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## **A research agenda for studying managerial decision making through the lenses of simple heuristics**

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### **Abstract**

14 Management practitioners often preconsciously rely on simple heuristics when approaching ill-structured  
15 decision problems. Simple heuristic research suggests that those simple cognitive strategies do not only  
16 constitute a fast mode of deliberation but may also be effective. Nonetheless, empirical research using  
17 simple heuristics as a theory of managerial or organisational cognition remains sparse. To stimulate  
18 empirical research, we propose concrete avenues for research, starting with the empirical problems and  
19 then considering how simple heuristics can be used as a lens to address these issues. We illustrate our  
20 argument by focusing on empirical problems involved in project decisions. Specifically, we discuss three  
21 problems that both pose a challenge and offer an opportunity for simple heuristic research: decision (or  
22 problem) framing, acquisition and use of unstructured information, and identification of options. We  
23 discuss these challenges along two views: the use of heuristics through the practitioner and the  
24 development of heuristics in the context of the organisational environment. Our article contributes to the  
25 research on project decision making through concrete guidance for designing empirically relevant research  
26 within the simple heuristic paradigm, as well as to the simple heuristic community by extending the  
27 research into novel empirical problems and methodological approaches.

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33 **1. Introduction**

34 Managers often face ill-structured decision problems, for which classic analytical approaches are  
35 unavailable or unfit (Simon, 1973, 1956). In such cases, these practitioners often – though not always  
36 openly so – rely on their intuition or tacit ‘expert judgement’ to deliberate on the decision problem and  
37 choose a course of action (Akinci and Sadler-Smith, 2012; Dane and Pratt, 2007; Hodgkinson and Sadler-  
38 Smith, 2018). In this paper, we discuss the simple heuristic programme (Gigerenzer et al., 2011) as a lens to  
39 study the cognition of managerial decision making and to shed light on the processes of expert judgement  
40 and intuition.

41

42 Simple heuristics are cognitive strategies that enable ‘fast and frugal’ inferences for complex decision  
43 problems by drawing only from a small subset of the available information and processing this information  
44 through simple algorithms (Gigerenzer and Gaissmaier, 2011). Earlier, Simon (1956) proposed such  
45 heuristics as suitable strategies to solve ‘ill-structured’ problems in organisational decision making. More  
46 recent contributors, such as Artinger et al. (2015) and Mousavi and Gigerenzer (2014), emphasise this  
47 theoretical suggestion, and the academic interest in heuristics in managerial and organisational decision  
48 making is continuously growing (Loock and Hinnen, 2015).

49

50 However, the research paradigms accepted in management research and the simple heuristic research  
51 programme differ significantly. The first is eclectic, inspired by a variety of disciplines, such as sociology,  
52 political sciences and economics (Tsoukas and Knudsen, 2005), while the second is firmly grounded in  
53 psychology and as such, paradigmatic and mostly positivist. Consequently, management scholars pursue  
54 different research problems or questions and thus use methodologies that differ from those applied in the  
55 study of heuristics. Owing to the paradigmatic difference between the fields, we cannot just transfer  
56 research questions and methodologies from the heuristic research programme into management contexts.

57 Such a transfer would imply asking questions and making contributions that are usually considered less  
58 interesting or relevant to managerial contexts (Zahra and Newey, 2009).

59

60 We propose an alternative approach to studying heuristics in management contexts, inspired by  
61 organisational research, extending the previously suggested 'heuristics in the wild' approach (Gigerenzer et  
62 al., 2011). Our first suggestion is to begin the research with the problem, not the theory, and then explore  
63 how the theory can explain behaviours related to the problem. As such, when studying management  
64 decisions, we suggest that scholars develop a rich understanding of the context and the idiosyncrasies it  
65 carries. Such a shift from research driven by theoretical questions, studied in controlled contexts, to  
66 research driven by real-life problems, studied in rich decision contexts 'in the wild', has obvious  
67 implications for the methodological design of studies. We therefore investigate alternatives, particularly  
68 qualitative methodologies, which we argue are fruitful research opportunities for simple heuristics in  
69 management contexts.

70

71 To illustrate our points, we need to focus on a specific context and its particular managerial challenges. We  
72 focus on decisions in projects as our empirical context. For reasons that we will detail in the next section,  
73 from both the practical and the theoretical stance, projects comprise an empirically relevant, theoretically  
74 accessible and researchable context to study managerial decision-making. We therefore ask, 'How can we  
75 research individuals' decision-making behaviour in projects through the lens of simple heuristics?'

76

77 From the perspective of this question, our paper contributes to the academic communities of both  
78 managerial decision-making and simple heuristics. For managerial decision-making research, we provide  
79 concrete guidance for designing empirically relevant research within the simple heuristic paradigm. For the  
80 simple heuristic community, we contribute to the 'heuristics in the wild' research by discussing challenges

81 that result from the particular empirical circumstances and by suggesting how to address these challenges  
82 through careful formulation of the research problem and use of novel methods.

83

84 This paper is organised as follows: in Section 2, we introduce the empirical context of project decision-  
85 making, pointing to particular challenges in this context. In Section 3, we summarise the key notions of the  
86 simple heuristic paradigm and the current research on the heuristics of managerial practitioners. Building  
87 on this, in Section 4, we connect theory and context to a comprehensive research agenda. In Section 5, we  
88 conclude the paper with a discussion of the research agenda and an outlook for future research.

89

## 90 **2. The problem: behavioural decision making in projects**

91 In this section, we introduce projects as constituting a managerial context for the study of simple heuristics.  
92 We first argue why we have chosen projects as illustrations. We then situate this paper within the research  
93 on project decisions and describe two typical problems of that context: the challenge of uncertainty in the  
94 definition and assessment of a 'good decision', and the institutional influence on individual cognition.

95

### 96 **2.1. Why projects?**

97 Projects are temporary vehicles used to undertake unique and complex endeavours and thereby transform  
98 the status quo. We have chosen to study project decision making for four reasons.

99

100 First, projects are all around us, from the construction of an iconic building to the merger of large  
101 corporations. In financial terms, spending on infrastructure projects worldwide is assessed at US\$6–9  
102 trillion annually, which is equivalent to 8% of the global gross domestic product annually (Flyvbjerg, 2014).  
103 Projects affect not only infrastructure. Projects have become a dominant form of organising in business and  
104 society (Lundin et al., 2015). It is through projects that companies deliver innovation, new strategies or a

105 novel marketing campaign. Moreover, several industries are solely organised through projects, such as  
106 consultancy, construction, media and films, to name a few.

107

108 Second, while multi-project organisations aim to streamline the execution and the management of their  
109 projects, many projects remain unique in their own complex system of stakeholders, tasks, dependencies,  
110 goals and so on and have limited useful historical data. As such, repeatability is harder to identify than in  
111 other management contexts where operations are cyclical and repetitive. Thus, for many project decisions,  
112 practitioners need to rely on generic decision strategies based on heuristics rather than on learned and  
113 developed strategies (Artinger et al., 2015). Nonetheless, even in highly complex contexts, we can find  
114 aspects that are repetitive and cannot be outsourced to machineries, such as interpreting people's feelings,  
115 phrasing intelligent and appropriate questions, making sense of status reports, among others. For these  
116 recurring yet fuzzy instances, we expect that practitioners have developed heuristics that help them  
117 navigate each situation. Thus, projects provide a rich context to research on the development of fast and  
118 frugal heuristics.

