THE ANCHORING EFFECT IN THE CONTEXT OF STRATEGIC INVESTMENT DECISION MAKING

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Abstract

The anchoring effect is discussed in literature as one of the most robust and persistent bias that affects most decisions. Strategic investment decisions are non-routine, complex and uncertain and have a significant impact on the long-term performance. This paper seeks to explore the anchoring effect in the context of contextual factors and process dimensions of the strategic investment decision making by reviewing and analysing literature on anchoring effect and strategic investment decision making. This paper concludes that contextual factor "characteristics of decision makers" and process dimensions "procedural rationality" as well as "intuition" show robust conceptual interdependencies to the anchoring effect.

Keywords: *anchoring effect, strategic investment decision making, heuristic, bias, process dimension, contextual factor*

1. INTRODUCTION

The anchoring effect is discussed in literature as one of the most robust and persistent bias that affects most decisions. Strategic investment decisions are non-routine, complex and uncertain and have a significant impact on the long-term performance. The analysis of the anchoring effect in the context of strategic investment decision making should provide valuable insights. The analysis of the anchoring effect and strategic investment decision making is based on reviewing the literature on these two topics.

This paper is focussed on the conceptional basics of the anchoring effect and the strategic investment decision making in research literature. Moreover, the conceptual interdependencies and the classification of topics of anchoring effect as well as strategic investment decision making are discussed.

The remainder of this paper is structured as follows. Section 2 introduces the basics of strategic investment decision making and section 3 discusses the basics of the anchoring effect. Section 4 concludes the paper by summarizing the results.

2. STRATEGIC INVESTMENT DECISION MAKING PROCESS

2.1. Characteristics of strategic investment decision making process

The strategic investment decision making process is discussed in this section. As introduction to this topic, the characteristics of strategic investment decision making are described. Moreover, the contextual factors described in literature are summarized and the process dimensions of strategic investment decision making are analysed.

Strategic investment decision making process is described to be of high relevance as this type of decisions are strategically important, are usually related with long term and substantial resource consumption and are difficult to reverse. Strategic investment decision making is part of strategic decision making with the unit of the analysis being the investment project. Research regarding strategic decision making is divided into content research and process research whereby both research directions are complementary (Elbanna 2006). The content research focuses on issues of strategy content and the process research deals with the process of strategic decision making and the factors affecting this process (Elbanna 2006). The latter is discussed in this section.

Decisions are commonly categorized as routine, short-term or strategic (Elliot et al. 2020). Strategic decisions are taken based on information or input data of high variability and horizons over several

months or years. Input data with high variability may be market data, industry trends and technological changes. Regarding investments, researchers distinguish between operational and strategic investment decisions (Alkaraan 2016). The risk and potential outcomes of operational investments are sufficiently understood by managers and the projects can be executed via standardized or routine procedures (Alkaraan 2016). Strategic investment decisions are non-routine, complex and uncertain and have a significant impact on the long-term performance (Alkaraan 2016; Alkaraan und Northcott 2006, 2013). Further characteristics of a strategic investment decision-making process are high risk and ambiguity (Alkaraan 2020) as well as hard-to-quantify outcomes (Alkaraan und Northcott 2006). Moreover, strategic investment decisions are "subjectively influenced by the values and expectations" of the decision makers (Alkaraan 2016).

Strategic investment projects may cover investment in a specific business as well as joint ventures and mergers and acquisitions (Elliot et al. 2020; Alkaraan 2016; Alkaraan und Northcott 2006). Other examples for strategic investment projects are introduction of new product lines, of new manufacturing technologies or shifts in production capabilities (Alkaraan 2016; Alkaraan und Northcott 2006). Moreover, introduction of electronically integrated operations, electronic commerce capability and computerised production processes are classified as strategic investment projects (Alkaraan und Northcott 2006).

