

From Knightian uncertainty to real-structuredness: Further opening the judgment black box

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Abstract

Research Summary: Entrepreneurial judgment remains a concept that resembles a black box. This article attempts to further open that black box by developing a dimensionalization of types of judgment. To achieve this, it joins recent efforts to explicitly link entrepreneurship to Simonian themes by integrating the notion of decision problem structures into the judgment-based approach (JBA) to entrepreneurship. This article proposes a more comprehensive and nuanced approach to judgment in the face of decision problems we label “real-structured.” Extending the JBA comes with several important implications: It uncovers additional entrepreneurial knowledge problems, provides new insights for both economic organization and judgment communicability, and informs research on entrepreneurial success and failure. It also sheds new light on the controversy over the relationship between effectuation and judgment.

Managerial Summary: When taking decisions, entrepreneurs cannot know how the future will pan out. Those decisions are made under conditions of uncertainty and only time will tell whether they prove astute or otherwise. The uncertainty of the future leads entrepreneurs to exercise judgment based on their individual beliefs and to act accordingly. The components of that entrepreneurial judgment remain rather underexplored.

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The purpose of this article is to dig deeper into, and thereby improve, the understanding of entrepreneurial judgment. The main result of this article is a four-part dimensionalization of judgment, covering entrepreneurial (sub-)judgments on the effects incurred by action, the appraisal of action alternatives, the goals underlying action, and resolving the decision problem.

KEYWORDS

effectuation, entrepreneurship, heuristic, ill-structuredness, judgment-based approach, knowledge problems, real-structuredness, uncertainty

1 | INTRODUCTION

The emerging judgment-based approach (JBA) (Foss & Klein, 2012, 2015; Klein, 2008)¹—drawing on Cantillon (1755), Knight (1921), Mises (1949), and Casson (1982)—suggests a focus on *judgment under uncertainty* as the core element of entrepreneurship (Foss & Klein, 2020; McCaffrey et al., 2021). While the JBA promises prolific progress in entrepreneurship research, it is still in its infancy (Foss & Klein, 2015) and could benefit from refinement (Foss & Klein, 2012). This does not come as a surprise given that the JBA is a fairly recent renaissance of a seemingly superseded form of traditional thought. The JBA is not yet—and cannot be—a mature theory, but valuable foundations have been laid that must be extended incrementally over time. While some of the gaps that were originally left unaddressed have since been filled (Foss & Klein, 2015; Godley & Casson, 2014; Hallberg, 2015; McMullen, 2015), others remain. One of the remaining gaps concerns the notion of judgment itself, which has been elusive, virtually a black box (Foss & Klein, 2015; McCaffrey, 2013). What judgment *is* (e.g., what forms it can take) rather than what it *does* (bring about decisive entrepreneurial action) has not been specified in much detail (Foss & Klein, 2012), with few exceptions (Foss, Foss, & Klein, 2007; Foss & Klein, 2012; Godley & Casson, 2014; McMullen, 2015).

However, this is an unsatisfactory state, for it *inter alia* impedes building theories that highlight entrepreneurial judgment (rather than good or bad luck) as a significant and impactful causal factor producing varying outcomes of entrepreneurial action. One way to remedy this issue is to recourse to the Simonian notion of decision problem structures. Doing so reveals that entrepreneurs exercise judgment over much more than uncertainty and additionally delineated knowledge problems (Mitchell, Mitchell, Hunt, Townsend, & Lee, 2022; Townsend, Hunt, McMullen, & Sarasvathy, 2018) associated with options and outcomes; this path also facilitates the further unpacking of the judgment black box by dimensionalizing different types of judgment. Judgment scholars have touched upon the structure of the decision problems over which entrepreneurs exercise their judgment (Foss & Klein, 2012; Packard, Clark, & Klein, 2017), but thus far, they have not fully integrated it into the JBA. However, similar to the way in which “[m]uch recent progress in economics has come from rediscovering long-neglected, but once-prominent, phenomena,” (Foss & Klein, 2015, p. 585) recalling the concept of decision problem structures can advance the JBA.

This article aims to contribute to unpacking the judgment black box by developing a dimensionalization of types of judgment. To achieve this, this article draws on the Simonian notion of decision problem structures, delineates different structural characteristics that decision problems might feature, illustrates how that notion goes beyond the existing taxonomies of both uncertainty and other knowledge problems, and integrates it into the JBA. Focusing on

¹See also Brown, Packard, and Bylund (2018); Foss, Klein, and Bjørnskov (2019); Foss, Klein, and Murtinu (2019); Klein and Bylund (2014); Klein and Foss (2008); and McCaffrey, Foss, Klein, and Salerno (2021).

problem characteristics and formulation, this research borrows from the problem-finding and problem-solving perspective (Nickerson, Yen, & Mahoney, 2012) and joins recent efforts to explicitly link entrepreneurship to Simonian themes, such as the design emphasis that Simon (1996) initiated (e.g., Berglund, Bousfiha, & Mansoori, 2020; Dimov, 2016). The identification of different problem characteristics entrepreneurs potentially deal with in their judgment facilitates the delineation of associated types of judgment. Based on the JBA thus extended, this article proposes a comprehensive process of entrepreneurial judgment that explicitly covers all potential problem characteristics and thus types of judgment rather than merely the uncertainty of options and outcomes and the judgment associated with it. Doing so *inter alia* contributes to conceptualizing entrepreneurship as design by better specifying the types of judgment potentially involved in entrepreneurial experimentation with resource bundles and, as such, the design of artifacts (Berglund et al., 2020). The proposed dimensionalization of entrepreneurial judgment has further important implications. Not only does it inform research on economic organization, particularly regarding the delegation of judgment power (Foss et al., 2007; Foss & Klein, 2012) both inside and outside a firm's boundaries, but it can also shed new light on entrepreneurial success and failure. The extended view of the JBA additionally aids in clarifying its supposedly contradictory relationship (Saravathy & Dew, 2013) with effectuation (Saravathy, 2001, 2008).