119

120 Third, while akin to the decision contexts of middle and top managers and knowledge workers, the decision  
121 challenges faced in projects are magnified due to an increased level of uncertainty, particularly concerning  
122 the complex technical and social systems involved in projects (Davies and Mackenzie, 2014; Geraldi et al.,  
123 2011). Thus, using projects as illustrative cases can serve as useful guidance for subsequent considerations  
124 of other managerial decision contexts.

125

126 Fourth, projects are temporal organisations that are formed and then dissolved (Lundin and Söderholm,  
127 1995). This temporary existence makes their boundaries more easily defined and studied. Additionally, a  
128 project typically has stakeholders who meet repeatedly and intensively throughout the period of the  
129 project. These interactions provide room for learning and sharing of decision-making heuristics or routines.

130 These interactions make projects excellent opportunities to study the development of shared heuristics and  
131 how contextual aspects shape the selection of individual cognitive strategies.

132

## 133 **2.2. What is the decision?**

134 A project can be perceived as a vast collection of decisions (Stingl and Geraldi, 2017). They span from  
135 strategic decisions, such as the decision to launch or terminate a project, to mundane and day-to-day  
136 decisions, such as what information to share in a meeting or whether to accept minor changes in the  
137 project plan (Rolstadås et al., 2014). These choices shape the project and are core mechanisms through  
138 which a project manager and other stakeholders can influence the direction of the project. Therefore, it is  
139 important to study decisions to enhance the understanding of projects.

140

141 Possible definitions of decisions in organisational and project studies cover a wide range, including explicit  
142 decision events, messy 'emerging decisions' or inaction and indecisiveness (March, 1994). For the purpose  
143 of this paper, we focus only on *explicit decision events*, involving conscious judgement or choice (if only for  
144 inaction) by an individual or a group. This delimitation does not imply a depreciation of other concepts of  
145 managerial or organisational decision making, which acknowledge implicit or entangled decision processes.  
146 However, it is necessary because the research following the simple heuristic paradigm requires specific  
147 instances of judgement and choice.

148

149 When exploring decisions as events in projects, we further acknowledge that actors in projects (and  
150 elsewhere) are not rational decision makers. A core interest of the research in project decisions is how  
151 project practitioners *do* make their decisions if not according to the standards of normative rationality  
152 (Stingl and Geraldi, 2017).

153

154 As projects are vehicles for change (Turner and Müller, 2003), they are inherently uncertain. Specifically,  
155 uncertainty in this context means the limited and unreliable nature of available decision-relevant  
156 information. This uncertainty results from the complexity of a project as a socio-technical system, the  
157 ambiguity of meanings and definitions across actors, and the lack of knowledge about both the present and  
158 the future (Hällgren et al., 2012). Particularly, this fluid nature of ambiguity, complexity and a dynamic and  
159 unpredictable future creates a context in which project decisions conform to Knight's (1921) definition of  
160 uncertainty rather than to risks with a specified probability (Daniel and Daniel, 2018). From this  
161 uncertainty, we derive the three main challenges to project decision making: lack of reliable information,  
162 ambiguous definition of 'the good decision', and inherent misalignment of interests and perspectives across  
163 actors.

164

165 The lack of reliable information is manifested across all types of project decisions, albeit often for different  
166 reasons. The novelty of projects limits the availability of historical or experiential information, time  
167 pressure reduces the potential to gather information, and the complexity of the project's technical and  
168 organisational aspects limits the potential to analyse dependencies and relationships in full (Geraldi et al.,  
169 2011). Moreover, the forward orientation of projects, embedded in a dynamic environment, creates the  
170 challenge that decision-relevant aspects are simply unpredictable at the moment of the decision (Daniel  
171 and Daniel, 2018). Furthermore, relevant information in projects is often buried in more noise than signal,  
172 highlighting the need for project practitioners to capture weak signals (Ramasesh and Browning, 2014). This  
173 challenge particularly highlights the question of how practitioners search for information or selectively pay  
174 attention to specific informational aspects.

175

176 In summary, the information environment in project decisions is often unstructured, information is  
177 captured in different forms, often ambiguous, and the alternative paths to decide on are undefinable. Thus,



178 project decisions often depend on the project manager's ability to capture the right information and  
179 envision and create options, rather than choose only one (Gil, 2007).

180

181 The ambiguous definition of 'the good decision' results from diverging priorities or goals across  
182 stakeholders, as well as the fuzzy relation between successful project management and a successful  
183 project. First, projects often serve multiple, sometimes contradictory purposes, such as creating profits  
184 versus being vehicles for sustainable or social changes, and usually, different stakeholders defend different  
185 purposes (Davis, 2014). Consequently, the notion of a good decision varies among stakeholders because  
186 'good' is a subjective judgement of the individual actor. Second, decision outcomes will be manifested in  
187 the future and may be subject to unpredictable developments on the way there. Thus, project researchers  
188 have contested an unequivocal relation between 'good' project management practices – including decision-  
189 making practices – and 'good' project outcomes (Cooke-Davies, 2002). A particular observation made  
190 regarding project decision making is the attention paid to making 'resilient' rather than 'optimising'  
191 decisions, that is, prioritising the ability to react and adapt in the future over aiming for the best possible  
192 outcome (Kutsch and Hall, 2016).

193

194 Misaligned interests and perspectives emerge as projects typically require collaboration and coordination  
195 among a variety of stakeholders, sometimes coming from different organisations and representing diverse  
196 skills and capabilities (Davies et al., 2018). This creates different interpretive frames and incentives across  
197 the actors, giving rise to misunderstandings, conflicts and ambiguity. Thus, project managers may need to  
198 not only evaluate the potential costs, delays and stakeholders' reactions but also consider how different  
199 stakeholders will frame the situation and what decisions will emerge from such framings. As such, there is  
200 no clear definition of what a decision should be; instead, the framing of the decision itself is part of the  
201 decision making in projects (Tryggestad et al., 2013). The complex interdependencies among stakeholder

202 groups (and technologies) can further exacerbate the challenges involved in the decisions, as consequences  
203 of actions are difficult to determine upfront (Geraldi et al., 2011).

204

205 Hence, the uncertainty of many project decisions creates a setting where no single 'best' decision can be  
206 found through careful analysis. Similar to Simon's (1955) suggestion, project practitioners aim to find the  
207 'good enough' option. In that case, 'good enough' means balancing the (ambiguous) objectives for the  
208 decision outcome, the expectations of how the decision will lead to specific outcomes, and the boundaries  
209 of the decision context in terms of information availability or the cost of the (information) search.

210 Moreover, in the context of uncertain information and ambiguous objectives, project practitioners face the  
211 challenge that there is no clear definition of what the decision is about. Thus, together with the described  
212 unstructured informational environment and an undefined number of potential options, project decisions  
213 are akin to ill-structured problems (Simon, 1956).

214

215 When researching ill-defined problems, we favour descriptive over prescriptive research. Here, descriptive  
216 research means the investigation into how practitioners *make* decisions in practice, rather than how they  
217 *should* make these decisions. Because of the argued complexities inherent in the definitions of 'good'  
218 decisions in projects and hence the difficulties to establish what would be a 'better decision', we suggest  
219 that descriptive research provides the more valuable avenue as it allows novel theorising in the context of  
220 the decision.