"Strategic investment decisions are one-off, non-repeatable decisions" which require large amount of varied information to be collected and analysed prior to decision making in order to cope with the high risk and uncertainty associated with this type of investments (Alkaraan 2020). The risk is described as strategic risk, operational risk and financial risk (Alkaraan 2020). Moreover, this information is likely to be unique and related to the specific investment object (Alkaraan 2020). Internal and external information is required, including financial and non-financial information (Alkaraan 2020). Strategic investment decisions are made using several assumptions. These assumptions consist of internal and external parameters and include "projections of economic growth, commodity prices and exchange rates, introduction of technological and productivity advancements, cost and supply parameters" (Alkaraan 2020).

Research findings revealed that the strategic investment decision making process is less systematic than discussed in the normative literature and that this process is influenced by a combination of contextual factors in a complex way (Alkaraan und Northcott 2013). Furthermore, the strategic (investment) decision making is discussed as a complex process which is shaped by the interaction of multiple dimensions (Alkaraan und Northcott 2013; Elbanna 2006) and several drivers of the process remained unexplained in the research literature (Alkaraan und Northcott 2013). From the practitioners point of view, the process cannot be fully understood regarding achievement of economically rational procedures and decision making (Alkaraan und Northcott 2013). Potential problems in achieving a successful strategic investment decision making are inadequate evaluation of investment opportunities, inability to achieve synergy, or inadequate pre-decision control mechanisms (Alkaraan 2016). Generally, the research on strategic investment decision-making is described to be inherently practical (Alkaraan 2016).

2.2. Contextual factors influencing strategic investment decision making

As previously described the strategic investment decision making process is influenced by a combination of contextual factors in a complex way. The contextual factors impacting strategic investment decision making are discussed in this chapter. A multi-factor view is dominating the publications.

Research articles regarding the impact of contextual factors on investment decision making process are focused on appraisal techniques being used and how these techniques are used (Carr et al. 2010). For example, several articles analysed the impact of contextual factors on the use of financial appraisal techniques in country context (Alkaraan 2020) and cross-country differences in the investment decision making process (Graham 2017). However, research articles did not discuss cross country differences to be significant even between developed and emerging countries (Hermes et al. 2007). Graham und Sathye (2018) stated that the use of sophisticated risk management techniques increase with increasing

environmental uncertainty. However, in extreme uncertainty the benefit of sophisticated financial and risk appraisal techniques is of low value and non-financial information gain importance (Elmassri et al. 2016). Furthermore, Alkaraan und Northcott (2006) stated that sophisticated "scientific" risk analysis techniques, like real options analysis, are not widely used in practice.

Regarding the characteristics and expectations of stakeholders the literature showed a broad range of analysed factors. Carr et al. (2010) analysed how contextual factors market orientation and performance in relation to shareholder expectations, impact the choice and use of capital budgeting techniques as well as the impact on the decision making process itself. Alkaraan und Northcott (2013) explored the interactions between several contextual factors and organizational aspects of strategic investment decision making processes. One of the contextual factors analysed in the research of Alkaraan und Northcott (2013) is "demographic characteristics of decision-makers" which covers top management's specialist background (e.g. accounting/finance, engineering, operations etc.).

Education of management involved in investment decision making is analysed in researches regarding the usage of financial appraisal techniques (Graham und Sathye 2018; Brunzell et al. 2013; Hermes et al. 2007). Hermes et al. (2007) stated that education of finance directors has an impact on the usage of net present value appraisal techniques. Brunzell et al. (2013) stated that characteristics of finance directors regarding education and age have an impact on the usage of sophisticated capital budgeting methods. Graham und Sathye (2018) analysed the impact of environmental uncertainty, firm size, education attainment and national culture (all four described as specific contingency factors) on the capital budgeting process, and especially on the usage of financial appraisal and risk appraisal techniques.

Brunzell et al. (2013) analysed the determinants real options, agency problems, political risk, the previously mentioned CFO characteristics and short-term pressure on the capital budgeting system. Graham (2017) discussed the impact of national culture on the investment decision making process and pointed out that the difference is mainly driven by the different levels of uncertainty in the researched countries and the corresponding reaction to these uncertainties in Australia and Indonesia. "Uncertainties can arise from economic, political, legal and social dimensions" (Graham 2017).

