Heuristic processes in individual supplier selection

Work-in-progress paper

Bálint Esse- balint.esse@uni-corvinus.hu –Hungary -Corvinus University of Budapest

Abstract

The aim of the author is to explore the heuristic steps individual decision-makers make in their supplier selection decisions. All the steps, that are in some way deviations from the ideal of formal rationality are considered as heuristic: the emergence of cognitive heuristics (Tversky – Kahneman, 1974; Gigerenzer, 2004), the use of other simplifying rules and the use of heuristic decision strategies (Bettman et al, 1991).

The paper builds on the tradition of bounded rationality theory (Simon, 1972), and from its followers chooses the fast-and-frugal approach (Gigerenzer, 2004) as dominant. This means, that the focus is not on the biases, but on the potential in heuristics. There is an agreement about heuristics that these tools of the human mind are effective and fast, but the focus is not always on the positive outcomes. After dealing with theoretical discussions on heuristics, the author is addressing also the attitude of the decision makers themselves towards the use of heuristics: how do they feel about deviating from deep analysis, from exhausting decision making strategies?

The paper is in a way conceptual, but a research project and its results are also presented. The research is qualitative, conducted with a constructivist grounded theory approach (Glaser – Strauss, 1967; Charmaz, 2003). Qualitative interviews are used to generate and gather information about supplier selection decision processes of individuals. Observing group processes could be easier through analysis of the dialogs, but in the case of observing heuristical and other cognitive processes it could be difficult to distinguish these from group dynamics effects. Within the interview the retrospective verbal protocol analysis is used (Payne et al, 1978). Decision-makers in small and medium sized enterprises are interviewed, as this is the enterprise size where there is no, or weak supplier selection regulation. The first findings show that decision-makers have their sets of heuristical rules, for example threshold values, metarational rules, heuristical strategies and others. They deviate from the unreachable ideal of formal rationality by using noncompensatory decision strategies and other simplifications. The usage of these tools is not seen as irrational, because their perception of rationality differs from the academic formal rationality ideal. What seems very important, is the adaptivity. Decision-makers solve a vast number of decision tasks, with different products and services, in different situations, in different supplier-buyer relationships. These and other contingency factors are handled by using different decision tools, strategies in the process. This is in concordance with the notion of ecological rationality: in different buying situations different tools are successful. This is why the the research addresses the question of adaptivity as well. The question of adaptivity interesting, because the process of tool selection from the „adaptive toolbox” is not examined by the fast-and-frugal research program.

The paper contributes to the literature of supplier selection: there are few studies, which enrich this literature by empirical analysis of heuristic, fast decision making in this field. It also contributes to the heuristics and biases literature: the usage of these tools is predominantly observed and analyzed in experimental situations. By analyzing real-world decision processes in supplier selection, this research enriches the results of both fields. There are further questions raised by the research which are presented in the paper.

Keywords: heuristics, decision strategies, cognitive effort, adaptive decision-making

INTRODUCTION

In the present paper I aim at exploring the cognitive level of supplier selection decisions. These are the decisions that organize subjects into supply chains, then networks of chains. By gaining knowledge about the process of these decisions, it is easier to understand certain patterns in structure of networks. For the supplier side it provides knowledge which helps in entering into these networks.
For the purposes of this paper I deal with the buyer side only, without interaction and negotiation. The keyword is *heuristics*: these are simplifying rules, rules of thumb, that can make decision making faster and more simple. In this paper I am searching for simplifying rules in individual supplier selection decision making processes. I approach this topic from decision science perspective. The research was done on SME-s, because in their case we can talk about free, unregulated individual thinking algorithms, which are suitable for such study. The main question in one sentence is: *what cognitive shortcuts do decision makers use in supplier selection decisions and how do they evaluate this?*

I believe that by answering my questions I can provide new knowledge to various fields. The behavioral aspects of purchasing is still not a deeply researched area. Most of the literature on supplier selection deals with optimizing models, the effectiveness of the material and information processes, but the behavioral aspect can still be characterized as abandoned (Carter et al., 2007). By conducting this research I contribute to the behavioral area of this field.