221

222 As suggested by Stingl and Geraldi's (2017) literature review on behavioural decision making in projects,  
223 most descriptive research on project decision behaviour is conducted in separated schools of thought that  
224 either frame human cognition as a source of bias or treat it as a black box that underlies the observable  
225 individual and group behaviour that is the interest of the research. Specifically, the prevalent research on  
226 heuristics in project, follows the tradition of Tversky and Kahneman's (1974) "heuristics and biases",

227 therefore focussing on *what* the individual ultimately decides. In contrast, descriptive research on adaptive,  
228 simple heuristics opens opportunities to probe into the question of *why and how* an individual arrives at  
229 the observable decision by identifying and comparing possible cognitive strategies without *a priori* labelling  
230 this cognition as inherently biased or wrong. We therefore believe that the descriptive stream of simple  
231 heuristics offers the theoretical foundation to study descriptive decision behaviour in project contexts.

232

### 233 **2.2.1. What is the decision context?**

234 Projects are embedded in an institutional context; the temporary organisation created to execute the  
235 project is connected to the parent organisation or organisations that have initiated the transformation  
236 (e.g., the new building, or the merger or a new product). As the temporary organisation is created for each  
237 project and expected to 'die' when it fulfils its function, it will adopt and mirror the managerial practice of  
238 its surrounding organisations (Grabher, 2002; Sydow and Staber, 2002), while profiting from a certain  
239 degree of autonomy. The consequence is that decision-making structures will vary from project to project.

240

241 Hence, decision makers will exploit their existing expert intuition, that is, they will draw on their experience  
242 and adapt it to the new project conditions. At the same time, we can expect them to learn and develop  
243 new forms of decision making in the course of a project, potentially even devising shared ways of making  
244 decisions and creating meaning across the project organisation ('Where are we? What action is appropriate  
245 for that situation?') (Abatecola, 2014; Oliver and Jacobs, 2007). The shared decision strategies in each  
246 project could be perceived as explorative knowledge developed for the project.

247

248 Moreover, ambidextrous capability – the ability to both exploit strength and explore new opportunities –  
249 has been a core concern in the management of projects (e.g., Brady and Davies, 2004; Turner et al., 2016).  
250 However, we lack insights on the cognitive setup that allows individuals to navigate between exploration  
251 and exploitation in messy project contexts. Thus, the study of *individual cognition* and its interactions with

252 context is promising and could shed light on the static and the dynamic facets of the expert intuition used  
253 in projects. Simple heuristics address this challenge by examining adaptive behaviour toward a specific  
254 context.

255

### 256 **3. Simple heuristics as a theory of the cognition of individual decision making**

#### 257 **3.1. Heuristics in managerial decision making**

258 Managerial studies have provided ample evidence of heuristics at the foundation of managerial decision  
259 making, as 'intuition' or 'gut feel' (Dane and Pratt, 2007; Leybourne and Sadler-Smith, 2006), as explicit  
260 'mantras' (Eriksson and Kadefors, 2017) or as 'simple rules' (Bingham and Eisenhardt, 2011). Recent  
261 publications have increasingly reflected the work of Gigerenzer et al. (2011) and the simple heuristic  
262 programme as theoretical framing for the study of heuristics in organisations (Loock and Hinnen, 2015).

263

264 As a theory of cognitive sciences, simple heuristics posit that human judgement and decision making are  
265 based on a set of adaptive cognitive strategies that make fast and frugal use of a subset of available  
266 information in the form of cues (Gigerenzer and Gaissmaier, 2011). This conceptualisation follows a  
267 widespread (though not uncontested) notion of cognitive science, which states that the mind possesses a  
268 repertoire of cognitive strategies to approach decision and judgement problems (Einhorn and Hogarth,  
269 1981; Pachur and Bröder, 2013). In that view, simple heuristics are adaptive tools that decision makers  
270 consciously or preconsciously select and apply in different decision contexts (Gigerenzer, 2000; Marewski  
271 and Schooler, 2011).

272

273 This simple heuristic programme researches the structure of these cognitive strategies and the question of  
274 how individuals develop and select among them. The programme encompasses questions of both a  
275 prescriptive nature ('What is an efficient decision strategy for this context?') and a descriptive nature

276 ('What decision strategies do individuals apply in a certain context?'). The interest in heuristics in  
277 managerial decision making has strongly leaned towards the prescriptive stream, that is, a focus on the  
278 statistical evaluations of the ecological rationality of selected heuristics for a specific decision problem  
279 without investigating managers' actual cognitive strategies.

280

281 However, some descriptive studies have aimed at identifying specific heuristics used by managers and  
282 management teams. As argued in the introduction, our study focuses on the descriptive stream of heuristic  
283 research. Managerial decision problems researched in this stream investigate cognitive strategies of  
284 selecting target customers (Bauer et al., 2013; Persson and Ryals, 2014; Wübben and Von Wangenheim,  
285 2011), making investment decisions (Berg, 2014; Gamble and Allport, 2015), forecasting future financial  
286 performances (Cianci and Kaplan, 2010), selecting personnel (Luan et al., 2019) or judging credit ratings  
287 (Summers et al., 2004). A common denominator of those studies is that they provide examples of recurrent  
288 decisions made in similarly structured information environments. Many of them have additionally used the  
289 typically data-rich environment to evaluate subsequently the performance of the identified heuristic and  
290 decision behaviour against specified success criteria.

291

292 These studies focus on the question of whether managerial decision makers use heuristics, and if so, which  
293 heuristics, by comparing observed decision behaviour with expected decision behaviour that a model of  
294 a specific heuristic would predict. For example, in Persson and Ryals' (2014, p. 1728) analysis of marketing  
295 decisions in the Nordic banking sector, the decision problem is defined as 'determining the status of the  
296 customer as active or inactive'. The cues are directly linked to the data structure of a bank's information  
297 system, and clear success criteria for the correct status determination are provided. Thus, this approach  
298 defines the decision problem as a specific question, provides explicit cues, and – in case of prescriptive  
299 intents – evaluates the judgement based on a success metric defined by the researchers.

300

301 Alternatively, a few studies discuss heuristics at the organisational or group level as guiding principles  
302 embedded in narratives (Oliver and Jacobs, 2007), as shared mantras or catchphrases (Eriksson and  
303 Kadefors, 2017) or as simple rules (Bingham and Eisenhardt, 2011; Davies et al., 2017). These works refer to  
304 the simple heuristic programme and particularly to its claim of such heuristics being ecologically rational  
305 (for a critique of this claim, see Vuori and Vuori, 2014). However, these works are less concerned with the  
306 individual cognitive strategies and their development, which are likely to form the foundation of the explicit  
307 and observable shared organisational heuristics. Nonetheless, these studies point to the important  
308 issue that heuristics can act as shared interpretive tools that potentially co-evolve at the cognitive level of  
309 the individuals in a group and facilitate shared decision making (Abatecola, 2014).

310

311 In summary, the current research on simple heuristics follows two separated paths: the structural  
312 exploration of individual heuristics for specific, relatively well-defined problems or the study of shared rules  
313 at the organisational level, which are decoupled from a specific decision problem and the cognition of the  
314 individual.