2 | AN OUTLINE OF THE JBA AND ITS RELATIONSHIP WITH UNCERTAINTY

While its roots can be traced at least as far back as the eighteenth century (Foss & Klein, 2015), the JBA has only recently noticeably entered the stage and seriously challenged the prevailing conceptions of entrepreneurship. The JBA has evolved as part of a larger research effort advocating the study of action as the unit of analysis in entrepreneurship research (Klein, 2008; McMullen & Dimov, 2013; McMullen & Shepherd, 2006). It gives prominence to judgmental decision-making and directly links entrepreneurship to asset ownership (Foss & Klein, 2005, 2012; Foss, Klein, & Bjørnskov, 2019).² The JBA holds that entrepreneurship is inherently about investing one's owned or otherwise controlled means in the face of uncertainty to acquire profit, thus transforming *imagined* opportunities into action (Bylund & Packard, 2022; Foss & Klein, 2012, 2015; Klein, 2008). It “is operationalized in the beliefs–actions–results [...] framework” (Foss & Klein, 2020, p. 366), meaning that entrepreneurs hold particular beliefs upon which they act, which ultimately culminates in some results, such as financial profit or loss. Entrepreneurship thus understood provides a natural foundation to link the entrepreneur to the firm (Foss et al., 2007; Foss & Klein, 2012; Klein, 2008; Knight, 1921).

One way to circumscribe entrepreneurial judgment is to “simply define judgment as decisive action about the deployment of economic resources when outcomes cannot be predicted according to known probabilities” (Foss & Klein, 2012, p. 38). Hence, judgment has been causally linked to Knightian uncertainty, that is, a situation in which neither a priori nor statistical probabilities exist (Knight, 1921), and formalized decision rules are inapplicable (Mousavi & Gigerenzer, 2014).

While uncertainty has played a vital role in many theories of the entrepreneur (Dimov, 2018; McMullen & Shepherd, 2006; Townsend et al., 2018),³ it has been at the heart of the JBA in particular. Foss and Klein (2012, p. 79), for instance, explicitly “link judgment to uncertainty.” Most entrepreneurship research, including the JBA, generally associates uncertainty with the consequences of entrepreneurial action, either in terms of its outcome alone or regarding both available options and their outcomes. Foss and Klein (2012, pp. 38–39, emphasis on *consequences* added) have illustrated that in “a judgment-based approach, bearing uncertainty—that is, making decisions without knowing the *consequences* for sure—is the entrepreneur's *raison d'être*.” In a more nuanced fashion, Packard et al.

²See also Foss, Klein, and McCaffrey (2019); Klein and Klein (2001); McCaffrey et al. (2021); and Salerno (2008).

³Further references include Folta (2007); McKelvie, Haynie, and Gustavsson (2011); Shepherd, Williams, and Patzelt (2015); and Townsend and Hunt (2019).

(2017) have delineated different types of Knightian uncertainty by considering the entrepreneur's sets of both options and outcomes.

3 | UNCERTAINTY, DECISION PROBLEM STRUCTURES, AND KNOWLEDGE PROBLEMS

3.1 | Uncertainty and decision problem structures

Knightian uncertainty is a double-edged sword: While it essentially enables entrepreneurial action (Knight, 1921; Mises, 1949; Townsend et al., 2018; Wu & Knott, 2006), it is also the major challenge facing entrepreneurs. Though it is imperative to relate entrepreneurship to Knightian uncertainty (Bylund & Manish, 2016), in their decision-making, entrepreneurs need not only cope with uncertainty; further obstacles may also arise. Whether this is the case and, if so, to what degree, fundamentally depends on the structure of the decision problem(s) the entrepreneur faces.

Decision problems have been classified according to their properties as either well-structured or ill-structured (Newell, 1969; Simon, 1973), and the problem-finding and problem-solving approach emphasizes the importance of understanding such problem characteristics for value creation (Baer, Dirks, & Nickerson, 2013; Macher, 2006; Nickerson et al., 2012). With well-structuredness, the decision-maker knows all the available options and their respective outcomes and can appraise the options in light of a distinct goal, and a computational routine exists that facilitates problem solving (Simon & Newell, 1958). Well-structured problems enable the decision-maker to select the optimal solution to the problem, thereby making a so-called rational choice (Kahneman & Tversky, 1979; Simon, 1976a).⁴

Entrepreneurs are a specific type of decision-maker, predominantly acting in contexts where the prerequisites of such a form of rational decision-making will not be met—either partially or completely. If at least one of these premises is absent, such decision problems have been qualified as afflicted by structural defects (Adam & Witte, 1979) and therefore labeled ill-structured (Newell, 1969; Simon, 1973; Simon & Newell, 1958; Townsend & Hunt, 2019).⁵ Hence, “[p]roblems are ill-structured when they are not well-structured” (Simon & Newell, 1958, p. 5). However, given that (not only) Simon and Newell (1958, p. 5) “are forced to admit that [...] certainly a majority of the very most important decisions [...] lie much closer to the ill-structured than to the well-structured end of the spectrum,” we have come to question the utility of describing the overwhelming majority of decision problems entrepreneurs face in the real world as being somewhat *defective* and *ill-structured*, although those terms are well-established. Doing so seems particularly unsuitable given that those attributes are assigned based on a comparison of such decision situations with an, at best, fairly rare, if not hypothetical, ideal. The description is reminiscent of the nirvana fallacy Demsetz (1969) identified. To avoid that pitfall, we suggest referring rather generally and value-free to structural *characteristics* and *real-structuredness* whenever decisions do not match hypothetical ideals but simply cover typical real-world features.

Real-structuredness and the degree to which it applies are not objective facts but subjective perceptions of the structure of a particular decision problem. Once a decision problem is perceived as real-structured, an optimal solution to it resulting from a simple act of choice is no longer defined *ex ante*, and it is therefore inaccessible (Beckert & Bronk, 2018; Gigerenzer, 2008). Rather than optimizing, entrepreneurs are constrained to trying to reach a satisficing solution (Simon, 1976a) to the initial decision problem (Miller, 2007; Wilson & Alexis, 1962) by applying their judgment (Foss & Klein, 2012, 2015; Klein, 2008; Knight, 1921; Mises, 1942).⁶ That is not to say, however, that entrepreneurs act irrationally because the decisions they face do not allow for optimization. To the contrary, we follow Mises

⁴See also Ariely (2009); Miller (2007); von Neumann and Morgenstern (1944); and Savage (1954).

⁵Reitman (1964) used the term “ill-defined problem.”

⁶See also Bylund and Manish (2016); Holmes Jr., Holcomb, Klein, and Ireland (2014); Packard et al. (2017).

(1949) in thinking that human and—by dint of being a proper subset of it (Bylund & Gupta, 2021)—entrepreneurial action is generally rational in the sense that it “is motivated by the urge to remove a felt uneasiness” (Mises, 1949, p. 233).