THE SUPPLIER SELECTION DECISION

The reasons for the choice of supplier selection decisions were twofold. My previous research interests were networks, intraregional networks, and continuously I was getting to the micro-level and got to the point of analyzing, how do dyadic ties emerge. With a decision science perspective, I was interested in how does the decision about doing business with a buyer or supplier go on in the mind of the chooser. How do firms, by organizing themselves into supply chains, then nets, finally arrive to being a part of a network (Håkansson and Ford, 2002). The other reason was the interest in heuristic processes of the mind. The supplier selection decisions are suitable for analyzing decision strategies for several reasons. This is a decision where in most cases actual alternatives exist, these are the suppliers (and not courses of actions created by the decision-maker). Depending on the product or service, this situation is often repeated, and theoretical models exist, which could help in these decisions. The process can be traced, some of the criteria can be uncovered and they have a conscious level, although sometimes there might be much of intuition.

Before conducting the research I had reviewed the literature on various aspects of supplier selection decisions, what I will summarize here briefly. When analyzing supplier selection decisions, one meets a few dominant research streams in literature. I found important to study literature on the analysis of research criteria, the supplier selection methods and the contextual factors affecting supplier selection decisions.
Studies analyzing supplier selection criteria (beginning with Dickson, 1966) analyze the importance of various criteria with various research methods. Different studies bring different results about the importance of criteria, what is mainly because of different contexts but also because of the different methods applied, and the weaknesses of these methods (see Esse,

2010). The main concern about this stream is that it can not stand on its own: knowing the "importance" of a criterion can be hardly interpreted correctly without knowing the decision algorithm, the way it is used. This was one of the motivations to analyze whole decision processes.
The main supplier selection methods discussed in literature are categorizing, weighted scores, total cost of ownership, vendor profile analysis, analytic hierarchy process and similar. These are all optimizing methods and prescriptive ones, but – according to Patton (1996) – we know little about what algorithms are really used. This was a second strong motivation to do an open, exploratory qualitative research into individual supplier selection decision making. Getting to know how individuals decide, what decision strategies they use, can give us clues, which method is the closest to this process (instead of asking whether someone uses a certain method). For detailed description of these and other methods please see for example DeBoer et al (2001) and others.
Among contextual factors (the factors not in the decision process, but influencing the parameters of the decision) the main issues are organizational role, buying situation, type of relationship and product type (Sheth, 1973; Robinson et al, 1967; Webster and Wind, 1972; Kraljic, 1983, and others). The influence in decision process, the importance of criteria and participants of the decision, all depend at least on these factors.

THE RESEARCH QUESTIONS

My primary interest in research were the heuristics. There are two main positions on heuristics (which is the main stream dealing with simplifications) in the decision making literature. The dominant research program dealing with simplification is the heuristics and biases (Tversky and Kahneman, 1974) research program, which emerged from the bounded rationality theory. Later on, two points of view began to appear: one side focuses on the possible mistakes to which heuristics may lead (this is the original direction mentioned above), the other the potential in these tools of mind (Gigerenzer, 2007). Both programs accept though, that heuristics lead to good results, are fast and effective. The differences are in the focus: the possible mistakes or the positive potential.
These programs analyze the human behavior when facing probability judgment problems dominantly in experimental situations, usually testing specific heuristics in binary decision situations. There are few that would search for simple strategies in reports from real decision making processes. After reviewing the literature I assume that by searching not only for specific heuristics, but all the simple strategies (for example heuristic decision strategies[1]) of human mind, and by analyzing these in real world business decision situations, I can enrich the field by the generated knowledge. Also, the negative or positive view of these strategies is theoretical: they are viewed as good or bad compared to certain concepts of rationality. However, there is little known about what does the decision maker think when using these tools, how does he feel about it. This why I had chosen to analyze the cognitive process of supplier selection and also the assessment of the decision-making process by the decision-makers themselves, so I formulated the research questions to target these topics.

[1] We consider every decision strategy as heuristic, if it does not result in decision through considering all information on all criteria. An example of heuristic decision strategy is the lexicographic decision rule. The decision maker compares the alternatives on the most important criteria, and chooses the best. He considers the second most important criterion only if there is a draw.

I have conducted a interpretative qualitative study, using the grounded theory methodology[2] as frame, which I present in the next section. In the interpretative paradigm there is no hypothesis testing, and this is true for grounded theory as methodology. Therefore I formulated research questions, not hypotheses. The two main research questions were: *How does the cognitive process of supplier selection decision look like? What is the attitude of the individual towards the rationality of the process?*
In this paper I deal dominantly with the first question. I would like to understand what is in the head of the decision maker. What conscious processes run when selecting a supplier? Most of the decision making research focuses on the result of this process. I was interested in the process. My objective was to explore the decision strategies used, to identify the simplifying steps and their context.