315

### 316 **3.2. Expanding the study of managerial decision making through simple heuristics**

317 Considering the complex, subjective and dynamic context of decision making, as described in the project  
318 context, and the review of heuristics in managerial literature in general, we identify two white spots. First,  
319 we find no descriptive research regarding the individual cognition in a nuanced and turbulent decision  
320 context. Second, we find no research on the role that the organisational environment plays in  
321 the development of individual cognitive strategies. This latter area would aim at establishing a link between  
322 simple rules and individual cognitive strategies. We argue that both areas of investigation would benefit  
323 from increased attention through the descriptive stream of heuristic research, from which follows our  
324 proposed research agenda.

325

326 First, as a theoretical frame, simple heuristics allow identifying, describing and comparing individual  
327 cognitive strategies of decision makers. The simple heuristic view investigates *why and how* an individual  
328 arrives at an observable decision by identifying and comparing possible cognitive strategies. These  
329 investigations have yielded abundant structural descriptions of heuristics, such as satisficing (Selten, 1998;  
330 Simon, 1955), recognition heuristics (Gigerenzer and Goldstein, 1996), one-clever-cue heuristics or take-  
331 the-best heuristics, among others. A couple of reviews (Artinger et al., 2015; Gigerenzer and Gaissmaier,  
332 2011) provide a comprehensive overview of these different heuristic structures. Common to these  
333 structural descriptions is a rule-based approach to information search, information processing and decision  
334 making. Moreover, simple heuristic research has demonstrated that through experience, individuals  
335 develop consistently applied decision strategies in the form of simple heuristics (Dhimi, 2003; Gacasan et  
336 al., 2016; Garcia-Retamero and Dhimi, 2009; Pachur and Marinello, 2013; Summers et al., 2004). Thus, the  
337 simple heuristic research provides an appropriate angle to describe the cognitive processes of judgement  
338 and decision making.

339

340 Second, the conceptualisation of simple heuristics as learned, contextually shaped and (pre)consciously  
341 selected decision strategies allows studying how the (organisational) environment shapes individual  
342 decision behaviour. Hence, the programme offers an angle to study not only *whether* expert intuition or  
343 expert judgement follows heuristics but also theories on *how* such experience-derived heuristics are  
344 developed at an individual cognitive level, as well as the environment's role in this development.

345

346 Research on learning and selecting cognitive strategies has offered insights on how the learning  
347 environment can influence the development and adoption of specific heuristics (Pachur and Olsson, 2012;  
348 Rieskamp and Otto, 2006) or how an information environment provides cues for strategy selection  
349 (Marewski and Schooler, 2011). A key finding of this research is that the formulation of the decision  
350 problem, its statistical and informational environment, and how individuals receive feedback on their

351 choice shape the development of specific types of cognitive strategies adopted in the future (Pachur and  
352 Bröder, 2013). The organisational context thus shapes individual heuristics through the learning  
353 environment that it creates, as it influences reflection and feedback on the decision and consequently  
354 creates the criteria for perceived success or failure. The simple heuristic programme thus provides a  
355 theoretical framework to study how the environment shapes individual and shared decision behaviours by  
356 conceptualising simple heuristics as interpretive tools that evolve through interaction with the  
357 environment.

358

359 Adopting the stance of descriptive cognitive research and its view on the dynamic development of  
360 heuristics, we therefore use the following definition: *Simple heuristics are cognitive strategies for*  
361 *judgement and decision making that make use of a small subset of the available information through*  
362 *specific rules. Individual decision makers use those strategies adaptively to choose a 'good enough'*  
363 *alternative for a specific decision or judgement problem. Environmental aspects, such as feedback and*  
364 *information structure, shape how the decision maker develops and adaptively selects among those*  
365 *strategies.*

366

367 Reflecting the previously discussed complex, ambiguous and uncertain context of project decision making,  
368 this definition invites three critical lines of inquiry. First, if a specific heuristic is applied only to a specific  
369 decision problem, then what is the perceived decision problem that the decision maker considers? As many  
370 project decisions are ill-defined problems, they follow ambiguous success criteria that are open to  
371 subjective interpretation by the individual decision maker. Thus, to properly observe and analyse the  
372 heuristics at play, researchers need to understand the framing of the decision maker regarding the decision  
373 problem itself and how the individual subjectively perceives 'good enough'.

374



375 Second, if a heuristic only uses a subset of the available information, how can we determine what this  
376 subset is, in an environment of largely unstructured and ambiguous information? Such information  
377 environments are typical for the most salient and relevant decisions in project contexts.  
378 Third, if a heuristic serves to choose the 'good enough' *alternative*, how do the decision makers identify the  
379 alternatives among which they choose?

380  
381 Hence, research on project decision heuristics would benefit from an expansion beyond the question,  
382 'What heuristics do project practitioners use in their decision making?', which aims at a merely structural  
383 description of heuristics and the cues used thereby. In the next section, we discuss how research can  
384 succeed in stepping beyond this question.

385

#### 386 **4. Discussion: a research agenda for studying behavioural decision making in projects through the lens** 387 **of simple heuristics**

388 Departing from the empirical context of project decision making, we have structured the research agenda  
389 as a framework of questions. The framework consists of two dimensions. The first dimension is related to  
390 either a static or a dynamic view of heuristics as cognitive strategies of decision making. The second  
391 dimension involves critical questions resulting from the definition of simple heuristics when applied to the  
392 context of project decision making.

393

394 Throughout this section, we use a specific example of a classic project decision: how to respond to a  
395 requested scope change in a commissioned project, that is, a project carried out for a customer.

396 Commissioned projects usually have a contractually agreed scope of deliverables and specifications.

397 However, as both the client and the project team learn more about the project – or as environmental  
398 factors change – the client may identify needs and preferences that were not part of the original scope  
399 (Kreiner, 1995). For example, the client may ask for an interface's integration into a particular software or

400 for a change in materials, may want to change the layout of the project site or may ask for additional  
401 functionalities in a software or a machine. The project manager and his/her team will then have to decide –  
402 often under considerable time constraints and with limited information – how to react to this desired  
403 change in scope. The typical reactive modes include accepting the change without adjusting the schedule  
404 and the cost, prompting a formal change request with an impact on the agreed schedule and cost or  
405 informing the customer that the change cannot be accommodated. Given the time pressure and the limited  
406 information availability in these situations, we suggest that project managers will rely on heuristics to  
407 approach this decision. However, studying such heuristics requires an extended set of questions and  
408 methodologies that we discuss in the following section.

409

#### 410 **4.1. Level of analysis: static versus dynamic view on simple heuristics**

411 The first dimension of our research agenda follows the prototypical questions encountered in the literature  
412 on individual decision behaviour in projects, focusing on either the observed decision behaviour or its  
413 antecedents. Thus, we consider heuristics through either a static view (focusing on the heuristics that  
414 practitioners use for a specific decision at a specific point in time) or a dynamic view (asking how the  
415 organisational environment shapes over time the heuristics that experienced practitioners use).