Perceived real-structuredness results from the absence of at least one of the four characteristics of well-structured problems (Adam & Witte, 1979; Wilson & Alexis, 1962; Witte, 1979), namely causality (limited knowledge of options and/or outcomes), appraisability (lack of expertise to appraise different outcomes), solvability (lack of an algorithm to find the best solution), and goal (unknown or competing ends) characteristics (Rapp & Olbrich, 2020, 2021). The spectrum of decision problem structures thus covers well-structured problems (if, and only if, all of the attributes mentioned above are present) and a range of real-structured problems that differ in degree depending upon the perceived presence and extent of each of the outlined characteristics. Table 1 juxtaposes the constituent properties of both well- and real-structured decision problems.

An example that can illustrate the notions discussed in this article is that of an entrepreneur aiming to enter the consumer market by offering exceptional cheese products. This entrepreneur might not only consider her profit levels, her personal willingness to bear uncertainty, and liquidity when deciding to produce and sell cheese, she may also target creating new jobs in her community. In other words, four different goals that (potentially) compete with each other must be met to some extent when making decisions. Since all of the entrepreneur's goals originate from her individual set of ends, the source of the goal characteristic is endogenous.

When starting the business, the cheese entrepreneur is confronted with an indefinite number of options, including whether to make cheese or buy it and somehow facilitate additional consumer value, and whether to specialize in sheep's, goat's, or cow's milk cheese products. A decision to produce cheese is concomitant with a multitude of sourcing decisions concerning whether to produce the source milk or buy it (from domestic producers or foreign ones), the former introducing questions of land acquisition, a workforce, premises, and logistics, among others. Further necessary decisions include those on product specialization, such as hard or soft cheese, and marketing issues such as likely demand, distribution channels, and price points. Additionally, the entrepreneur's knowledge of each option's outcome is limited. She does not have complete insight into the required production processes and thus cannot quantify the input each option would require. Furthermore, the entrepreneur can only make educated guesses about customers' future preferences, the scale of their demand for cheese delicacies, and their willingness to pay. In other words, the potential future turnover is uncertain simply because it involves indeterminable human action (Packard & Clark, 2020b), not least influenced by the entrepreneur's own actions (Cope, 2011; McGrath, 1999; Townsend et al., 2018).

Assuming that the cheese-product entrepreneur in our example would aim for the highest achievable profit, she knows neither how to appraise the particular input required to exercise each option to produce and sell a particular cheese product nor the sales that the product will generate. Specific models of cost accounting and investment theory have been developed to offer an appropriate basis for such appraisal, and they consider each resource's particular scarcity and calculate based on marginal costs and marginal profits, respectively (Forrester, 1977; Schmalenbach, 1947, 1949; von Böhm-Bawerk, 2005; von Wieser, 1893, 1927). Given that this

TABLE 1 Decision contexts and decision types

	Decision situation	
	Well-structured	Real-structured
Goals	Distinct	Unknown or competing
Options and outcomes (causality)	Well-known	Partly known; imagined
Appraisability	Given	Not given or inefficient
Solvability		
	Optimizing choice	Satisficing judgment

scarcity stems directly from the entrepreneur's properties, namely the limited set of resources available to her, there is a crucial difference between causality and appraisability. While the former largely originates outside the entrepreneur's purview and derives from her environment, the latter stems from both her individual sets of means and goals.

The exemplified entrepreneur might also face challenges resolving solvability issues, for instance, when it is necessary to decide how to sequentially process incoming orders, an issue that would also arise with respect to the order in which to deliver the cheese to customers. Building on Simon's (1976a, 1976b) distinction between substantive rationality and procedural rationality, and Dosi and Egidi's (1991) differentiation between substantive and procedural uncertainty, we classify the causality characteristic as a *substantive* structural characteristic and, in contrast, the solvability characteristic as a *procedural* structural characteristic.

One may wonder how the structure of the decision problem relates to the degree of unknowingness emphasized in the JBA. Both are closely intertwined and are, in fact, two different ways of understanding and structuring the decision an entrepreneur faces. If a decision problem is perceived to be well-structured, that is, both the set of options and the set of outcomes are closed and the entrepreneur is aware of how to appraise the different options and (computationally) solve the problem in line with the intended goal(s), that entrepreneur is in either a risky or an ambiguous decision situation, as Packard et al. (2017) described. In such situations, the entrepreneur is equipped with decision-relevant information of a significant magnitude. While the entrepreneur cannot be certain about the particular outcome beforehand, she at least knows all possible outcomes and can make subjective estimations of the likelihood of the occurrence of each item in the context of the closed set of outcomes (ambiguity) (Savage, 1954), or she might even know such likelihoods (risk).

Similar to the relationship between well-structuredness and risk/ambiguity, real-structuredness and uncertainty are also intertwined. If entrepreneurs are uncertain about the options and/or their respective outcomes, they perceive the decision problem as being real-structured. Moreover, with recourse to the entire range of the above-presented structural characteristics, entrepreneurs might perceive the underlying decision problem as real-structured for more than one reason.

Contrasting the notion of decision problem structures with existing typologies of uncertainty, as illustrated in Table 2 (which builds on Packard et al., 2017; Rapp & Olbrich, 2020), reveals that most of those typologies solely or primarily focus on uncertainty in terms of options and/or outcomes. While some delineations incorporate uncertainties surrounding further characteristics, particularly regarding the goals involved (Garud & Van de Ven, 1992) and the solvability of the decision problem (Dequech, 2011; Dosi & Egidi, 1991), the taxonomies do not cover all the facets of real-structuredness. Broad, undifferentiated notions of uncertainty—Knightian uncertainty, as such, or the concept of case probability (Mises, 1949)—can be interpreted as embracing the entire range of structural characteristics; naturally, however, they fail to identify the characteristics' differing natures and implications.

Systematically incorporating all structural characteristics into the process of entrepreneurial judgment, rather than just uncertainty regarding options and outcomes, promises a broader, more comprehensive and nuanced understanding of the subject than has been available to date. Foss and Klein (2015, p. 592) have acknowledged "that entrepreneurs (may) suffer from these problems," subsuming both "limited knowledge [...] and ill-specified objectives." They seem to agree that entrepreneurs may have to juggle with various issues in their judgment and not merely the unknowingness surrounding their options and/or their outcomes. Accordingly, Foss and Klein (2012) have hinted at issues facing entrepreneurs beyond uncertainty thus understood, particularly Simonian themes such as "ill"-structured decision problems, their decomposability, and bounded rationality. Moreover, the frameworks Packard et al. (2017) and Packard and Clark (2020a, 2020b, 2020c) have presented also relate to and encapsulate particular structural characteristics of decision problems, namely unspecified goals and the solvability of the problem in light of the limits uncertainty imposes on predictive economic calculation. However, while those aspects of entrepreneurial decision problems have already been touched upon, neither they nor additional characteristics have yet been fully unfolded and expressly integrated into the JBA.