RESEARCH METHODOLOGY AND METHODS

The research I have conducted is interpretative, more precisely I approached the topic with a constructivist approach. The Grounded Theory Methodology (GTM, Glaser and Strauss, 1967) is used as methodology, in its evolved, constructivist form (Charmaz, 2003). This methodology lets the substantive theory of a field to emerge in an iterative process. Its basic principles are the *constant comparison* and *theoretical sampling*. These two processes ensure the connection between generated data and the results. These are also the ongoing processes which indicate the direction of the iterative process of research. GTM results in a substantive theory, what is somewhere in between minor hypotheses and grand theory (Glaser and Strauss, 1967). The main characteristics of GTM is, that data generation[3] and data analysis are not separate phases of research, but these are done parallely.

Semi-structured qualitative interviews were used as data generating research methods. Elements of Verbal Protocol Analysis (VPA) and Ethnographic Decision Modeling (EDM) are the process-tracing research methods that were used embedded in the interviews and gave it the structure.

The *interviews* were semi-structured, as I approached the subjects with very few open ended questions prepared in advance, and more questions – leading and refining ones – have emerged during the interviews. The interviews were subjectivist qualitative interviews, because they focused on the perceptions and meanings of the interviewees. Therefore I never asked on actual theoretical concepts (I did not ask a question about *simplifying*, or *rationality*), but wanted to get a very rich description of the decision process and then identified the answers to my questions. This way it was an exploratory research.
The interview string is an evolving construct in GTM: during the research process, the theory is slowly emerging, categories and connections between categories appear and further questions are needed to shed light on connections or categories which are not yet clear. This way new, more precise questions are integrated into the interview strings. In the first interviews, only two-three open-ended questions were prepared, in the last interview there

[2] Grounded theory methodology is a methodology building on constant comparison and theoretical sampling in an iterative manner. For further reading see Glaser and Strauss (1967) and later.

[3] Term generation is better in this research paradigm, than data gathering. Using the term gathering could suggest that data is independent from the researcher, and that it exists „somewhere out there". Instead, data is generated in the interactions of researcher and the interviewees.

were a lot more questions.

VPA is a process-tracing method, stemming from the information-processing approach to decision analysis. The essence of VPA is that the researcher asks the subject to give a continuous verbal report while doing the tasks, so simply to think aloud. These reports are handled as the protocols of the individual's behavior (Payne and Bettman, 2004).
From the EDM method the so called *contrastive questioning* was used. This is the form of asking the subject, if he chooses alternative A from A and B, what should change to choose rather B. There is significant potential in this form of asking, knowledge about criteria and trade-offs can be gained.
Knowledge about the decision process in general, about evaluation of their own decision-making processes were generated by the interviews, but the main part of the interviews (and most of the interview time) were structured by using VPA and EDM on supplier selection decisions of two inputs.

Coding was used as data analysis method. I used the three levels of coding in GTM: open, axial and selective coding. In line with coding process I continued to write the so called *memo* file, what I used also as research diary. This is an important tool in following the research process, a document which, in fact, gives the basis for the emerging substantive theory. The process of thought, important illuminations and the construction of knowledge about the phenomenon is followed here. Data analysis goes on in line with data generation and indicates the point, to which research should continue, in my case how many more interviews to conduct, with who and what questions to ask.

One can find rules for stopping in a GTM research (to conduct 8-20 interviews, others indicate the rule of twelve interviews (Goulding, 1999)), but there can be no such rule: the terminating point is the point of theoretical *saturation*. I have conducted twelve in-depth interviews. The stopping rule of data generation is saturation: the researcher continues with the process until the relationships and categories are theoretically saturated. This saturation means, that further interviews do not strengthen or enlighten new relationships, no change in the generated theory would happen. I have reached this point after twelve interviews, as I felt that the new directions generated would lead outside the research focus and the revealed relationships could be considered as saturated.
As the research was aimed at analyzing individual decision making free of any prescription or regulation, I conducted the interviews at small and medium-sized enterprises (SME). The logic was led by the principle of *theoretical sampling*: the direction, with whom and about what should interviews be conducted, is given by the knowledge from the previous interviews. This is how after the first interview with an SME with prescribed purchasing process and after a large company I turned to the SME-s.
The interviews were recorded and transcribed. Transcriptions were converted to the proper text file format and then analyzed with the TAMS Analyzer[4] software. This is an open-source software developed for qualitative data analysis of texts by building codes and code sets. This way I handled the text files of all the interviews as one project with a common code base.