416

417 The *static view* explores the heuristics used by project practitioners at the time of the research. It thus  
418 connects to prior heuristic research embedded in other contexts, which has specifically inquired about the  
419 cues that the individuals acquire and potentially consider in their decision making, and  
420 the cognitive processes of how these cues inform the decision. This view investigates *why and how* an  
421 individual arrives at the observable decision in the given instance by identifying and comparing possible  
422 cognitive strategies. As such, this view is aligned with the classic research problem of the ‘heuristics in the  
423 wild’ programme: ‘What strategies do experts and lay people rely on in real-world decisions?’ (Gigerenzer  
424 et al., 2011, p. xix). Nonetheless, following the lines of critical inquiry introduced before, we can develop

425 relevant sub-questions that inform and support this overarching research question and (as we will show)  
426 point to other practical problems of project decision making and decision-making research, which can be  
427 investigated through a simple heuristic lens.

428  
429 The *dynamic view* investigates how specific heuristics are cognitively developed through influences and  
430 feedback from the environment. This focus on the development and the selection of specific heuristics for  
431 specific decision problems through influences from the environment connects to the questions addressed  
432 by the literature concerned with the learning and the selection of heuristics.

433  
434 The findings of this stream of literature indicate that the context can dynamically shape the development  
435 and the selection of heuristics at the individual level through knowledge creation, feedback provision and  
436 the structure of the informational environment. In other words, simple heuristic research suggests that an  
437 organisation may (wittingly or unwittingly) provide a learning and informational environment that  
438 influences the selection of the heuristics applied by its members in particular decision situations.

439 Consequently, the dynamic view allows exploring how the interaction between the individual and the  
440 organisation influences the development of preferences for the selection of heuristics for specific decision  
441 problems. The dynamic view thereby investigates differences across contexts, particularly across time ('Do  
442 heuristics of individuals change as they familiarise themselves with a new project? Do individual strategies  
443 converge within a project team over time?'), or across different projects that are exposed to various  
444 environmental conditions.

445  
446 This evolving and dynamic view of heuristics also offers to investigate broader phenomena of  
447 organisational decision making and behaviour, particularly the phenomenon of organisational sensemaking  
448 (Weick, 1995). This follows from two considerations. First, heuristics are cognitive strategies that guide the  
449 perception and the interpretation of environmental cues or stimuli. Second, as suggested by Abatecola

450 (2014), the heuristics that guide these interpretations are likely to co-evolve among members in the same  
451 organisational or informational context. Following Weick's initial conceptualisation of the sensemaker's  
452 individual cognition as 'a frame of mind [...] that is best treated as a set of heuristics rather than as an  
453 algorithm' (1995, p. xii), converging heuristics across individuals may thus provide a cognitive explanation  
454 for convergence of meaning. This view supports Sandberg and Tsoukas' (2015) call to study the micro-  
455 foundations of organisational sensemaking through the individual cognition of the sensemakers.

456

#### 457 **4.2. Three critical challenges: problem framing, information use and identification of options**

458 The second dimension reflects the assumptions and the concepts of simple heuristics against the challenges  
459 of the project decision-making context. For this dimension, we follow the three critical questions  
460 introduced before:

- 461 (1) What is the perceived decision problem that the decision maker considers?
- 462 (2) How does the individual search for and elicit cues from an unstructured and ambiguous  
463 information environment?
- 464 (3) How does the decision maker identify options?

465

##### 466 **4.2.1. Individual framing of the decision problem**

467 Decision framing refers to the subjective perception of what the decision is about, entailing both the  
468 identification of the problem that requires a decision and the understanding of what purpose the decision  
469 should serve (i.e., the understanding of a 'good' or 'successful' decision).

470

471 Such framing is missing in many types of project decisions. First, many project decision instances are  
472 reactive to changing environments and are not embedded in processes that dictate the timing or the  
473 purpose of a decision. Second, the variety of values, preferences, beliefs and goals across a project team

474 (e.g., Atkinson, 1999; Flyvbjerg, 2014) and the variable time spans over which success may be evaluated  
475 (Davies et al., 2017) create an ambiguous success definition that trickles down to each decision within the  
476 project. Thus, what constitutes a 'good' decision in the decision maker's view will eventually reflect  
477 subjective preferences, values and individual experiences (Kreiner, 2014).

478

479 Hence, other than the classic simple heuristic research, the perceived decision problem as such is not  
480 necessarily clear to the researcher or even the decision maker. This latter view reflects a common  
481 argument of organisational studies, depicting decision making, not as an event, but as a process in which  
482 meaning is created (Kreiner, 2012; March, 1994).

483

484 Taking the example of the change request, the project manager has – in the absence of an explicit process  
485 within his/her organisation – neither a formal trigger for the decision making nor a formulated decision  
486 problem. In the project manager's perception, the client's request to change may thereby concern various  
487 problems, such as the following, among others: Is this change technically feasible? Is this change covered  
488 by the contract? How can I avoid additional costs? How and when should I respond to the request?

489

490 Thus, to research which heuristic the project manager applies to solve a problem, we first need to establish  
491 which decision problem he/she actually perceives to be facing. While studying the heuristics of predefined  
492 problems is valuable for the establishment of the simple heuristic theory, understanding the problem  
493 framing and its origin is critical to capture the lived experience of project practitioners (Cicmil et al., 2009,  
494 2006). In this regard, the simple heuristics lens can provide a fresh view on how new information or specific  
495 stimuli – such as an e-mail by the client asking for a change – are cognitively processed, leading to first, a  
496 problem definition, and second, to a decision or decision-equivalent behaviour.

497

498 Kaplan and Simon (1990) suggest that heuristics can play an important role in the framing of the ambiguous  
499 or ill-defined problems that are typically encountered in project decision making. Thus, a potential research  
500 angle may ask: (How) Do heuristics inform the framing of the problem? Which cues from the environment  
501 are chosen to be considered relevant for the decision framing?

502

503 While the static view explores the problem framing and the heuristics supporting the problem framing at a  
504 specific point in time, the dynamic view investigates how the organisational environment and prior  
505 experiences have led to the observed problem framing. In our example, the project manager and his/her  
506 colleagues might frame the change request consistently around a decision about contractual compliance,  
507 while in a different project, a similar stimulus may trigger decisions about technical feasibility. The dynamic  
508 view would therefore ask how the organisational environment has shaped this framing and the heuristics in  
509 place that lead to that framing. The characteristics that could be explored in this regard include questions  
510 about feedback, routines of reporting and communication, shared preferences, formative events and so on.  
511 Thus, the questions of the dynamic view are as follows: Which organisational characteristics shape the  
512 heuristics that project practitioners apply to frame a decision problem? How do these heuristics for  
513 decision framing change over time in more or less turbulent environments? Under which circumstances do  
514 the heuristics applied for decision framing converge among members of the same project or organisational  
515 unit?

516

#### 517 **4.2.2. Individual uses of information as cues**

518 The informational context of project decisions is typically unstructured and ambiguous, where anything can  
519 become a cue – the position of a cable in a technical drawing, the raised eyebrow of a colleague, the 5:45  
520 AM time stamp of the client’s e-mail and so on. Our example has countless potential information sources  
521 that the project manager may consider – technical designs and bills of quantities, opinions and attitudes of

522 team members, prior and current behaviour of the client, current financial and competitive situations of  
523 the company, personnel planning sheet and so on.

