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# A research agenda for studying project decision-behaviour through the lenses of simple heuristics

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1 2 3 4 5 6 7 8 9 10 11 12	Stingl, V., & Geraldi, J. (2021). A research agenda for studying project decision-behaviour through the lenses of simple heuristics. Technological Forecasting and Social Change, 162, 120367. https://doi.org/10.1016/j.techfore.2020.120367 A research agenda for studying managerial decision making through the lenses of simple heuristics Verena Stingl, Aalborg University, Technical University of Denmark Joana Geraldi, Copenhagen Business School
13	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.

### 33 1. Introduction

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

41

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

49

However, the research paradigms accepted in management research and the simple heuristic research programme differ significantly. The first is eclectic, inspired by a variety of disciplines, such as sociology, political sciences and economics (Tsoukas and Knudsen, 2005), while the second is firmly grounded in psychology and as such, paradigmatic and mostly positivist. Consequently, management scholars pursue different research problems or questions and thus use methodologies that differ from those applied in the study of heuristics. Owning to the paradigmatic difference between the fields, we cannot just transfer research questions and methodologies from the heuristic research programme into management contexts. Such a transfer would imply asking questions and making contributions that are usually considered less
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

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

76

From the perspective of this question, our paper contributes to the academic communities of both
managerial decision-making and simple heuristics. For managerial decision-making research, we provide
concrete guidance for designing empirically relevant research within the simple heuristic paradigm. For the
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

simple heuristic paradigm and the current research on the heuristics of managerial practitioners. Building

on this, in Section 4, we connect theory and context to a comprehensive research agenda. In Section 5, we

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

In this section, we introduce projects as constituting a managerial context for the study of simple heuristics.
We first argue why we have chosen projects as illustrations. We then situate this paper within the research
on project decisions and describe two typical problems of that context: the challenge of uncertainty in the
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

- 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
- society (Lundin et al., 2015). It is through projects that companies deliver innovation, new strategies or a

novel marketing campaign. Moreover, several industries are solely organised through projects, such as
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

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

125

Fourth, projects are temporal organisations that are formed and then dissolved (Lundin and Söderholm, 1995). This temporary existence makes their boundaries more easily defined and studied. Additionally, a project typically has stakeholders who meet repeatedly and intensively throughout the period of the project. These interactions provide room for learning and sharing of decision-making heuristics or routines. These interactions make projects excellent opportunities to study the development of shared heuristics and
how contextual aspects shape the selection of individual cognitive strategies.

132

### 133 2.2. What is the decision?

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

140

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

148

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

As projects are vehicles for change (Turner and Müller, 2003), they are inherently uncertain. Specifically, 154 155 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 ambiguity of meanings and definitions across actors, and the lack of knowledge about both the present and 157 158 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,

project decisions often depend on the project manager's ability to capture the right information andenvision 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 purposes (Davis, 2014). Consequently, the notion of a good decision varies among stakeholders because 185 186 '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

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

204

Hence, the uncertainty of many project decisions creates a setting where no single 'best' decision can be
found through careful analysis. Similar to Simon's (1955) suggestion, project practitioners aim to find the
'good enough' option. In that case, 'good enough' means balancing the (ambiguous) objectives for the
decision outcome, the expectations of how the decision will lead to specific outcomes, and the boundaries
of the decision context in terms of information availability or the cost of the (information) search.
Moreover, in the context of uncertain information and ambiguous objectives, project practitioners face the
challenge that there is no clear definition of what the decision is about. Thus, together with the described

unstructured informational environment and an undefined number of potential options, project decisions
are akin to ill-structured problems (Simon, 1956).

214

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

221

As suggested by Stingl and Geraldi's (2017) literature review on behavioural decision making in projects, most descriptive research on project decision behaviour is conducted in separated schools of thought that either frame human cognition as a source of bias or treat it as a black box that underlies the observable individual and group behaviour that is the interest of the research. Specifically, the prevalent research on heuristics in project, follows the tradition of Tversky and Kahneman's (1974) "heuristics and biases", therefore focussing on *what* the individual ultimately decides. In contrast, descriptive research on adaptive, simple heuristics opens opportunities to probe into the question of *why and how* an individual arrives at the observable decision by identifying and comparing possible cognitive strategies without *a priori* labelling this cognition as inherently biased or wrong. We therefore believe that the descriptive stream of simple heuristics offers the theoretical foundation to study descriptive decision behaviour in project contexts.