In an interpretative study there are paradigm-specific criteria for evaluating the quality of the research work: credibility, confirmability, dependability and transferability. All these are a

[4] TAMS - Text Analysis Markup System, © Apple Computer, AGRegex is © Aram Greenman, PCRE Library is © Philip Hazel.

pair of the classical positivist criteria (validity, generalizability, reliability). To meet these requirements, I used the basic principles of GTM and other activities: recording the interviews, avoiding qualifying statements, gestures or questions, blind coding (coding of interview parts by another researcher, then discussing it), constant comparisons, theoretical sampling, on site checking of my understanding.

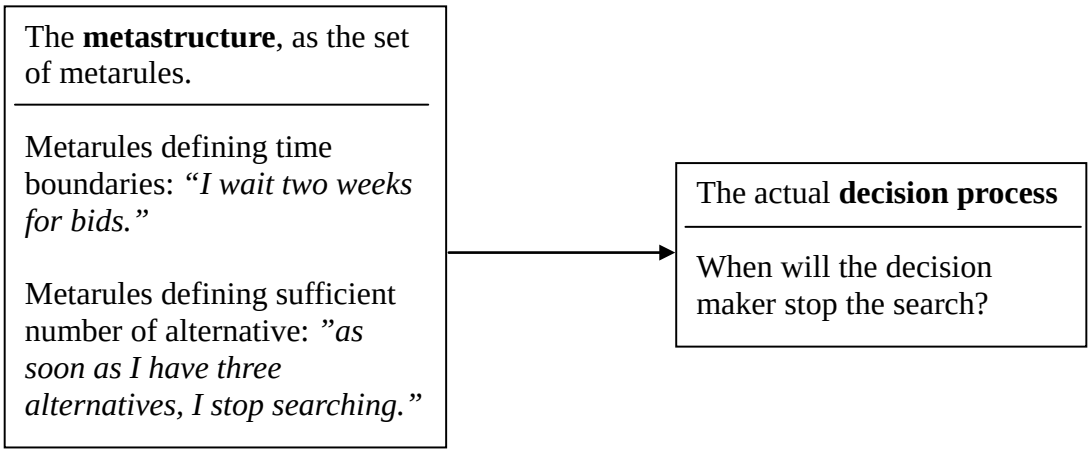
RESULTS

The grounded theory process results in a middle range substantive theory about the phenomena researched. In the coding process a *core category* emerges, which then gives the backbone for the theory created. Theoretically, there is always a core category, and it emerges naturally as this category has the most connections with others. There is always a category during the research process, which seems to be a good candidate to become this core category, and also it can change, as other categories begin to show more connections. In this section I present how I have come from the initial research interest (simple decision rules) to the *meta-structure* as potential core category, then finally arriving at the *attitude set*, as being the core connected strongly to the meta-structure.
I have kept the initial interest in simplifying. Emergence of other topics does not change the research questions, but leads to categories which explain the area of interest and the connections of different phenomena, thus allowing answering the research questions.

THE META-STRUCTURE

Many examples of adaptation can be found in the interviews, where subjects talk about how their decision making process depends on different contextual factors. Decision makers have different decision strategies and processes for different products, different situations, relationships etc. As they adapt to these factors, they make decisions about decisions (because deciding how to decide is different from filtering the options and choosing). These are called also secondary decisions or *meta-decisions*. A meta-decision is for example ranking the criteria according to significance, or the number of alternatives one wants to collect, choosing a search stopping rule, and also choosing the decision strategy. I call the results of these decisions *meta-rules* (for example in market *x* in situation *y* collecting *z* alternatives is enough), and the set of these rules as *meta-structure*. Here are those decision rules, stopping rules, rules of thumb, that do not function inside the decision making process, but by adapting to the situation and contextual factors they define the design of the decision process. Different processes for different buying situations defined by values of several contextual factors. There are plenty of heuristic rules in this structure. Examples of meta-rules (actually, heuristic ones) are shown in figure 1. As it is shown, the evolved meta-rules give answers in the actual context to the questions “how to decide”. In the meta-structure there are also rules for information search, on criteria to consider, on criteria importance, on decision strategy to apply etc.

