framework can support the emergence of innovation and help to evaluate its results.

Tsoukas (2005) quotes and refers to Toulmin (1990) to stress that managerial decision-making needs to embrace organizational complexity by reinstalling the importance of the particular, the local and the timely. Thus, we have to acknowledge connectivity, recursive patterns of communication, feedback, non-linearity, emergence, and ineffability to achieve organizational effectivity.

6 Legend: f, g, h, F designate functions or mathematical mappings; S and R designate parameter values creating the equivalence classes of similar cases [P] and [Q]; R designates furthermore the result of a calculation, P designates

Conclusions and implications

The future of Knowledge Management in supporting the effectiveness of organizations based upon an improved and theoretically founded practice

With special respect to Knowledge Management the decisive point in our context is the following: in classical Knowledge Management we usually start with explicit documentations and knowledge representations presupposing a common culture and with the belief that this approach will allow us to grasp the emotionally fixed intuitive knowledge of experts and to use it to reproduce their success by way of producing well-selected parameter values.

In contradistinction, Gigerenzer starts with the idea that the intuitions of the masters/experts can be "reduced" to simple heuristics/rules of thumb. Therefore we will turn the system around and take the heuristics as a starting point in order to grasp the experts´ knowledge so that explicit documentations of knowledge given as "complete (full) decision trees/complete problem-solving algorithms" can be replaced by documentations adapted to the real/practical thinking of human beings given as "effective (fast and frugal) decision trees/effective problem-solving space", which correspond to the intuitions resting upon the experience and feelings of the experts (Gigerenzer, 2007; Gigerenzer, 2008; Gigerenzer, 2002). The semantics of those decision trees, however, results and is being built up only afterwards, i.e., from the concrete and operative background knowledge of the users of the knowledge inherent in the algorithms. Parallel to the new approach, we can still (and definitely have to) formulate the theoretical (and thus explanatory) knowledge (i.e., the "complete decision trees and the complete problem-solving algorithms") to *explain* the decisions/problem-solutions ex post facto and make them understandable in their empirical occurence.

In other words: we do not start out Knowledge Management by simply trying to grasp the intuitions of experts and their expertise respectively with the help of "complete documentation". Instead we start with the explanatory, structural knowledge emerging at a higher level, which has been built up and implicitly created with the help of expertise. It is expertise as a domain-specific problem-solving competency together with the identified heuristics which can now provide what we originally expected from the technique of documentations, which we thought to be more or less complete. This means that we do not start with pure common sense thinking **F**, but with real personal experiences **E**, which someone has acquired in daily and professional life and which provide ecological/social knowledge in the sense of Damasio, knowledge one had to strive for and whose results therefore cannot be (re-) produced by simply applying easy rules **K** under the presupposition of an average layman knowledge/common sense **F** as knowledge of use.

Thereby the common-sensical knowledge **C** should not be considered in a pejorative or devaluating way, in the sense that it is bad or useless. Just the opposite is the case! The intuitions (or "gut feelings") we can find in daily life are quite distinct from the artificially constructed average knowledge we can find in the daily newspapers: the latter has to be formulated artificially so that people are deceived into thinking that everybody can understand everything, if the didactic is well chosen and one can follow the persuasive argumentation step by step and turn it into action straightforwardly. But that is fiction! Instead we have to use systematizing fiction to talk about fact, i.e., constructions to understand what is real. The structuralizing resolution level of fictions determines the *expressive power* of our means of representation in order to convey some relevant message, and thus of what we are able to *say*. Afterwards, we should

make use of the plurality of knowledge, the intuitions resting upon the categorizing power of emotions and feelings, and the fine nuances and distinctions available in everyday languages, guiding us to reach a deeper understanding of the world instead of reducing everything to a constructed average knowledge. This was also well known to Einstein, who once wrote: "What characterises our time is the perfection of mediocrity and the confusion of our aims."

Finally let us summarize the main point of our contribution with a well-known quote from The Little Prince (Exupéry, 1991, p. 68): "Goodbye," said the fox. "And now here is my secret, a very simple secret: it is only with the heart that one can see rightly; what is essential is invisible to the eye." This is what we often violate – and much too often today.

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