233

### 2.2.1. What is the decision context?

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

240

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

247

Moreover, ambidextrous capability – the ability to both exploit strength and explore new opportunities – has been a core concern in the management of projects (e.g., Brady and Davies, 2004; Turner et al., 2016). However, we lack insights on the cognitive setup that allows individuals to navigate between exploration and exploitation in messy project contexts. Thus, the study of *individual cognition* and its interactions with context is promising and could shed light on the static and the dynamic facets of the expert intuition used
 in projects. Simple heuristics address this challenge by examining adaptive behaviour toward a specific
 context.

255

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

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

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

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

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

('What decision strategies do individuals apply in a certain context?'). The interest in heuristics in
managerial decision making has strongly leaned towards the prescriptive stream, that is, a focus on the
statistical evaluations of the ecological rationality of selected heuristics for a specific decision problem
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.

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

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

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 (Dhami, 2003; Gacasan et 336 al., 2016; Garcia-Retamero and Dhami, 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

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

345

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

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

358

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

366

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

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		
386 387	4. Discussion: a research agenda for studying behavioural decision making in projects through the lens of simple heuristics		
386 387 388	<ul> <li>Discussion: a research agenda for studying behavioural decision making in projects through the lens of simple heuristics</li> <li>Departing from the empirical context of project decision making, we have structured the research agenda</li> </ul>		
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396 Commissioned projects usually have a contractually agreed scope of deliverables and specifications.

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

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

409

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

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

416

The static view explores the heuristics used by project practitioners at the time of the research. It thus 417 418 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

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

428

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

433

The findings of this stream of literature indicate that the context can dynamically shape the development 434 and the selection of heuristics at the individual level through knowledge creation, feedback provision and 435 the structure of the informational environment. In other words, simple heuristic research suggests that an 436 organisation may (wittingly or unwittingly) provide a learning and informational environment that 437 influences the selection of the heuristics applied by its members in particular decision situations. 438 Consequently, the dynamic view allows exploring how the interaction between the individual and the 439 organisation influences the development of preferences for the selection of heuristics for specific decision 440 problems. The dynamic view thereby investigates differences across contexts, particularly across time ('Do 441 heuristics of individuals change as they familiarise themselves with a new project? Do individual strategies 442 converge within a project team over time?'), or across different projects that are exposed to various 443 environmental conditions. 444

445

This evolving and dynamic view of heuristics also offers to investigate broader phenomena of
organisational decision making and behaviour, particularly the phenomenon of organisational sensemaking
(Weick, 1995). This follows from two considerations. First, heuristics are cognitive strategies that guide the
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

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

483

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

489

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

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

502

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

516

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

The informational context of project decisions is typically unstructured and ambiguous, where anything can become a cue – the position of a cable in a technical drawing, the raised eyebrow of a colleague, the 5:45 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

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

524

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

534

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

541

Learning theory suggests that with experience, practitioners develop the ability to aggregate cues or signals into patterns ('chunks') and thereby increase the amount of information they can consider in a decision (Miller, 1956). This aligns with the findings of the naturalistic decision-making literature on the role of recognised patterns that give indications for appropriate choices of action (Lipshitz et al., 2001). This suggests that cues are not only distinct pieces of information provided by the environment but can also be self-generated by the decision maker through holistic consideration of a situation or an aspect of it, where
 the aggregated judgement about the situation provides the cue.

549

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

558

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

562

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

568

Again, the dynamic view expands the question by a longitudinal or comparative dimension, inquiring into the shaping role of the organisational environment. Three organisational characteristics in particular are likely candidates for exploration. First, organisational signals point to the salience and significance of particular cues. Feedback, reporting structures or other routines may establish interpretive patterns that
serve as cues in the subsequent decision. In our example, the project manager may have developed an
understanding – for instance, through negative experiences or discussions with colleagues – that different
functionalities of the commissioned system are differently sensitive to changes. Thus, the project manager
may first consider the cue, 'Does it affect a critical functionality?' in approaching the change request. In a
different project, the project manager may rely on other cues, such as information related to timing, the
people involved, the location and so on.