Figure 1. Examples of meta-rules for alternative search in supplier selection decisions



Source: own construction

This emerging candidate for core category was interesting for me, because it is a tool of faster, more simple decision making: first time meeting a decision task in a specific situation, the decision maker has to decide, how to decide. He shapes the decision process. After a few similar tasks absolved, he will not decide consciously, but he knows, how to decide in this situation. What was a meta-decision requiring effort in the past, is now just a fit: for this task in situation *x*, decision process *z* is suitable.

THE ATTITUDE SET

In the research questions I have included one question on the attitude towards the usage of simple rules. But from the first interview I got many attitude statements even without asking such question, and not only about simple rules, but about search, information volume etc. I had not expected this in advance. Because other phenomena (for example incidents from the past, learning) also showed strong connections with these attitudes, and were connected with simplifying, eventually the *attitude set*[5] became the core category. As in meta-structure are the rules, how to decide, in the attitude set there are attitudes towards elements of decision process. Some examples of attitude elements connected to different aspects of the decision process are shown in table 1.

[5] Remember, that these attitudes are different from „normal" attitudes. These are not attitudes for example towards a certain product or supplier („what?"), but towards the elements of decision processes („how?"). They are positive or negative attitudes towards the meta-elements of decision processes (for example towards search, information volume, analysis etc.)

Table 1. Examples of attitude elements regarding different aspects of supplier selection decisions

element of the decision-making process	**example**
the length of the decision making	*„ (...) I like deciding quickly, and I do not like to think a lot, because the end is the same."(12)*
acceptance of the result	*„One should accept that sometimes he does not make good decisions. Obviously, it would be good if he made fewer bad ones, but after some time he finds out that he is not perfect, and then it becomes part of the life that he acted badly. At this point we should not be sad, instead we should deal with the next step.(10)"*
aspiration level/ maximization-satisficing	*„In this case, if these are fulfilled, simply I do not wish more."(5)*
searching, the amount of the collected information	*„Essentially I do not like to make a decision on the basis of too much information."(10)* *„ (...) and I want to have a good time, then maybe I look for another 8-10, but with it perhaps I cause a chaotic possibility for myself."(5)*
capacity bounds	*„You go to an exhibition, and there are 370 different exhibitors. You do not have a chance to see all of them, but you choose some saying "this is good – I would like to get to know it more closely."(7)*
analysis	*„I do not say that I am genius in mathematics, but the part I can use for my work, that part I enjoy with delight."(6)*

Source: interview texts, numbers in brackets indicate the interviewee

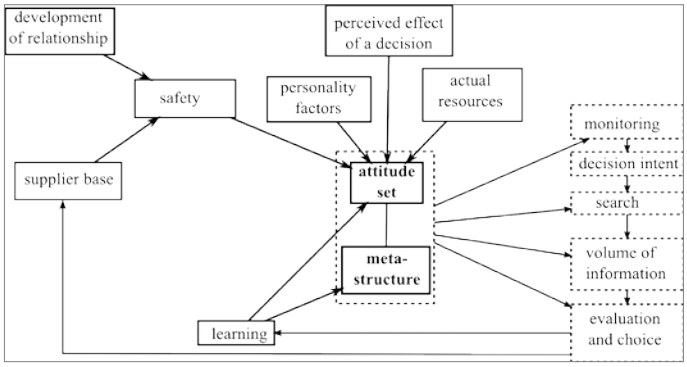
The attitude set seems to determine the meta-structure, and many other factors affect the meta-structure through the attitude set. It is hard to enlighten the nature of connection between the attitude set and the meta-structure, but it appears plausible that they are in *phenomenon – strategy* relationship (so the attitude set is shaped and it evolves, and the decision maker builds strategies according to this evolving set and these strategies are saved to the meta-structure). For example when a decision maker has a strong positive attitude towards fast decision making, and negative attitudes towards procrastination and information overload, in his meta-structure there will be a meta-rule allowing fast, simplifying decision strategies. An other decision maker, who has a strong positive attitude towards thorough search and deep analysis, might not have such rule in his meta-structure.

Because of this strong connection I handle these two categories as being the core category (together forming a kind of *adaptive mechanism*), with more emphasis on the attitude set. The role of attitudes in adaptivity appears in their wider definitions: attitudes are mental tools that facilitate the adaptation to the environment (Ajzen, 2001).