TABLE 2 Prime relationships between structural characteristics and typologies of uncertainty in the literature

	Structural characteristics			
	Options and outcomes	Appraisability	Goals	Solvability
Source from entrepreneur's point of view	Exogenous Substantive	-----Endogenous-----		Procedural
		Uncertainty		
Knight (1921)	-----Uncertainty-----			
Mises (1949)	-----Case probability-----			
Kahneman and Tversky (1982)	External uncertainty	-----Internal uncertainty-----		
Milliken (1987)	State, effect, response uncertainty			
Dosi and Egidi (1991)	Substantive uncertainty	Procedural uncertainty		
Garud and Van de Ven (1992)	-----Uncertainty-----	Ambiguity (unknown objectives)		
Wu and Knott (2006)	Demand uncertainty	-----Ability uncertainty-----		
Dequech (2011)	Substantive uncertainty	Procedural uncertainty		
	-----Strong uncertainty-----			
	-----Fundamental uncertainty-----			
Bylund and McCaffrey (2017)	Institutional uncertainty			
Packard et al. (2017)	Creative, environmental, absolute uncertainty			

3.2 | Knowledge problems and decision problem structures

Townsend et al. (2018, p. 665) have found “that despite the long history and central importance of Knightian uncertainty to theories of entrepreneurial action, there remains a surprising lack of agreement on core definitions of uncertainty in contemporary research.” The authors have identified “confusion stemming from a lack of construct clarity” (Townsend et al., 2018, p. 665) and sought to eliminate such confusion by delineating distinct knowledge problems, which—despite their differing features—have been subsumed by the term uncertainty. Townsend et al. (2018) have addressed the opacity surrounding entrepreneurial decisions by distinguishing ambiguity, equivocality, and complexity from uncertainty. While some equate *ambiguity* with uncertainty (e.g., Kuechle, Boulu-Reshef, & Carr, 2016; York & Venkataraman, 2010), in the conceptualization of Townsend et al. (2018, p. 671) it “refers to what Weick calls the collapse of sensemaking, the conditions that emerge when people suddenly feel that the world is no longer constituted as a rational, orderly system”, *equivocality* “refers to knowledge problems stemming from the existence of multiple meanings or interpretations” (Townsend et al., 2018, p. 672). *Complexity*, according to Townsend et al. (2018, p. 673), “emanate[s] from a combination of detail complexity, which is the multiplicity of variables involved in a problem, and from dynamic complexity, which is the multiplicity of the interactions that occur between these variables over time.” Complexity thus understood draws on Simon (1962, 1996) and has been embraced by scholars in contextualizing judgment within the complex structure of heterogeneous capital (Foss & Klein, 2012).

TABLE 3 Relationship between structural characteristics and knowledge problems

		Structural characteristics			
		Causality	Appraisability	Goal	Solvability
Knowledge problems		Uncertainty	Incommensurability	Unawareness	Unavailability
		Ambiguity		Competition	Inefficiency
		Complexity			
		Equivocality			
		Townsend et al. (2018)			

Similar to questions around how the degree of unknowingness and decision problem structures relate to one another, questions arise about the relationship between decision problem structures and entrepreneurial knowledge problems. While the latter have distinct properties and their delineation helps establish a more nuanced framework for characterizing decision situations facing entrepreneurs, the two elements share a common denominator. This is clear in Townsend et al.'s (2018) illustration of the boundary conditions among entrepreneurial knowledge problems. Each knowledge problem is associated with the structure of typical decision rules, and all of those rules refer to the cause-and-effect relationship between actions and outcomes (Townsend et al., 2018, p. 675, emphases added): The structure of the typical decision rule in the case of complexity is described as “Do *actions* X1 or X2 *cause outcome* Y?” whereas its counterpart in the case of equivocality reads “Which *action*, X1 or X2, should I take to *produce outcome* Y given what I know about situation Z?” In the same fashion, the rule associated with uncertainty is “Can *action* X *cause outcome* Y?” and that associated with ambiguity is “Does *action* X *cause outcome* Y in situation Z?” The knowledge problems Townsend et al. (2018) have described thus resemble the causality characteristic of decision problems, though more nuanced owing to the distinction between the different underlying causes of the problem characteristic. The existing knowledge problem taxonomy, however, disregards the remaining structural characteristics that might feature in entrepreneurial decision problems, namely the goal, appraisability, and solvability characteristics. Yet, these characteristics also reflect entrepreneurial knowledge problems—*unawareness* of or *competition* among goals, *incommensurability* (i.e., lack of a common measure among action alternatives), and the *unavailability* or *inefficiency* of problem solutions. Table 3 summarizes the relationship between the characteristics of real-structured decision problems and entrepreneurial knowledge problems, expanding the taxonomy Townsend et al. (2018) introduced.

The notion of the structural characteristics of decision problems overlaps in some ways with the uncertainty taxonomies suggested in the literature and the classification of knowledge problems (Townsend et al., 2018), particularly in terms of the causality dimension, while diverging in other ways. However, those taxonomies should not be viewed as three distinct and competing ways of circumscribing entrepreneurial decision situations. Instead, the three frameworks should be viewed through an integrative lens, as complementing one another. Taking this approach, the problem structure concept fits the role of the meta-framework well. Differentiation of both uncertainty types and additional knowledge problems can then aid in unpacking the structure of decision problems in that they investigate and reveal the nature and types of the characteristics involved.

4 | ENTREPRENEURIAL JUDGMENT IN LIGHT OF REAL-STRUCTUREDNESS

4.1 | A dimensionalization of types of judgment

When facing real-structured problems, entrepreneurs cannot simply choose the best course of action according to some formalized decision rule; rather, they must apply their judgment to decide what to do. Thus far, however,

TABLE 4 Relationship between elements and types of judgment

		Types of judgment			
		Causality	Appraisal	Goal	Solution
Elements of judgment	Skills and experience	X	X	X	X
	Creativity	X	X		
	Uncertainty preferences	X	X	X	

judgment has been an elusive concept. While we know what entrepreneurial judgment *does*—it brings about decisive action concerning the employment of scarce resources—what judgment *is* has not been specified in much detail (Foss & Klein, 2012, 2015). For this reason, further opening the judgment black box is desirable (Foss & Klein, 2015; Foss, Klein, & McCaffrey, 2019). It not only aids in better specifying what distinguishes judgment from pure luck (e.g., Foss & Klein, 2015; Giménez Roche & Calcei, 2021; McCaffrey, 2016), thus expressly underlining the vital meaning of the concept, but it also facilitates building new theories that conceive of judgment as a varying causal factor in entrepreneurial decision-making producing differing outcomes.