2.3. Process dimensions of strategic investment decision-making process

2.3.1. Process dimension strategy formulation

The impact of contextual factors on the strategic investment decision making process is described through the process dimensions. The key process dimensions of strategic decision making processes are discussed as procedural rationality, intuition (intuitive synthesis) and political behaviour (Elbanna 2006). Similarly, Alkaraan und Northcott (2013) discussed procedural rationality, strategy formulation and political behaviour.

Strategy formulation evaluates whether decision makers choose an investment project which will support the realisation of company's strategic goals (Alkaraan und Northcott 2013). As the strategic investment decision making process is guided by the strategic intent (Alkaraan und Northcott 2013) and senior managers may prefer projects which match their expectations and intuition (Emmanuel et al. 2010), a project may be chosen which is not consistent with strategic goals and financial targets (Alkaraan und Northcott 2013).

2.3.2. Process dimension political behaviour

Political behaviour describes the impact on the strategic investment decision making process "by the use of power amongst decision-making group members" and conflicts between the members resulting from different organizational positions and personal interest (Alkaraan und Northcott 2013; Elbanna 2006). Political processes can exclude feasible alternatives as it may lead to incomplete understanding of the environmental constraints due to political tactics focusing on circumstances inside the organization rather than towards environmental topics (Elbanna 2006). Moreover, political processes may impact the criteria used for project evaluation and hence may violate organizational goals (Alkaraan und Northcott 2013).

The decision making process impacted by political processes "is unlikely to be based on complete and accurate information" (Alkaraan und Northcott 2013) as politics may lead to distortion of information and restricting information flow resulting in decisions made on incomplete information (Elbanna 2006). Moreover, political decision making processes are divisive and therefore time-consuming, leading to delay of the decision and the corresponding consequences especially in fast paced environments (Elbanna 2006). Researches showed that some type of investment projects are more likely to increase political behaviour in the decision making process (Alkaraan und Northcott 2013). Elbanna (2006) summarized the tactics addressed by previous authors and pointed out that researches have supported a negative relationship between political behaviour and organizational outcomes. However, politics is discussed to have a positive effect in the execution stage as it can ease the implementation of strategic decisions (Elbanna 2006).

2.3.3.Process dimension intuition

2.3.3.1. The basics of process dimension intuition

Another process dimension discussed by Elbanna (2006) in context of strategic decision making is intuition which is directly linked to key aspects of the decision makers. Elbanna (2006) described the dimension intuition as a concept of strategic decision making and noted that few researches have been done so far on this topic. Intuition is described via the three indicators: reliance on judgement, reliance on experience and the use of gut feeling (Elbanna 2006). Reliance on judgement is used when decisions should be made fast, information is not available or not analysable, and there is no precedent (Elbanna 2006). Reliance on experience describes intuition as an ability to learn from experience, where deep and problem related knowledge is used as a basis for solution processes (Elbanna 2006). Use of gut feeling covers the decision makers' feelings and emotions regarding a specific problem and is not based on any specific reasons (Elbanna 2006).

In summary, intuition is described as a very subjective dimension which is difficult to operationalize (Elbanna 2006). Whether high procedural rationality is superior in comparison to intuition is discussed controversially (Elbanna 2006). Researches showed that decision makers rely on intuition as an effective approach for strategic decision making (Miller und Ireland (2005) cited by Elbanna (2006)) and that intuition as a flexible and creative strategy formulation approach is of advantage in rapid changing environments (Grant (2003)(Grant 2003) cited by Elbanna (2006)). Furthermore, under extreme uncertainty management judgement and intuition becomes an important substitute for missing quantitative and financial analysis (Elmassri et al. 2016).

Elbanna (2006) pointed out that positive and negative aspects of intuition in decision making is discussed in literature. Positive aspects are faster decision which is of benefit in high-velocity environment and reduced amount of information required for the decision making (Elbanna 2006). Negative aspects are neglecting routine processes and negative impact in stable environment (Elbanna 2006). However, a positive impact from intuition on organizational performance is not robustly proven (Elbanna 2006).