579

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

589

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

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

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

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

625

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

632

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

642

Table 1 summarizes the developed framework of the research agenda and proposed illustrative researchquestions.

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

	Static view: What are the cognitive strategies of the individual decision maker?	Dynamic view: How does the context or the organisational environment shape these cognitive strategies over time?
Framing: What is the perceived decision problem that the decision maker considers?	(How) Do heuristics inform the framing of the problem?	Which organisational characteristics shape the heuristics that project practitioners apply to frame a decision problem?
Information: How does the decision maker search for and elicit cues from an unstructured and ambiguous information environment?	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?
Options: How does the decision maker identify and select potential response alternatives?	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

Following those three critical lines of inquiry within the static and the dynamic views, we see the need for a 647 methodological expansion in simple heuristic research. The classic simple heuristic research provides 648 established methods to identify the heuristics applied to well-defined decision problems with clear-cut 649 cues. However, for the discussed research problems, we need to take into account the subjective 650 perceptions of the decision maker, the fuzziness of the information and the potential shaping effect of the 651 organisational environment. We believe that to explore those aspects adequately, we should incorporate 652 more qualitative or mixed-method approaches into simple heuristic research. Considering that the 653 researchers will have a limited a priori understanding of the practitioner's lived experience, a predefined 654 set of likely framings is at high risk of being incomplete or misrepresenting the actuality of project decision 655 making. To overcome this limitation, qualitative methods allow exploratory or open investigations that are 656 helpful for the early inquiries into specific decision-making phenomena, when no specific decision problem 657 or set of cues is apparent to the researchers. Thus, qualitative methods are necessary for the development 658 of new theories or models regarding the role of heuristics in project decision making. 659

660

661 4.3.1. Qualitative and mixed methods of researching project decision heuristics Qualitative methodologies allow gathering insights on the framing of the decision problem, the acquisition 662 and use of information and cues, and the development of options. We expect those cognitive processes to 663 unfold in a manner that seems overlapping or intertwined to the external observer; thus, the methods 664 suggested in the following paragraphs are likely to produce insights on some or all of those aspects. 665 Research can follow two (not necessarily separated) streams of qualitative inquiry with different potentials 666 and limitations: observation and interview. 667 668 Observational methods capture any form of data on what is done and what is said during a decision 669 instance. Thus, they allow investigating the immediate behaviour of the decision maker(s), without any 670 influence of the researchers or post-rationalisation of the behaviour. However, during the observation, the 671 researchers have no opportunity to clarify or inquire about the decision maker's behaviour. Thus, such 672 methods require a sufficiently confined decision instance where aspects that are not at the centre of the 673 research but may influence the behaviour are fixed or can be observed. For example, if the observational 674 method aims at investigating information use, the researchers would need assurance that the decision 675 problem and the options are unambiguously clear to the observed individual(s). If these cannot be assured, 676 observational methods should include ways to capture the data on the problem framing or the option 677 identification, such as interviews or a research design where the participants formulate decisions or 678 judgments in a way that reveals their framing. A confined decision instance also means that researchers 679 have a nearly full grasp of the information that is available to the decision maker(s), an assumption 680

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681

The best level of control for observational methods can be achieved through realistic decision simulations
 in which the participants comment on the information search and the deliberation process in the form of a

challenged by the expected use of cues from memory.

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

692

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

707

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

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

715

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

730

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

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

739

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

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758

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

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

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

766

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

772

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

779

780 **5. Conclusion and outlook** 

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

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

789

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

In conclusion, we have presented several arguments that the simple heuristic paradigm can contribute to all key areas of current research on project decision making behaviour and have indicated how it may do so. We thus contribute to two academic fields: project decision studies and simple heuristic research. We expanded project decision studies by providing guidance for empirical research within the simple heuristic paradigm. We have done so by starting with the empirical context of interest and connecting the identified key research themes with avenues through which simple heuristics can provide new insights. We have thus reversed the argument previously brought forward for simple heuristics, which has merely identified managerial decision making as a suitable context that shares the characteristics of contexts in which simple heuristics are (arguably) likely to succeed. Our approach in developing a research agenda for project decision making may thus serve as a blueprint for further applications of simple heuristics to other 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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