524

525 In brief, there are large amounts of information, different data formats (from qualitative to quantitative),  
526 uncertainties inherent in this information, different levels of availability and costs of information search,  
527 and limited control over which information actually captures the decision makers' attention (even when  
528 discounting the political processes operating in the background). The study of simple heuristics in such a  
529 context would therefore need to address the following questions: How do decision makers make sense of  
530 all this information? How do practitioners encode fuzzy information into cues? How do practitioners search  
531 their information environment for salient cues? Which cues are actually used? In particular, we suggest  
532 that the role of social cues, derived from the behaviour and the expressed opinions of other individuals in  
533 the project, merits increased attention in the study of managerial heuristics.

534

535 While heuristics build on the notion that only a few cues inform a decision, the unit of the cue is  
536 ambiguous. In practice, cues may not be clear-cut informational units, such as a number, a colour, a  
537 physical presence, among others. Rather, cues in organisational practice may be derived from situational  
538 patterns; various elements of interactions with a client lead to a classification as 'favourable' or  
539 'unfavourable', or the cumulative aspects of a specific technical problem are judged as 'complex' or 'simple'  
540 (Shan and Yang, 2017).

541

542 Learning theory suggests that with experience, practitioners develop the ability to aggregate cues or signals  
543 into patterns ('chunks') and thereby increase the amount of information they can consider in a decision  
544 (Miller, 1956). This aligns with the findings of the naturalistic decision-making literature on the role of  
545 recognised patterns that give indications for appropriate choices of action (Lipshitz et al., 2001). This  
546 suggests that cues are not only distinct pieces of information provided by the environment but can also be

547 self-generated by the decision maker through holistic consideration of a situation or an aspect of it, where  
548 the aggregated judgement about the situation provides the cue.

549

550 The aggregation of information can take various forms regarding the amount of aggregated information  
551 and the formulation of the aggregated cue. In its most simple form, it may relate to an encoding of a  
552 numeric value into a categorical value, such as expensive/economical or long/short. In its more complex  
553 form, encoding of cues may take whole patterns. Stingl et al. (2018) have provided examples of how  
554 executives of a project-based organisation consider various circumstantial cues of a project-bidding  
555 opportunity to formulate binary cues, such as 'Is the tender preparation feasible in meeting the deadline  
556 time?' or 'Can we beat the competition?'. The practitioners would then apply these self-generated cues in  
557 one-reason heuristics for the de-selection of project opportunities.

558

559 Consequently, research on heuristics in project practice can investigate which aggregated cues inform  
560 decisions and how the potential underlying heuristics (introduced as 'nested heuristics' by Shan and Yang,  
561 2017) support the formulation of these aggregated or encoded cues.

562

563 Thus, we may ask, How do individuals aggregate and encode information into cues or meta-cues that  
564 represent patterns of information? Studying the role of heuristics in information aggregation or encoding  
565 would be relevant to both the development of individual decision experiences in complex settings and  
566 fostering of organisational contexts that increase the agility of decision making by aggregating information  
567 in line with individual cognitive strategies.

568

569 Again, the dynamic view expands the question by a longitudinal or comparative dimension, inquiring into  
570 the shaping role of the organisational environment. Three organisational characteristics in particular are  
571 likely candidates for exploration. First, organisational signals point to the salience and significance of



572 particular cues. Feedback, reporting structures or other routines may establish interpretive patterns that  
573 serve as cues in the subsequent decision. In our example, the project manager may have developed an  
574 understanding – for instance, through negative experiences or discussions with colleagues – that different  
575 functionalities of the commissioned system are differently sensitive to changes. Thus, the project manager  
576 may first consider the cue, ‘Does it affect a critical functionality?’ in approaching the change request. In a  
577 different project, the project manager may rely on other cues, such as information related to timing, the  
578 people involved, the location and so on.

579  
580 Second, the organisational context may foster the development of higher fluency in interpreting particular  
581 types of information or data as easily usable cues. Fluency in interpreting pieces of information as cues is  
582 relevant because it reduces the cognitive load, which in turn favours the selection of a particular cognitive  
583 strategy (Pachur and Bröder, 2013). Fluency may result from the accessibility of the information  
584 presentation, such as easy-to-read red-amber-green charts or yes/no formats, as well as the project  
585 manager’s relative familiarity with a fuzzy cue. For example, Gantt charts, the most prevalent visualisation  
586 tool for project scheduling, provide a simple depiction of the project’s progress. Deviations and their  
587 implications for the overall project duration are easy to identify, even by novices, and potential mitigation  
588 strategies, such as speeding up other tasks, become more readily cognitively available.

589  
590 Third, the availability of different types of information within the organisation is likely to affect the  
591 decisions following differences in the costs of information (Pachur and Bröder, 2013) – monetary costs but  
592 equally, time, effort or cognitive capacities. Thus, organisational structures and routines, related to  
593 reporting and other forms of data capturing, proximity to and friendly relationships with colleagues,  
594 language differences or simply trust in a source as the sole information provider can shape the selection of  
595 heuristics.

596

597 Thus, the dynamic view can ask the following questions: How does the organisational context shape the  
598 perceived salience of specific cues? How does the organisational context support the development of  
599 fluency in interpreting particular pieces of information as cues? How does the availability of information  
600 favour the development and selection of specific heuristics?

601

#### 602 **4.2.3. Developing and deliberating among alternatives**

603 As ill-defined problems, most project decisions lack a clear-cut set of options or alternatives to respond to  
604 the decision problems. When taking a particular action, the alternatives are potentially unlimited, and the  
605 decision maker therefore needs to identify, frame and screen those alternatives with regard to the  
606 perceived decision problem.

607

608 In our example of the change request, this could mean that even with a clear problem framing, such as  
609 choosing a response action that creates the lowest financial exposure to the project, the potential action  
610 alternatives that the project manager may consider are not set. He/she might draw some alternatives from  
611 experience (e.g., requesting an amendment to the contract, increasing the price or politely refusing the  
612 change) but might also explore novel solutions particular to the request. Following Kaplan and Simon's  
613 (1990) argument, the problem-solving literature highlights the important role of heuristics in the  
614 development and screening of potential solutions. Specifically, heuristics can restrict the search space and  
615 can create the focus by providing rules for responses that can or cannot be followed in the particular  
616 situation. In our example, the project manager may know that it is against the strategic interest of the  
617 project to refuse reasonable change requests or that the area affected by the change is of low technical  
618 criticality. He/she may use those cues and heuristics as boundaries for the exploration of potential  
619 alternatives. Thereafter, heuristics can support the screening and the selection of these identified  
620 alternatives (Albar and Jetter, 2013).

621

622 The resulting questions for this line of research therefore include the following: Which heuristics guide the  
623 search for response options? How do heuristics act as boundaries in the search for solutions? What  
624 heuristics do practitioners use to screen and select responses?

625  
626 When adopting the dynamic view, the question expands to how experience and feedback in the  
627 organisational environment, combined with information availability, shape the heuristics that guide the  
628 identification of action alternatives, as well as the heuristics that allow selecting among the identified  
629 alternatives. In particular, knowledge sharing or feedback practices, reporting structures or interpretive  
630 frames of organisational narratives may lead to the development of particular heuristics among the project  
631 team members.