THE RELATIONSHIPS

The simplified set of uncovered relationships is shown in figure 2. Here I present only a short description of the relationships between categories for the purposes of this paper. This figure is the result of the data analysis process: I had conducted the coding, then created categories and iteratively searched for connections.

Figure 2. The model of revealed relationships between categories



In the center is the core category of the attitude set and meta-structure. These ensure the adaptivity of the decision making. On the right, the categories of the steps of decision process can be found, which are shaped by the core category: what decision strategies to use, when to stop a process, and so on. After a supplier selection process, the supplier base evolves, what provides a level of perceived safety. This feeling of safety shapes then the attitudes again, with which the decision maker enters his next decision tasks. This is indicated on the left side of the figure.
During the decision process the individual gets feedback about the results of his strategies, and through a learning process this shapes the core category. New rules embed into the meta-structure, but only those, which are supported by an attitude from the attitude set (what is also shaped by learning). The core category is evolving in this continuous process, and in an ideal case results in better and more effective decision processes.

HEURISTIC ELEMENTS IN SUPPLIER SELECTION DECISION AND THE ENVIRONMENT IN WHICH THEY ARE USED

In the research I could identify three decision processes that can be called *heuristic*: the use of cognitive heuristics, the heuristic decision strategies and the meta-rules.

Heuristic decision strategies are the lexicographic and similar strategies, because using these requires less cognitive effort (than for example a weighted additive model), and decision making is faster. There is only a short phase before the final decision, when the consideration set is finally small (3-4 alternatives), when decision makers use compensatory decision strategies, such as weighted additive model. In earlier phases they filter the options by using a form of lexicographical strategies, most frequently evaluation by aspects, or combination of

lexicographic and other decision strategies. Not one case was observed in which only compensatory, weighted additive model would be used in the whole process.

In the *meta-structure*, there are rules that define the decision parameters (for example the sufficient number of alternatives, waiting heuristics etc.) which prevent endless search and analysis. I have found that by learning, the meta-structure becomes a really powerful heuristic tool. As the decision maker learns the results of his previous decisions, new meta-rules are saved to the meta-structure, or the existing rules are refined. For example if the decision maker conducts an exhaustive analytic process all the time, but he sees that (for example because of the characteristics of a certain market) it does not end with better result than a more simple process, he adjusts his process. One can see, that by time passing, the meta-structure of the decision maker is getting finer and finer. He will know, in what situations what processes do pay off. First, he has to decide, how to decide, but after several repeating decisions it is not a decision: he will only fit the created process to the situation. This way, the decision processes gets faster. There is one thing, however: because of the concordance between the attitude set and the meta-structure, only those rules can embed into the meta-structure, which are supported by an attitude.

From the *cognitive heuristics* and biases I have found examples on *availability* (buying a printing machine, because its brand name is familiar from music industry), *representativity* heuristics (stereotyping the supplier), or the *bias of sunk costs* (sticking to the actual supplier because of the common past).

Heuristic steps are used mainly because of lack of time and resources. There is less search, and the set of alternatives is cut smaller when the product is standard and the market reacts fast, this way one can get the same product and does not have to worry about the price. In cases of high uncertainty the search within the known suppliers is preferred, to reach safety. The actual state of the firm and its resources affect the level of optimization or simplifying, there are „bounded organizational capacities" similar to bounded cognitive capacities.

HUMAN RELATIONSHIPS AND TRUST IN SELECTION

In this part I only discuss a few points in detail, with special focus on human relationships and the level of perceived safety. Trust and human relationships are in focus of many studies (see for example Finch et al, 2002; Uzzi,1997). The role and importance of human relationships, connecting to the concept of trust, have appeared several times in interviews, but in different roles, mainly two: human relationships as ways of search and human relationships as strengthening elements of business relationships.
As a search algorithm, human relationships appear as a safeguard, actually the only real one in the hands of a small or medium-sized enterprise. Searching through the nets of human relationships was more times evident than not: there was only one interviewee who avoids business with people he knows, because of bad experience.
The personal ties, relationships are crucial not only in search, but in relationship development. There is no connection between two organizations, but between two people. How this is important in SME business practice, can be illustrated by this interview part:
"To me the biggest problem is when at the same company someone else is put to the same position every one or two months. I had a well-established relationship with whom I could

reach something, we already knew each other and so on. When I had something I gave a call, and now there is a totally unknown person there so I have to start the building of a more friendly relationship from the very beginning, and if we are to begin achieving the goal, then a new person comes again and so on (...) And even though this is unprecedented yet, I often thought that on the basis of a case like this, a relationship can be absolutely finished."(11)

The development of the relationship has an effect on the attitude: as the confidence strengthens and the offers get better, the feeling of safety increases, searching and checking becomes weaker. The pursuit of satisfaction and sunk costs can also be observed.