2.3.3.2. Key characteristics of decision makers in context of intuition

As introduced above, strategic investment decisions are "subjectively influenced by the values and expectations" of the decision makers (Alkaraan 2016). The subjectivity aspect is covered under the process dimension intuition which is directly linked to the key aspects of the decision makers. Furthermore, strategic investment decisions are decisions which are infrequent, important to the organization and primarily made by top managers (Elliot et al. 2020). Similarly, the top management is assigned to make strategic decisions (Elbanna 2006). The top managements' key characteristics are impacting the process dimension intuition and are discussed in this chapter.

Decisions must be made with limited information in conditions of uncertainty as the future cannot be accurately predicted (Otley und Soin 2014). "Decision makers face a challenge regarding the future that implicitly involves political, macroeconomics variables, technological and financial risk and uncertainty" (Alkaraan 2020). In some cases the information is not available to fully support the decision making process (Alkaraan 2020). However, some outcomes can be predicted especially where decision-

makers have knowledge and experience derived from similar decisions (Otley und Soin 2014). The high requirements regarding the skills of the decision-makers in the strategic decision-making process is discussed in the literature, as the decision-makers in strategic investment projects are facing high ambiguity and uncertainty as a key practical problem (Alkaraan 2020). Importance of decision makers characteristics is further discussed in literature regarding the increasing automation of processes. Automating decision making by taking the correct input from all preceding tasks and transferring the input into feasible output is discussed to be "too challenging" without a human factor (Korhonen et al. 2021).

Consequently, the decision makers of strategic investments are described to be experienced managers relying "on their judgement and intuition based on a thorough knowledge of the industry" (Alkaraan und Northcott 2013; Alkaraan 2020). The experience of decision-makers is discussed to have a major impact on the investment process. Experience gained in one investment project is transferred to the next project resulting in streamlining the next project (Alkaraan 2016). In other words, non-programmed or non-routine decision making processes may turn into semi-routine processes "in the course of time by applying knowledge learned from having successfully handled non-programmed decision situations in the past" (Alkaraan 2016). Alkaraan (2016) provides several references, which discussed the impact of intuition and experience of decision makers especially in a high-validity environment. Although the importance of experience of the decision makers is discussed to be a very important part of the decision making process, the "individual variable" do not dominate the research over the contextual factors (Carr et al. 2010).

Coping with ambiguity and uncertainty associated with strategic investment projects is one of the key practical problems faced by decision-makers (Alkaraan 2020). The uncertainty linked to strategic investment decision making process requires the decision makers to utilize their strategic thinking, intuition and negotiation to ensure effective project outcomes (Alkaraan und Northcott 2013). However, if the decision situation is unfamiliar, the situation is diagnosed in a greater extent before acting and creating story building (Alkaraan 2016). Similarly, decision with high uncertainty may require higher involvement of procedural rationality (Alkaraan und Northcott 2013). However, as decision makers are limited by cognitive abilities, a fully rational-analytic approach may not be applicable (Alkaraan 2020). Procedural rationality is discussed in the next chapter.

2.3.4. Process dimension procedural rationality

2.3.4.1. The basics of procedural rationality

As shown by researches decision makers use a combination of rational and intuitive decision making (Elbanna 2006) and literature suggest to see intuitive and rational decision making as two extremes of a continuum (Elbanna 2006). Procedural rationality as one of the two extremes is discussed in this chapter. Procedural rationality is subjectively summarized as the "extent to which the decision making process reflects a desire to make the best decision possible under the circumstances" (Alkaraan und Northcott 2013). A more detailed characterisation is described by an "attempt to collect the information necessary to form expectations about various alternatives, followed by the use of this information in the final decision" (Dean und Sharfman (1993) cited by Alkaraan und Northcott (2013)).

Procedural rationality is derived from the classical economics theory, assuming decision makers to behave fully rational and to have clear goals, complete information and the cognitive capacity to analyse complex situations (Alkaraan und Northcott 2013). In case the conditions are violated, rationality is substituted by alternative conceptions. In this case, simplifying the complexity as a result of bounded rationality can be achieved through experience, intuition and judgement (Alkaraan und Northcott 2006, 2013; Alkaraan 2016).