In this regard, integrating the notion of real-structuredness into the JBA proves to be useful because it unveils the different problem characteristics entrepreneurs potentially address when exercising judgment. It thus facilitates the delineation of corresponding types of judgment involved in entrepreneurial reasoning and, by so doing, answers the following question, raised by Foss and Klein (2012, p. 234): “How can judgment be dimensionalized?”

In accordance with the structural characteristics outlined above, four corresponding types of judgment can be distinguished: causality, appraisal, goal, and solution judgments. *Causality* judgment refers to the particular kind of judgment entrepreneurs exercise when defining their set of available action alternatives and imagining the effects the alternatives might yield. *Appraisal* judgment describes the distinct type of judgment entrepreneurs apply to compare and evaluate their options. *Goal* judgment reflects entrepreneurs' efforts to specify the goal(s) toward which they are striving. Lastly, *solution* judgment reflects the distinct type of judgment entrepreneurs exercise when attempting to (computationally) resolve a decision problem.

Aiming to at least partially describe what judgment is, Foss and Klein (2012)—building on Casson (1982), Csikszentmihalyi (1996), Gartner (2007), and others—outlined the different elements of judgment, namely *skills and experience*, *creativity*, and *uncertainty preferences*. To gain a deeper understanding of judgment, these elements can be related to the types of judgment delineated above. All three elements of judgment are involved in both causality and appraisal judgments. Defining available options and imagining their possible outcomes, as well as comparing and evaluating those options, necessitate skills and experience, in addition to creativity. Uncertainty preferences also factor into these two types of judgment in that they impact both the definition of the entrepreneurial set of options and the evaluation of their imagined effects. Goal and solution judgments feature less elements. While experiences may shape goals, and the degree to which one is willing to bear uncertainty is involved in goal judgment, solution judgment demands specific skills. Table 4 summarizes the relationship between the elements and each type of judgment.

4.2 | Judgment on real-structured decision problems: A processual perspective

Real-structuredness prevents entrepreneurs from identifying optimal decisions (Gigerenzer, 2008); that is, any attempt to resolve their decision problem cannot result in an optimal solution but will be limited to one the entrepreneur hopes is “‘good enough’ (satisfices)” (Simon, 1976b, p. 72). “Several procedures of rather general applicability and wide use have been discovered that transform intractable decision problems into tractable ones. One procedure [...] is to look for satisfactory choices instead of optimal ones” (Simon, 1979, p. 501). Transforming intractable

problems into tractable ones requires initially perceiving the decision problem as real-structured. However, the boundary between such problems and their well-structured counterpart “is vague, fluid and not susceptible to formalization” (Simon, 1973, p. 181). Whether a problem appears to be real-structured, and if so, to what degree, is thus a matter of a particular entrepreneur’s individual perception (Simon, 1986), as is the case with uncertainty (Dimov, 2018; Packard et al., 2017; Shepherd et al., 2015) and the decision environment in general (Maitland & Sammartino, 2015). Simon (1986, p. S211) reasoned that “[i]f [...] we accept the proposition that both the knowledge and the computation power of the decision maker are severely limited, then we must distinguish between the real world and the actor’s perception of it and reasoning about it.” Whether the problem is perceived as real-structured depends on the extent to which the entrepreneur perceives it as having structural characteristics. Since those prohibit the entrepreneur from initially solving the decision problem, it is necessary to somehow resolve the identified issues to transform the intractable problem into a tractable one, that is, one with an improved structure that allows for at least a satisfactory solution (see Sarasvathy’s (2001) illustration of the transformation process in her urn example).

This process of identifying and resolving structural characteristics may include one or more recursion loops (Adam, 1996; Foss, 1996) if they appear not to be satisfactorily resolved and/or if further issues are identified in the course of the process, and hence, the structure of the decision problem has not yet been sufficiently improved. To resolve perceived real-structuredness requires applying judgment. If, for example, an entrepreneur believes the decision is afflicted with the causality characteristic, she can resolve the issue by subjectively populating both the set of options and the set of outcomes (Packard et al., 2017), which constitutes an act of causality judgment. Moreover, if the entrepreneur believes that addressing particular structural characteristics has improved the problem structure, the entrepreneur, again, must apply judgment to decide and act upon the resulting decision problem. Unlike most of its theoretical depictions (Shepherd et al., 2015), entrepreneurial decision problems are usually not singular events. Longer time horizons, learning, experience acquired over time, and altering ends and/or means necessitate ongoing subsequent judgment, which entails conceptualizing entrepreneurial decisions as dynamic recurring processes (Holmes Jr. et al., 2014; Packard et al., 2017; Wood, Williams, & Drover, 2017). Owing to the substantial similarity of both perspectives, we present the comprehensive process of entrepreneurial judgment in real-structured situations in Figure 1 in a manner that builds significantly on Packard et al.’s (2017) model of the entrepreneurial judgment process under Knightian uncertainty.

Klein, Barney, and Foss (2013, p. 779, emphasis added) have underscored that “under Knightian uncertainty [...] judgment, satisficing, biases, *heuristics*, experimentation and learning, and the like are critically important.” Heuristics seem particularly suited for real-structured decision problems (Macher, 2006) and thus for entrepreneurial decision-making (Busenitz & Barney, 1997) because unlike “statistical optimization procedures, heuristics do not try to

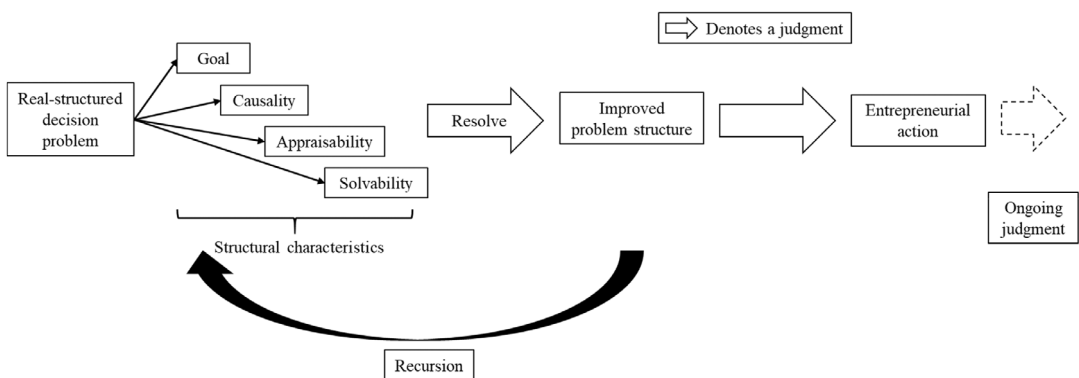


FIGURE 1 Dynamic process of entrepreneurial judgment in real-structured situations

optimize (i.e., find the best solution), but rather satisfice (i.e., find a good-enough solution)” (Gigerenzer, 2008, p. 20). Although heuristics do not seek to optimize, we—following Gigerenzer (2008), Gigerenzer and Gaissmaier (2011), and others—reject the notion that heuristics necessarily result in biased decision-making (even though biases do not arise outside of heuristic decision-making), are always deemed to provide inferior second-best solutions, and are only applied owing to human cognitive boundaries. Instead, heuristics are the best fit for *particular* problems (Berglund et al., 2020; Maitland & Sammartino, 2015), namely real-structured ones (Macher, 2006).