632  
633 For example, if a project's steering committee repeatedly focuses on the issue of cost overruns while  
634 paying less attention to technical issues or client relation issues, this may steer the project manager's  
635 search towards solutions with low immediate effects on costs (but which may be detrimental to  
636 performance or customer relations). Moreover, the availability of similar previous experiences can serve as  
637 heuristics for the identification and the selection of solutions (Reiter-Palmon, 2017; Simon, 1990). Thus, this  
638 is the main question of the dynamic view: How does the organisational environment shape the heuristics  
639 used to identify, screen and select responses? In particular, this question may also distinguish between  
640 'known' decision problems that share superficial similarities to problems that the decision maker has  
641 previously encountered and new problems that may only share (some) structural similarities.

642  
643 Table 1 summarizes the developed framework of the research agenda and proposed illustrative research  
644 questions.

Table 1 - Framework of the research agenda with illustrative research questions.

	<b>Static view: What are the cognitive strategies of the individual decision maker?</b>	<b>Dynamic view: How does the context or the organisational environment shape these cognitive strategies over time?</b>
<b>Framing: What is the perceived decision problem that the decision maker considers?</b>	(How) Do heuristics inform the framing of the problem?	Which organisational characteristics shape the heuristics that project practitioners apply to frame a decision problem?
<b>Information: How does the decision maker search for and elicit cues from an unstructured and ambiguous information environment?</b>	How do practitioners search for and encode unstructured and ambiguous information into cues?	How does the organisational context shape the perceived salience of specific cues? How does the organisational context support the development of fluency in interpreting particular pieces of information as cues? How does the organisational context shape the 'cost of information' and consequently favour specific heuristics?
<b>Options: How does the decision maker identify and select potential response alternatives?</b>	Which heuristics do practitioners use to identify possible responses? Which heuristics do practitioners use to screen and select responses?	How does the organisational context shape the heuristics used to identify, screen and select responses?

646

### 4.3. Methodological suggestions

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Following those three critical lines of inquiry within the static and the dynamic views, we see the need for a methodological expansion in simple heuristic research. The classic simple heuristic research provides established methods to identify the heuristics applied to well-defined decision problems with clear-cut cues. However, for the discussed research problems, we need to take into account the subjective perceptions of the decision maker, the fuzziness of the information and the potential shaping effect of the organisational environment. We believe that to explore those aspects adequately, we should incorporate more qualitative or mixed-method approaches into simple heuristic research. Considering that the researchers will have a limited *a priori* understanding of the practitioner's lived experience, a predefined set of likely framings is at high risk of being incomplete or misrepresenting the actuality of project decision making. To overcome this limitation, qualitative methods allow exploratory or open investigations that are helpful for the early inquiries into specific decision-making phenomena, when no specific decision problem or set of cues is apparent to the researchers. Thus, qualitative methods are necessary for the development of new theories or models regarding the role of heuristics in project decision making.

660

661

#### **4.3.1. Qualitative and mixed methods of researching project decision heuristics**

662

Qualitative methodologies allow gathering insights on the framing of the decision problem, the acquisition and use of information and cues, and the development of options. We expect those cognitive processes to unfold in a manner that seems overlapping or intertwined to the external observer; thus, the methods suggested in the following paragraphs are likely to produce insights on some or all of those aspects.

663

664

Research can follow two (not necessarily separated) streams of qualitative inquiry with different potentials and limitations: observation and interview.

665

666

667

*Observational methods* capture any form of data on *what is done* and *what is said* during a decision

668

instance. Thus, they allow investigating the immediate behaviour of the decision maker(s), without any

669

influence of the researchers or post-rationalisation of the behaviour. However, during the observation, the

670

researchers have no opportunity to clarify or inquire about the decision maker's behaviour. Thus, such

671

methods require a sufficiently confined decision instance where aspects that are not at the centre of the

672

research but may influence the behaviour are fixed or can be observed. For example, if the observational

673

method aims at investigating information use, the researchers would need assurance that the decision

674

problem and the options are unambiguously clear to the observed individual(s). If these cannot be assured,

675

observational methods should include ways to capture the data on the problem framing or the option

676

identification, such as interviews or a research design where the participants formulate decisions or

677

judgments in a way that reveals their framing. A confined decision instance also means that researchers

678

have a nearly full grasp of the information that is available to the decision maker(s), an assumption

679

challenged by the expected use of cues from memory.

680

681

The best level of control for observational methods can be achieved through realistic decision simulations

682

in which the participants comment on the information search and the deliberation process in the form of a

685 think-aloud protocol. This method is suitable for decision instances with a well-defined information  
686 environment, for example, when decision makers typically receive only a limited set of formalised  
687 documents or presentations. This method may also be appropriate suitable for researching decision  
688 problems at very early stages, where no prior information is available, or for high-level decision-making  
689 bodies whose individual members assess the information about specific projects only in confined  
690 committee meetings. Another possible empirical context may involve decisions related to abruptly  
691 emerging situations.

692  
693 A well-developed approach for this type of simulation research is the active information search (AIS)  
694 method (Huber, 1997) that has previously been applied to the study of how project practitioners identify  
695 risks in a new project (Stingl and Geraldi, 2019; Winch and Maytorena, 2009). AIS allows observing the  
696 information search behaviour of an individual making a specific decision or performing a judgement in an  
697 experimental setting with a controlled informational environment. This method combines observation data  
698 on the information search behaviour with contextual data from a think-aloud protocol on how the  
699 individual frames the information in the form of cues or bases one's judgements or decisions on those cues.  
700 Thus, this method provides insights on the heuristics that guide the information search, on cues to which  
701 the decision maker pays attention, on the heuristics that inform decisions or judgments and on contextual  
702 factors that may explain the preferences for the observed heuristics. However, the observation of a  
703 simulated decision context always bears the limitations of laboratory research, through the simplification of  
704 a real-world problem, a tighter temporal frame, the potential absence of variations in the 'cost of  
705 information acquisition' and so on. Thus, the findings may be indicative of real-world decisions yet may be  
706 inappropriate representations of the latter.

707  
708 An approach to studying real-world decision making without the limitations of simulations is shadowing  
709 project practitioners or observing committee meetings, combined with reviewing documents and

710 conducting interviews to gauge the thinking process of decision makers. However, with this approach, the  
711 researchers may have limited control over all instances of information acquisition outside the researched  
712 environment, such as previously acquired information, informal chats and so on. Moreover, they might be  
713 unable to record the practitioners' reflections on newly acquired information, which can offer valuable  
714 insights into the choice and the salience of specific pieces of information.

715

716 *Interviews* can overcome some of the limitations of observational studies but introduce their own  
717 shortcomings. In their simplest form, interviews can be semi-structured, directly asking for aspects such as  
718 decision framing, relevant criteria or choice of options, although with the risk of biasing the findings  
719 through post-rationalisation and other pitfalls of explicit interview methods (Nisbett and Wilson, 1977).  
720 More nuanced techniques from other fields of decision research allow adding a more subtle inquiry,  
721 typically combined with a simulation step to validate the explicitly described approaches. Specific methods  
722 include the applied cognitive task analysis (Militello and Hutton, 1998) or the critical decision  
723 method (Hoffman et al., 1998), both rooted in naturalistic decision-making research (Klein, 2015). These  
724 two-step methods first enable experienced decision makers to break down their tacit decision processes  
725 into explicit individual elements of the task. Based on the results of the first step, the researchers then  
726 develop decision scenarios for the second part of the method, in which the experienced individuals engage  
727 with the scenario to validate the task decomposition elicited in the first step. The structure of the task  
728 decomposition typically depicts individual cue-like information elements of the environment and structures  
729 them similarly to one-reason and multiple-cue heuristics.