Although individuals may behave rational, the rationality is limited (Alkaraan und Northcott 2013). Limitation of rationality results from limitations of individuals which is described as bounded rationality (Alkaraan und Northcott 2013; Elbanna 2006). Bounded rationality covers limitation by cognitive and political realities (Elbanna 2006). The cognitive limitations can prevent the individual of "knowing all choices and opportunities, remembering all the previous choices and knowing the consequences of the alternatives from which a choice is to be made" (Alkaraan und Northcott 2013).

Besides the limited cognitive capabilities of the decision makers, cost of providing the relevant information as well as lack of forecasting abilities can be the obstacles to adoption of rational decision processes (Elbanna 2006). Moreover, Elbanna (2006) pointed out that among researchers no consensus exists regarding relationship between rationality and organizational outcomes, although most of the researched papers discussed a positive relationship. Elbanna (2006) discussed possible reasons for the contradictory results, e.g. treatment of environmental variables, methodological differences and failure to investigate more complex relationships.

As described above, the four process dimensions are strategy formulation, political behaviour, intuition, and procedural rationality. Researches showed that the type of investment project has an impact on the balances between procedural rationality, strategic focus and political decision making (Alkaraan und Northcott 2013). On contrary to this statement, no difference on the capital budgeting system and the investment decision making process was observed which can be explained by the type of the investment project (Graham 2017). The complexity of the project was observed to drive differences in the investment decision making process (Graham 2017). Similar statement is shared by Elbanna (2006), where the complexity of the decision making and the conflict among the decision makers shape the decision making process.

2.3.4.2. Investment appraisal techniques and capital budgeting systems

In summary, a rational strategic investment decision making process seeks to maximise shareholder wealth (Alkaraan und Northcott 2013). Furthermore, the background of the manager will influence the procedural rationality (Alkaraan und Northcott 2013). Subjective performance measures are discussed to be less likely associated with procedural rationality (Alkaraan und Northcott 2013). Finally, larger firms may have more resources to focus on procedural rationality and smaller firms are more likely to rely on strategy based strategic investment decision making (Alkaraan und Northcott 2013). This chapter discusses the objective measurement of performance as part of the procedural rationality in the context of financial appraisal techniques and considers the increasing importance of non-financial appraisal techniques.

The use of financial appraisal techniques is discussed extensively in literature (Alkaraan 2020). Papers mentioned cross-country differences in the use of financial appraisal techniques (Carr et al. 2010). The decision makers adopt the investment appraisal technique in dependent on the type of the investment project (Alkaraan 2020). Researches showed that no statistically significant difference was found in the use of financial appraisal techniques between strategic and non-strategic investment projects (Alkaraan und Northcott 2006). The usage of financial analysis techniques is increasing with time (Alkaraan und Northcott 2006).

The measurement of strategic investments is dominated by financial analysis techniques (Alkaraan und Northcott 2006). However, financial analysis techniques and non-financial analysis techniques are both used in investment appraisal and researches showed that non-financial/strategic criteria are of particular significance in strategic investment projects (Alkaraan und Northcott 2006). Financial analysis techniques describe only a portion of the appraisal approaches and more comprehensive, holistic approaches need to be implemented (Alkaraan 2020).

The weakness of financial appraisal techniques is discussed in literature. Financial project appraisals "tend to be biased towards short-term, less strategic investments whose benefits are most easily quantified" (Alkaraan und Northcott 2006). Moreover, financial appraisal techniques require proper application and are described to be incomplete of securing a rational decision process as they fail to capture intangible attributes and the value of flexibility (Alkaraan und Northcott 2006). However, strategic fit needs to be taken into consideration as well (Alkaraan 2016). Strategic investments need to be seen as integral part of company's strategy as they influence the long-term strategic direction of the organisation (Alkaraan 2020). Furthermore, the view on investment appraisal need to be taken from a much brother view: "social, organisational, cognitive, cultural, political, socio-economic and socio-political" (Alkaraan 2020). However, non-financial criteria most closely linked to financial outcomes is perceived to be the most important (Alkaraan und Northcott 2006).