The above discussed role of personal relationships can be in many aspects identified as trust. Trust is an attitude, but also a positive expectation from the partner. Based on other studies, in Finch et al (2010) two forms of the connection of heuristics and trust are distinguished: there might be heuristics that help to decide, whether to trust a partner, and trust can be a heuristic when deciding which supplier to choose.

Both connections have appeared in the interviews. Several forms of representativeness heuristics do appear when deciding whether to trust a partner. Heavily relying on one information source, or simple stereotyping. For example a construction business was not offered to a supplier, because he did not appear the way it was expected by the buyer: *"If, let's say, he gets out of a brand new BMW and he is suited up, then he is suspicious. Probably I do not do business with him."(6).* There are many factors, which help as proxies of trustworthiness, but from the interviews it is clear that it is derived mainly from reputation and position and time spent on the market.

Trust as a heuristic is also apparent. At the beginning, when there is no supplier base, it is hard to know, who to trust, and the previously mentioned function of trust is dominant. When having a stable, broader supplier base, this second function becomes dominant. Trust is earned dominantly by performing well on the supply performance criteria, which can not be assessed in advance, but only experienced. This performance and the trust developed cause the fact that SME-s do not switch to new supplier easily.

Talking about nets and networks (see Håkansson and Ford, 2002), by knowing more about the birth of buyer-supplier ties we learn more about the dynamics of emergence of networks. It is interesting, how the buildup of a supplier base changes the perceived level of safety and lessens the searching attitude. This means that after an existing base, the search is less intensive, less ties are built, because there is no perceived need for it. This, partly cognitive, process explains the limits of number of ties, after which the number of connections of a firm does not grow further. The attitude of the individual decision-maker thus explains the dynamics of connecting to different networks. For example a decision-maker with a satisficing strategy will be satisfied with a few suppliers, who meet his aspiration level and he will not search further. Another decision-maker, who considers the human relationships and advantages ensured by these relationships as very important, will not change partners easily. In contrast, a decision-maker with a maximizing attitude who always searches the whole market, trying to reach the best, will frequently connect to different partners, thus join different nets. Not only this attitude, but, naturally, the preferred number of contacts has its effects of network embeddedness. These processes and parameters of decisions depend much on contextual factors, but mainly on the structure of the specific product market.

MANAGERIAL IMPLICATIONS

It is not easy to define the advice for practice from this research, as all the research is about

individual knowledge, attitudes and experience. One of the main findings is that decision-makers in SME-s, according to their individual decision processes adjust their thinking not to a theoretical ideal of rationality, but to their set of attitudes which are developed by various factors.
If we believe in objective measures of results, we could say, that:

- a decision-maker thinking with a strong optimizing attitude in an environment, where a heuristic process would yield the same results, is wasting resources,
- a decision-maker deciding with strong heuristics in an environment, where optimizing approach would bring better results is not responsible,

and so on, but this approach would not count with at least two things: the mental and material costs of the decision process and the subjective perception of results. Who could say that a manager of an SME who knows he does not have the best, but is happy to decide quickly and in a cheap way, and is fully contented with results, is irresponsible? It would be necessary to quantify all the effort put in the decision process and the change in psychological well-being of the decision-maker to claim such things. It would be normative and idealistic to require a formally rational, in theoretical sense “ideal” way of deciding from the individual. One thing can be done: it appears, that decision makers do not have the same aspiration level, attitude throughout the whole process. There were decision-makers who do search extensively for suppliers, but after that decide in heuristic ways, other decision-makers do limited search in a heuristic way, but from the consideration set decide with optimizing methods. It could be advised to align the levels in all the process, but this would be a far more psychological advice than a managerial advice is expected to be.