To reach potentially satisficing decision outcomes, entrepreneurs can use a sophisticated heuristic approach as “a strategy for making decisions” (Mousavi & Gigerenzer, 2014, p. 1673). We deviate from the common perception in entrepreneurship research and related fields that heuristics offer mere rules of thumb (e.g., Busenitz & Barney, 1997; Tversky & Kahneman, 1974)⁷; generally, we approach the term heuristic in a Simonian (March & Simon, 1958), processual way, namely as a procedure of pre-structuring an initially intractable decision problem to improve its structure, eventually allowing for decisions believed to be satisficing (Adam, 1983, 1996; Rapp & Olbrich, 2021; Witte, 1979). More specifically, we apply the term heuristic in the sense that the initial real-structured problem is deconstructed into several subproblems (Foss, 1996; Foss & Foss, 2006). These subproblems should at least be better-structured than the initially unsolvable overall real-structured problem, and solving each subproblem separately and combining the respective solutions should ultimately enable the hoped-for satisficing solution to the initial problem (Adam & Witte, 1979; Witte, 1979). In that sense, our use of the term heuristic resembles Baer et al.’s (2013, p. 198) conceptualization of problem formulation, that is, “translating an initial problem symptom or web of symptoms into a set of questions or alternative formulations of the problem that are sufficiently well-defined in terms of the causes of the symptoms to enable the subsequent search for or generation of solutions.” Viewing heuristics through a processual lens rather than as rules of thumb both matches well with and explains the processual nature of entrepreneurial judgment and subsequent action. Moreover, the approach dovetails nicely with the core of the problem-finding and problem-solution perspective in that it associates judgment with problem formulation, problem solving, and solution implementation (Nickerson et al., 2012).

Figure 2 visualizes the process of the heuristic, understood as a structuring rule, which depends heavily on judgment. Initially, judgment is required to perceive the decision problem as real-structured; entrepreneurs then apply judgment to discern how the apparently unsolvable overall problem should be separated into subproblems they perceive as better-structured (Foss & Foss, 2006). Both the solution of better-structured subproblems and the combination of partial solutions toward the aspired-to overall satisficing solution and consequent action can also only be achieved through the exercise of entrepreneurial judgment (Holmes Jr. et al., 2014).

Before dealing with uncertain options and outcomes, an effective heuristic approach must first address the goal characteristic, since the entrepreneur’s set of desired ends is a prerequisite to coping with causality, appraisal, and the solution.

To continue with our cheesemaker example, the entrepreneur’s goal judgment eventuates in her focusing on the four apparently most important ends: making a profit, creating jobs, complying with her degree of willingness to bear uncertainty, and ensuring liquidity. The entrepreneur then operationalizes those goals, which involves considering the job goal achievement if at least 10 jobs are created and the liquidity goal achievement if an amount equating to 15% of all short-term liabilities is permanently held available in cash. If those two goals are met, profit should be maximized in accordance with the entrepreneur’s willingness to bear uncertainty (which is moderate in our example).

In the next step, the entrepreneur exercises causality judgment by selecting a manageable number of options from her vast set of means and then estimating their outcomes. Packard et al. (2017, p. 847) noted that “decision makers often seek to reduce the complexity of this decision context by reducing the consideration set of options and their corresponding outcome possibilities through the elimination of implausible or undesirable outcomes and by resolving the uncertainty as much as possible.” In other words, the entrepreneur converts open sets of options and outcomes into closed ones by populating them subjectively (Hansson, 1994; Packard et al., 2017).

⁷While Gigerenzer (2008) provided some examples of rule-of-thumb heuristics, Manimala (1992) listed a total of 186.

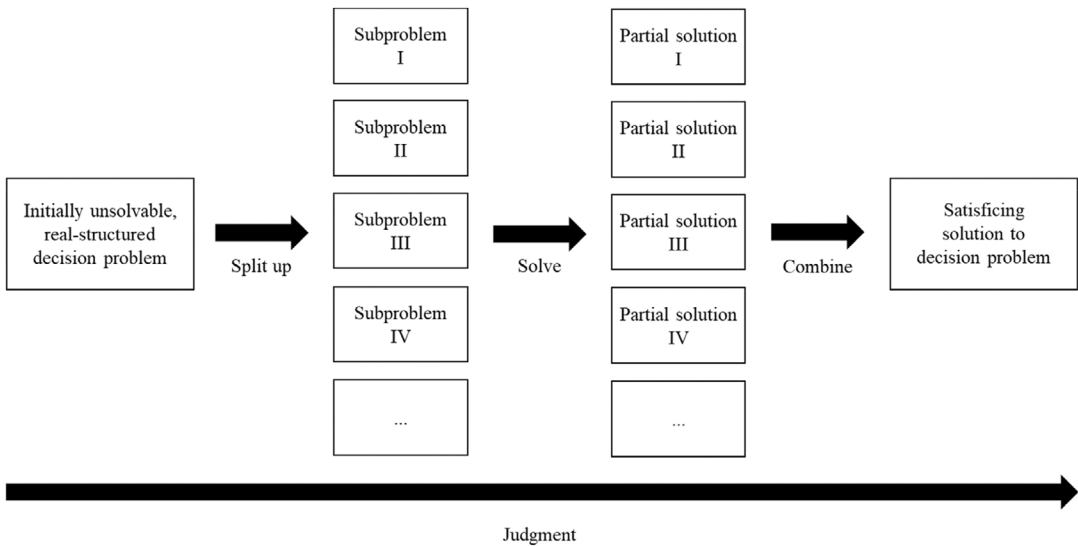


FIGURE 2 Heuristic process

In our example, the entrepreneur might undertake this conversion by eliminating all options that seem unattractive in light of her set of ends, such as those that would strain her willingness to bear uncertainty (e.g., the acquisition of cows and dairy farming, which would require a substantial investment) and those that would not create the required minimum of 10 jobs (e.g., merely importing and reselling cheese to retailers). The exemplified entrepreneur eventually closes the set of options by focusing on buying cow's milk from regional farmers, importing sheep's milk from France and goat's milk from Greece, and employing 10 cheesemakers to process the milk into cheese products. Additionally, she closes the set of outcomes by estimating the outcome of each option, that is, the input needed for its realization and its turnover.