3. THE ANCHORING EFFECT

3.1. Behavioural economics as basic concept of anchoring effect

As previously described, the independencies between the dimensions procedural rationality and intuition are discussed to play a main role in strategic investment decision making literature. Similarly, literature discussing the anchoring effect used behavioural economics as a basic concept. Behavioural economics has three major-interrelated sets of theory: the dual-process theory of decision cognition, judgment heuristics and cognitive biases (Ni et al. 2019). "The dual-process theory of decision cognition is a widely accepted theory for describing the process of decision-making" which provides an explanation for the presence and interaction of intuition and rational judgement in decision-making (Ni et al. 2019).

Kahneman (2011) and Kahneman und Frederick (2012) described two systems, namely intuition and reason, that work simultaneously and interact in the decision making process: System 1 is spontaneous, intuitive, effortless, and fast, and System 2 deliberate, rule-governed, effortful and slow. "A slower and more controlled mode of thinking governs the performance of unfamiliar tasks, the processing of abstract concepts and the deliberate application of rules" (Kahneman und Frederick 2012). Controlled thinking can override intuition or correct intuition by applying of self-critical operations (Kahneman und Frederick 2012). On the other hand, complex cognitive operations can migrate from System 2 to System 1 as proficiency and skills are acquired (Kahneman und Frederick 2012). The operations of System 2 can be disrupted by time pressure (Kahneman und Frederick 2012).

Decision makers use heuristics in System 1. These heuristics are subject to cognitive biases (Ni et al. 2019) which are discussed in the next chapter. In the decision making process cognitive biases are difficult to be mitigated as the intuitive thoughts are automatic and System 2 may not recognize the decision errors caused by System 1 (Kahneman 2011). However, Kahneman und Frederick (2012) summarized that an effect on judgment driven by an (irrelevant) variable can be reduced by an explicit reminder that activates the self-critical operations of System 2. On the other hand, Kahneman und Frederick (2012) discussed the controversy of experiments where System 2 was given a chance to correct the judgment by providing the adequate information, but no effort was made to bring the attention to that information. Kahneman und Frederick (2012) summarized this finding as an "unexpected weakness of the corrective operations of System 2".

System 1 and System 2 can be discussed as the extreme points in the continuum of procedural rationality and intuition as described in the process dimensions of strategic investment decision making process. Moreover, heuristics may be triggered by limited cognitive capabilities or by high cost for providing the relevant information.

3.2. The basics of heuristics and biases

Heuristics are described as the intuitive, rapid and automatic system (Furnham und Boo 2011) "which reduce the complex task of assessing probabilities and predicting values to simpler judgmental operations" (Tversky und Kahneman 1974). The application of heuristics sometimes leads to systematic errors such as biases and fallacies in the decision making (Tversky und Kahneman 1974). Judgment by heuristics is described as an intuitive and unintentional process of attribute substitution which is attributed in System 1 (Kahneman und Frederick 2012). However, heuristic may be deliberately adopted by System 2, for example when evaluation is done solely focussing on a particular issue (Kahneman und Frederick 2012). Recognition heuristic is assigned to this class of heuristics (Kahneman und Frederick 2012). Furthermore, heuristics are adopted as heuristics often work with sufficient rate of success (Kahneman und Tversky 1972). "Heuristics are quite useful but sometimes they lead to severe and systematic errors" (Tversky und Kahneman 1974).

Similar basic definition is used by targeting the managers main tasks and responsibilities. Part of manager's cognitive competence is the ability to identify potential opportunities (Jordão et al. 2020). Other competencies are described as immediately detecting and solving problems as well as predicting and preventing future threats (Jordão et al. 2020). Due to time and cognitive constraints, heuristics are applied based on intuition in the decision making process targeting to make a decision without significant quality loss (Jordão et al. 2020). However, the use of heuristics can result in considerable

and predictable errors of judgement which are called biases (Jordão et al. 2020). Ni et al. (2019) discussed that managers should be able to "identify situations in which they should move from the intuitively compelling System 1 thinking to the more logical System 2". By moving to System 2 process cognitive biases can be overcome in a decision making process (Ni et al. 2019).