The main application field in heuristics is in using them in building a knowledge base, what is the case for larger companies. Experience, well-performing heuristic meta-rules can be built into purchasing manuals after examining their accuracy. When a heuristic rule (the number of alternatives to be considered, the time limit to wait for the bids, the decision strategy to be used etc, and all connected to different environmental, contextual parameters) is performing well (eg. effectively, reaching the same, or nearly the same result with much less effort), it is advised to build into the knowledge base. This way a kind of an organizational meta-structure can be built, what makes it easier to decide more adaptively and effectively. This will also depend on the “attitude” set, if we believe an organization can have or construct one. The ideal situation would be that this organizational meta-structure, the purchasing manual is built on these individual meta-structures. Besides the effectiveness it is motivating for managers to see, that their knowledge is built into the manual and use it gladly (see examples in Gigerenzer, 2007).

SUMMARY AND FURTHER RESEARCH

Further explications of the structured research results follow according to the net of connections, which is the result of the grounded theory methodology process.
In most cases there are simplifying steps in decision processes. These can be divided into two groups: the **meta-decisions** and the **decision strategies** applied in the process. I had focused on the latter before conducting my research. I have found examples for these strategies – heuristic decision rules and cognitive heuristics – in the reports of the subjects.
The other field in simplifying, the **meta-decisions** have emerged during the research process. It became evident, that this aspect – not the decision steps within a decision, but decisions about decisions – provide possibilities for simplifying. However, it is not easy to distinguish between strategies and meta-decisions. For example a lexicographic rule includes both:

weighting the criteria is a meta-decision, the rule of selecting is a decision strategy.

The meta-structure is a part of an adaptive mechanism. The other category, that have emerged as being core category, was the **attitude set**, which is strongly connected to the meta-structure. The meta-structure in my interpretation is rather the cognitive level of adaptation, while the attitude set is not only cognitive, because it includes also emotional elements. It seems that in the meta-structure only those meta-rules are included, that are supported by an attitude.
The attitude set determines also, in **what way does the decision maker simplify and in what part of the decision process**. One can observe attitudes towards evaluation, search, volume of information, error. These attitudes affect what heuristics will be used in the decision process or on meta-level, and what the decision process will look like. The attitude set determines what kind of simplifications will be used and when. This means that the satisficing is not general for the whole decision process, but depending on the attitude set in the phase of search, evaluation or choice or elsewhere.
The attitude set is in connection with **personality**. The set is shaped by age, past roles, stories. These have emerged in the interviews, and although there is a strong suspicion that personality traits are behind these, they did not emerge in the interviews.
There are two points we can make here: satisficing strategies are not general in a case of a decision maker, but can be present in different elements of decision making process. The other point is, that the abilities or the readiness to make decisions in a heuristic way varies from person to person.
If there do exist decision situations or environments where this kind of decision making seems as wanted, these points are important in delegation, and also in forming groups.

FURTHER RESEARCH DIRECTIONS

In a grounded theory methodology, the further research directions are shown by the constant comparison of categories, what reveals the new possibilities the same way as in the process. After conducting further research, the substantive theory can be brought to a more general level. In this part I shortly summarize these possible directions.

One evident direction is the analysis of the **practice at large companies**. The results from the SME-s could be different from those at large companies in many ways. It would be interesting to see the relationship between the individual meta-structures and the prescribed purchasing regulations, as an **organizational meta-structure.** Beside these differences it would be interesting to explore, in what ways can the simplifying cognitive processes work in a regulated environment, and the attitudes towards regulations.
The researchers examining the potential in simple heuristics have defined an objective to build simple **decision support tools** on the heuristics that work. It is a knowledge management task, how could heuristics, heuristic decision rules and context-specific meta-rules be built into a decision support tool. This topic is also relevant rather for the large companies.
In this research, the most of the attitudes are connected with search and the volume of information. In connection with this, the effect of **age and experience** emerged, and the examination of age and capabilities could be also an interesting topic (as with age, some analytical capacities are getting weaker, but these can be replaced by experience and heuristics built on them).

I consider the formation **of the attitude set and also the meta-structure**, as a very interesting topic. There are only a few studies trying to find connections between personality traits and satisficing and heuristic decision making, with little success ((Bröder and Newell, 2008; Hilbig, 2008; Schwartz et al, 2002).
To see the effectiveness or other results of decision making styles, it would be fruitful to explore the connection between decision processes and firm **performance**.
The knowledge I gained from this research can be evaluated as new in more aspects, and it determines further research directions clearly. I feel the motivation to conduct some of these myself, but here I express my hope, that the paper or its part can inspire other researchers to do this as well.

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