To cope with the appraisability characteristic, the cheese entrepreneur should again be guided by her ends. Since the entrepreneur has already excluded options that do not meet the job creation goal and those that do not accord with her willingness to bear uncertainty, the next step is to find an appraisal that suits the target of gaining the highest possible profit. Hence, she transforms both the options' estimated future turnovers and their future costs arising from the resources needed into a common denominator, which allows her to rank the options in order of preference. The parameters used for this transformation would be derived from cost accounting theory and investment theory. If customer demand could be met completely, a resource is appraised with its marginal costs (Dean, 1951; Schmalenbach, 1909; von Böhm-Bawerk, 2005; von Wieser, 1893, 1927).⁸ If the entrepreneur would probably not completely meet customer demand, the possible sales have to be ranked in order of a descending margin of coverage per resource unit until the resource is exhausted. It is then appraised with its marginal costs plus its marginal profit, that is, the profit to be gained from its least profitable use (Hering, 2010; Olbrich, Rapp, & Follert, 2020; Schmalenbach, 1947, 1949).

With such a reduced problem structure, entrepreneurs can apply specific procedures to compute the anticipated outcome of each potentially desirable option based on their subjective estimates in the last step of the heuristic by exercising solution judgment. If only one resource is scarce, partial models like the future earnings method can be used (Olbrich, Quill, & Rapp, 2015), while in the case of more than one scarce resource, other models based on, for example, linear (Hering, 2000) or nonlinear (Toll & Kintzel, 2019) programming are worth considering. Additionally, both partial models and models of linear or nonlinear programming can easily be combined with scenario analyses or

⁸See also Brösel, Matschke, and Olbrich (2012); Forrester (1977); and Herbener and Rapp (2016).

(Monte Carlo) simulations, making it possible to “‘play’ with different possible courses of action by experimenting with different counterfactual images of reality” (Beckert & Bronk, 2018, p. 10). Utilizing such tools, one can account for the uncertainty inherent in the estimates, which opens a pathway to potentially satisficing decisions, considering the entrepreneur's willingness to bear uncertainty (Hertz, 1964; Hoffman & Hammonds, 1994).

It is important to note, however, that the purpose of applying these models in real-structured, uncertain contexts departs notably from its well-known counterpart under risk (Beckert & Bronk, 2018). In contrast to optimizing calculi in risky constellations, the computation itself does not and cannot provide any entrepreneur with an optimal solution to the initial decision problem under uncertainty. Unlike the examples in Savage's (1954) model, decision problems are not well-defined under uncertainty; hence, the probability distributions necessary as input data for a Monte Carlo simulation cannot accord with Savage's assumptions. Rather than subjective degrees of belief about the occurrence of particular *known* option-outcome combinations, they reflect subjective beliefs about the *possibility* of the occurrence of *imagined* option-outcome sets. This procedure seems to conform with Knight's (1921) thought, as he did not reject the idea of assigning such subjective likelihoods to imagined outcomes under uncertainty (Foss & Klein, 2012) but rather subsumed them by the term “estimated probability.”

Such a simulation can aid in structuring and visualizing the entrepreneur's personal perception of uncertain future paths as one piece of information supporting the intention to make a satisficing judgmental decision (Beckert & Bronk, 2018; Herbener & Rapp, 2016). The final decision to act one way or another does not lie within the scope of accounting or any supportive computation (Hering, 2021). No matter how sophisticated a computation may be, it can never overcome the barriers uncertainty erects (Lachmann, 1976; Mises, 1949; Sieben & Diedrich, 1990); hence, the entrepreneur must ultimately apply judgment (Hering, Olbrich, & Rapp, 2021; Hoffman & Hammonds, 1994; Rapp, Haßlinger, & Olbrich, 2018).

Nevertheless, because “the use of a variety of calculative devices and forecasting procedures aids rather than hinders entrepreneurial judgment” (Beckert & Bronk, 2018, p. 17), the entrepreneur's understanding and judgment can at least rest on a broader foundation of subjectively estimated financial considerations. “It would, after all, make no sense to argue that because it is impossible to predict the future with precision, economic actors should neither plan for possible eventualities nor examine analytically the threats, opportunities, profits, and losses that, *ceteris paribus*, could occur on certain specific (imagined) assumptions” (Beckert & Bronk, 2018, p. 14). Figure 3 illustrates how the model of heuristic problem solving applies to our example.

4.3 | Implications

4.3.1 | Entrepreneurial division of labor

Building on Knight (1921), Foss and Klein (2012, p. 98) interpreted “the firm as a *nested hierarchy of judgment*,” which involves both original and derived judgment (Foss et al., 2007; Foss & Klein, 2012; Foss, Klein, & Bjørnskov, 2019; Foss, Klein, & McCaffrey, 2019; Foss, Klein, & Murtinu, 2019). *Original* judgment is linked to the ultimate right to make decisions about the use of resources (Foss & Klein, 2012). In small businesses, the owning entrepreneur often personally fulfills day-to-day business duties. Beyond certain boundaries, however, it is impossible for “owner-entrepreneurs” (Foss et al., 2007; Foss & Klein, 2012) to run their business on their own. In such cases, employing staff and establishing a division of labor within the firm are common ways to ensure that all necessary duties are performed. Naturally, then, the entrepreneur, while maintaining the ultimate decision authority (Rothbard, 1962), needs to delegate decision rights and will require that employees act entrepreneurially. In other words, through the transfer of decision rights to subordinates, employees become entrepreneurs themselves (Knight, 1921). In order to distinguish between the owner-entrepreneur and employees exercising delegated decision rights, the latter have, among other terms, been labeled “intrapreneurs” (e.g., Neessen, Caniels, Vos, & de Jong, 2019), “manager-entrepreneurs” (Lachmann, 1956), or “proxy-entrepreneurs” (Foss & Klein, 2012) who exercise *derived* rather than original judgment