Cognitive biases describe the tendency of individuals to make systematic mistakes in judgement when making decisions (Kahneman und Tversky 1972; Tversky und Kahneman 1974). Kahneman und Tversky (1972) analysed how individuals "perceive, process and evaluate probabilities of uncertain events in the contexts of probability learning, intuitive statistics and decision making under risk" and stated that "deviations of subjective from objective probability (which is readily computable) seem to be reliable, systematic and difficult to eliminate". Individuals view chance as unpredictable but essentially fair (Kahneman und Tversky 1972; Tversky und Kahneman 1974). "People can be taught the correct rule, perhaps even with little difficulty. The point remains that people do not follow the correct rule, when left to their own devices" (Kahneman und Tversky 1972). Kahneman und Tversky (1972) pointed out that individuals are exposed to numerous random process. However, extensive exposure does not result in optimal behaviour in similar situations as individuals fail to extract an adequate conception from these experience (Kahneman und Tversky 1972; Tversky und Kahneman 1974).

3.3. The basics of bias anchoring effect

The anchoring effect is a robust and persistent bias that affects most decisions (Ni et al. 2019). Furnham und Boo (2011) described the anchoring effect as one of the most robust cognitive biases and stated that an impressive number of studies confirmed the robustness of the anchoring effects with very different judgements.

Heuristics that are employed in making judgements under uncertainty as described by Tversky und Kahneman (1974) in their pioneering work are representativeness (judgement of probability by similarity), availability (instances of large classes recalled better and faster than instances of less frequent classes), and adjustment and anchoring (different starting points yield different estimates). However, Kahneman und Frederick (2012) stated that the anchoring and adjustment heuristic does not fit the definition of heuristic as it does not substitute one attribute for another, but is increasing the plausibility of a particular value of the target attribute. Kahneman und Frederick (2012) summarized that the described adjustment and anchoring heuristics should be replaced by the title "affect heuristic" described by affective evaluation which can occur outside of awareness. Moreover, "it is not always possible to determine a priori which heuristic governs the response to a particular problem" (Kahneman und Frederick 2012).

The "adjustment and anchoring" or "adjustment from an anchor" heuristic as described by Tversky und Kahneman (1974) has insufficient adjustment as the main bias which describes the impact of the starting point (an initially presented value) on the final estimate by insufficient adjustments done to the starting point. Tversky und Kahneman (1974) titled the heuristic "Adjustment and Anchoring" and discussed the "insufficient adjustment" as a demonstration of the anchoring effect. The adjustment and anchoring heuristic results furthermore in biases in the evaluation of conjunctive and disjunctive events which is described by overestimation of probability of conjunctive events and underestimation of probability of disjunctive events and is driven by the insufficient adjustment to the starting point of elementary events (Tversky und Kahneman 1974). Moreover, Tversky und Kahneman (1974) stated that the chain-like structure of conjunctive events could be found in the context of planning, such as the development of a new product, which in general leads to "unwarranted optimism in the evaluation of the likelihood that a plan will succeed or that a project will be completed on time". Another bias which is associated to anchoring is described in the assessment of subjective probability distributions (Tversky und Kahneman 1974). Tversky und Kahneman (1974) stated that the result of subjective distribution depends on the procedure of elicitation. As a conclusion of their research, Tversky und Kahneman (1974) stated that a decision maker "will attempt to make his probability judgements compatible with his knowledge about the subject matter, the laws of probability, and his own judgmental heuristics and biases".