730

731 Hence, these interview-based methods allow exploring how experienced practitioners structure their  
732 decision problems, as well as which information or cues they rely on for the individual sub-tasks. These  
733 methods also provide insights on how practitioners frame the decision problem, particularly their concept  
734 of a 'good decision' in the given context. The limitation of these methods lies in their time-consuming set-

735 up that can reduce the highly experienced (and thus very busy) practitioners' willingness to participate.  
736 Moreover, these methods are suitable only for the exploration of conscious decision processes, thus  
737 potentially masking the underlying preconsciously processed cues that may similarly influence the  
738 decision.

739  
740 While both observation and interview methods have their limitations, they allow identifying potential  
741 framings of the decision problem, as well as a set of potentially used cues and how they inform the decision  
742 through heuristics.

743

#### 744 **4.3.2. Methods of researching the shaping effect of the organisational environment**

745 The dynamic view extends beyond the mere identification of simple heuristics to comparative  
746 investigations of how particular organisational characteristics lead to the development of such heuristics  
747 for an individual decision maker or a group of individuals acting in that environment. Research on this  
748 interplay between the organisational context and individual heuristics needs to gather data on structures,  
749 routines or processes within the project organisation, its information context and how individuals navigate  
750 in it. Such data could stem from ethnography-type research (Fetterman, 2010) on how people in the  
751 organisation perceive and talk about the specific decision or other types of qualitative and quantitative  
752 data on when and how individuals in the organisation encounter the decision and its consequences. For  
753 example, to study the heuristics used to select projects, important contextual factors may relate to the way  
754 that people in the organisation discuss the success or the failure of particular decisions, that is, the  
755 individual consequences related to 'good' or 'bad' decisions. To explore the shaping effect of such  
756 characteristics, the research needs to follow comparative study designs, such as multiple-case, longitudinal  
757 (where characteristics change or can take effect over time) or even experimental studies.

758



759 While this approach to researching the interplay between the organisational context and individual  
760 decision making promises interesting insights, its key limitation lies in the mono-directional orientation of  
761 the simple heuristic framework. This theoretical approach inquires into how the context shapes the  
762 heuristics but does not provide a theoretical proposition on how individuals and their decisions, in turn,  
763 shape the organisational context. The simple heuristic framework may thus contribute to certain aspects of  
764 the focal interests of the contemporary sensemaking theory but is insufficient to reconcile the overall  
765 mechanisms of reinforcing organisational and individual behaviours.

766

767 This limitation can also constitute an opportunity for the daring academic. Indeed, one of the core research  
768 concerns in organisational theory is the mutual interplay between agency and structures, that is, individuals  
769 and organisations. Studies on how individuals influence the organisational context, as well as the fuzzy  
770 interplay between the organisation and the individual, therefore have the potential to make a theoretical  
771 contribution to the simple heuristic theory.

772

773 Finally, the decision contexts of projects are dynamic. What constitutes a fruitful organisational context in  
774 one phase of a project may no longer be appropriate at a later stage, as the decision context changes, and  
775 stakeholders start behaving differently. Hence, akin to concepts of core competence and dynamic  
776 capabilities, prescriptive research could explore the organisational contexts that foster not only selecting  
777 fruitful heuristics but also learning how to develop and choose fast and frugal heuristics as the  
778 organisational and decision contexts change.

779

## 780 **5. Conclusion and outlook**

781 Our research agenda has aimed to advance the discussion on simple heuristics from the potential  
782 applicability of the theory to an illustration of how it can be applied. Particularly, we have argued that the  
783 simple heuristics lens provides a fresh angle to examine 'expert judgement'. Practitioners in organisations

784 often make decisions under high uncertainty and pressure to maintain legitimacy, professionalism and  
785 speed. We have observed practitioners camouflaging their expert judgement and intuition with what  
786 sounds rational and legitimate, such as analytical decision support tools and methods. Simple heuristics can  
787 provide an alternative view that values intuition and reflection in practice, as well as nurtures rich  
788 experiences.

789

790 Simple heuristics allow investigating individual decision making and its interaction with an organisational  
791 context as a set of learned and (preconsciously) selected cognitive strategies. This understanding of  
792 heuristics as being shaped by the environment and co-evolving among individuals operating in the same  
793 organisational and informational context sheds new light on sensemaking and provides a new theoretical  
794 framing to study group decision making.

795

796 In this paper, we have set out to systematically review the potential of the simple heuristic paradigm for  
797 the study of project decision behaviour, heading out from the practical problems of project decision making  
798 rather than from the theory of simple heuristics. Hence, we have sketched the main empirical problems  
799 and challenges of project decision making along the questions of which heuristics the decision maker uses  
800 (static view) and how the organisational environment shapes such heuristics (dynamic view). For each of  
801 these themes, we have then explored how a research approach of the simple heuristic paradigm can  
802 provide novel insights. In particular, we have provided illustrative research questions, suggested  
803 methodological approaches and pointed to the limitations and the challenges of each approach.

804

805 In conclusion, we have presented several arguments that the simple heuristic paradigm can contribute to  
806 all key areas of current research on project decision making behaviour and have indicated how it may do  
807 so. We thus contribute to two academic fields: project decision studies and simple heuristic research. We  
808 expanded project decision studies by providing guidance for empirical research within the simple heuristic

809 paradigm. We have done so by starting with the empirical context of interest and connecting the identified  
810 key research themes with avenues through which simple heuristics can provide new insights. We have thus  
811 reversed the argument previously brought forward for simple heuristics, which has merely identified  
812 managerial decision making as a suitable context that shares the characteristics of contexts in which simple  
813 heuristics are (arguably) likely to succeed. Our approach in developing a research agenda for project  
814 decision making may thus serve as a blueprint for further applications of simple heuristics to other  
815 empirical contexts of the managerial domain and beyond.

816

817 By rooting our approach in empirical phenomena rather than in the simple heuristic paradigm, we have  
818 also contributed to the 'heuristics in the wild' research as we have been able to point towards both  
819 limitations and opportunities of the simple heuristic paradigm in a new empirical context. In particular, we  
820 have revealed the potential for simple heuristics to broaden the research on the cognition of project  
821 practitioners when approaching ill-structured problems. Specifically, we have discussed the potential of  
822 single, nested or sequential heuristics in framing the problem, searching for and encoding unstructured  
823 information and identifying options. Finally, we have suggested alternative research methods that are  
824 suited for the complex and dynamic empirical context of managerial decision making.

825

826 Although aimed at academics, a practical implication of this paper is to expose practitioners to an  
827 alternative approach to identifying, describing, discussing and validating expert intuition. While managers  
828 silently accept 'gut feeling' and 'intuition' as part of their decision making, organisations are more likely to  
829 accept arguments based on procedural rationality. The consequence is that 'gut feeling' remains hidden or  
830 treated as a magic sixth sense that cannot be touched, discussed or validated. Practitioners may use the  
831 research methodologies offered in this paper to reflect and experiment on their own practice. The  
832 methodologies will help them identify, develop and test simple heuristics in organisations, specifically in  
833 areas such as forecasting, risk identification or the navigation of dynamic social changes.

835 **6. References**

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