Biases by adjustment and anchoring are driven by situations where people make estimates by starting from an initial value (Tversky und Kahneman 1974). The "different starting points yield different

estimates, which are biased toward the initial values" (Tversky und Kahneman 1974). In summary, the anchoring effect describes the effect that decision makers have a starting or anchoring point (at the beginning of the decision making process) to which adjustments can be done (Jordão et al. 2020; Tversky und Kahneman 1974). However, these adjustments are insufficient as the decision maker is biased in the search for information (showing preference for information which confirms the anchor), resulting in the final outcome being anchored to the starting point (Jordão et al. 2020; Tversky und Kahneman 1974). The starting point is influenced by opinions or initial information (Jordão et al. 2020). Generally, the anchor overwhelms the judgement and decision making process which may be useful in some cases but mostly results in less rational decision outcomes (Ni et al. 2019).

4. DISCUSSION

The summary of theoretic foundation is shown in Fig. **1**, which shows the relationship between contextual factors, process dimension and the anchoring effect. As previously discussed, the characteristics of stakeholders are listed under the contextual factors.

The anchoring effect is discussed in literature as one of the most robust and persistent bias that affects most decisions. Strategic investment decisions are non-routine, complex and uncertain and have a significant impact on the long-term performance. The process dimensions "procedural rationality" as well as "intuition" show robust conceptual interdependencies to the anchoring effect using behavioural economics as basic concept. Due to complexity and uncertainty of strategic investment decision making, heuristics based on experience, intuition, and judgment of the key decision makers are discussed to play an important role in the strategic decision making. Anchoring effect as a bias is described as a result of applying heuristics.

This paper focuses on providing an overview and on the conceptual basis of the strategic investment decision making process and the anchoring effect. A more operational view may be of interest for future research. Future research may focus on the single steps of strategic investment decision making and analyse on which decision steps the anchoring effect may have the most robust impact on the effectiveness and efficiency of the decision-making process. Furthermore, the contextual factor having strong impact on the anchoring effect could be a very interesting research topic. Moreover, mitigation of anchoring effect on the "most robust steps" of strategic investment decision making could provide benefit for practitioners.

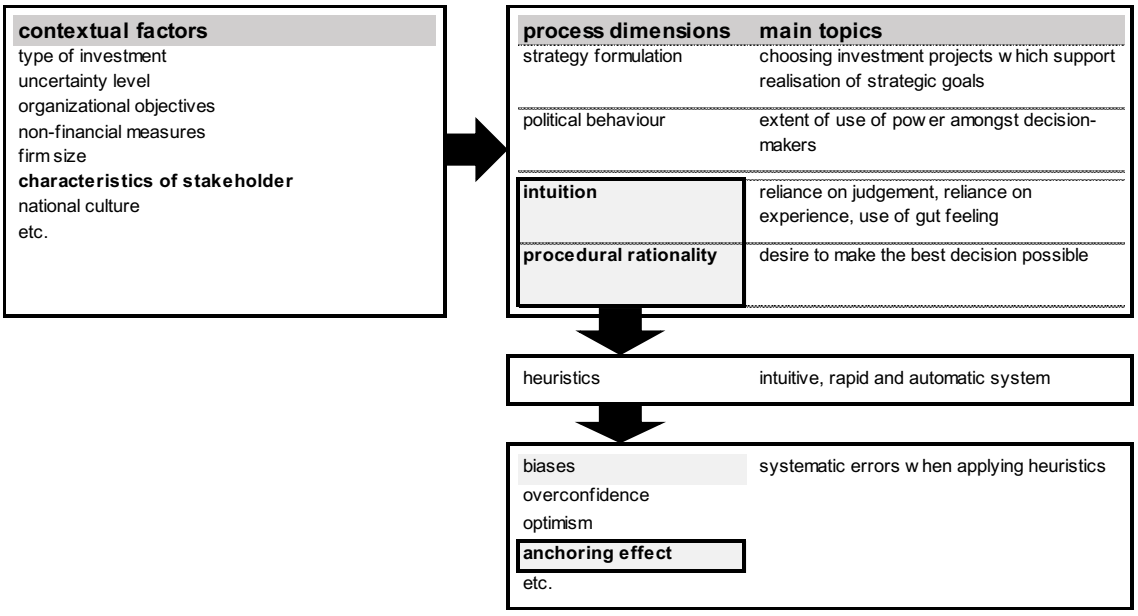

Fig. 1. Anchoring effect in context of strategic investment decision making

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