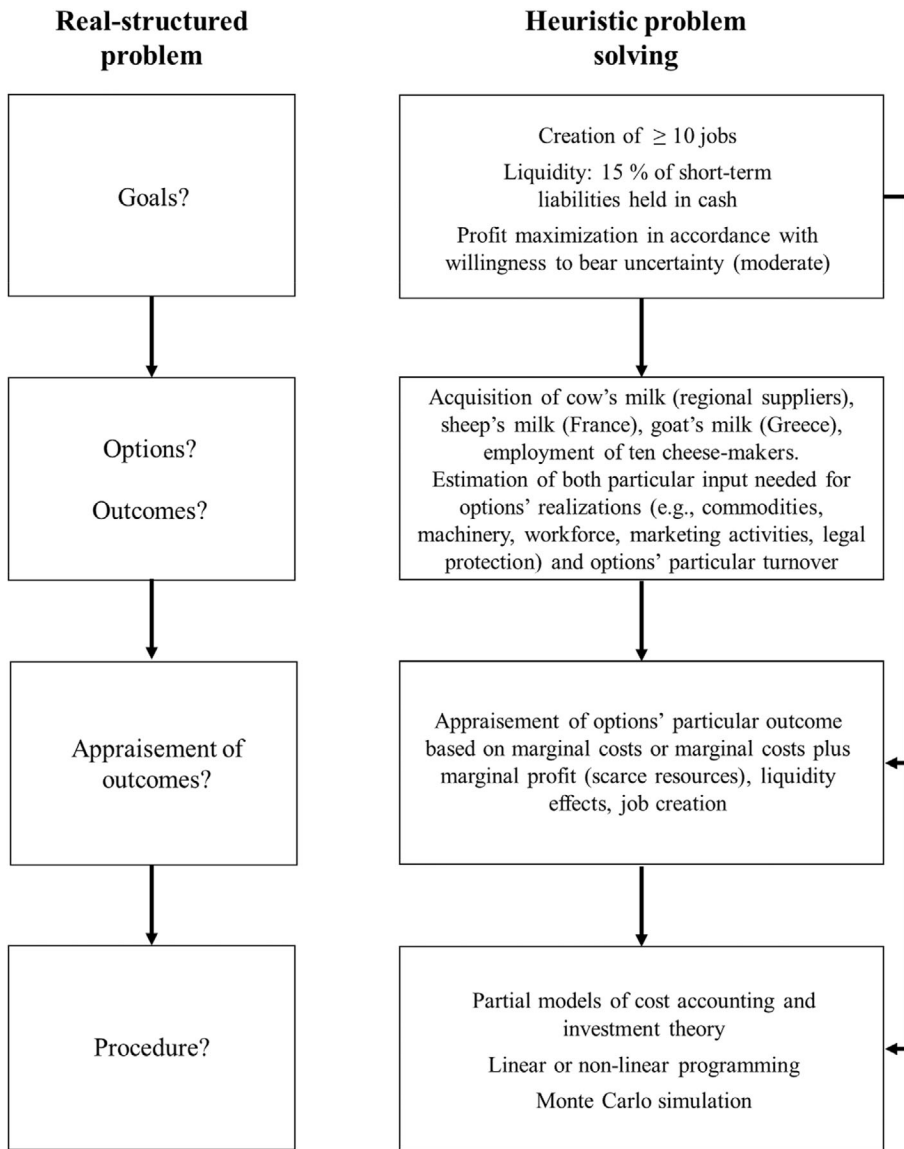


FIGURE 3 Heuristic problem solving

(Foss et al., 2007; Foss & Klein, 2012; Foss, Klein, & Bjørnskov, 2019). In many instances, “there is an entrepreneurial division of labor, needing coordination” (Foss & Klein, 2012, p. 230).

The dimensionalization of types of judgment developed in this article facilitates a more thorough exploration of such an entrepreneurial division of labor. Rather than speaking—virtually on a metalevel—of delegating judgment, as such (Foss et al., 2007; Foss & Klein, 2012), delineating judgment types reveals that the delegation of judgment might involve only specific judgment facets, allowing for a more nuanced conceptualization of such delegation. Entrepreneurship is decomposable into entrepreneurial actions performed by different individuals (Foss & Klein, 2012; Shane & Venkataraman, 2000), and so is entrepreneurial judgment. All four outlined types of judgment can occur as either original judgment exercised by the ultimate decision authority or as derived judgment. Individuals' judgment abilities vary (Knight, 1921); for instance, an owner-entrepreneur may believe that some of her employees

have superior imagination skills and thus delegate causality judgment to them, while personally retaining judgment of underlying goals and the attractiveness of the options her employees present (i.e., she retains the exercise of goal and appraisal judgments). The owner-entrepreneur might also decide to define the set of available options herself, that is, exercise the options-related part of causality judgment, while delegating imagining those options' potential outcomes to employees, or vice versa. Whether to delegate entrepreneurial judgment is not an either-or decision; rather, certain types of entrepreneurial judgment may be delegated to subordinates, whereas other types may remain subject to the ultimate decision-maker's original judgment. Whether the ultimate decision-maker considers delegating judgmental power to employees ultimately determines the object of her judgment. Focusing on causality judgment, for example, the entrepreneur herself defines available options and imagines their outcomes, if it is exercised as original judgment. If, however, she considers delegating judgment, her causality judgment concerns the question of to whom she could possibly delegate the decision authority and how well those persons can imagine possible paths of actions and their uncertain outcomes. In that case, she would be exercising Knight's (1921) concept of "judgment about other people's judgment, [that is,] evaluating employees according to their ability to act as proxy-entrepreneurs" (Foss & Klein, 2012, p. 216).

The entrepreneurial division of labor is most beneficial if the involved "parties' comparative advantages in forming original and derived judgment" (Foss & Klein, 2012, p. 208) are utilized in the best possible manner. The delegation of judgment should thus be pursued while acknowledging individuals' comparative advantages in exercising *specific* types of judgment. Being aware of the different judgment types and matching both the owner-entrepreneur's and potential delegates' particular skills with the appropriate ones is vital. It helps to mitigate "the possible inefficiency caused by the wrong assignment of roles" (Foss & Klein, 2012, p. 208) and ultimately the extent to which "destructive proxy-entrepreneurship" (Foss & Klein, 2012, p. 200) occurs. Such a nuanced view of the entrepreneurial division of labor dovetails nicely with Simon's (1976a) insight that decision-makers impose a choice architecture on decision problems, that is, an environment of choice that is both chosen and modifiable, which necessitates acts of judgment. A higher degree of integration mitigates the boundaries of individuals' rationality. Organizational members ought to be positioned within the choice architecture in such a way as to allow their decision-making to align with the organizational goals in the best possible manner. Simon (1979, p. 501) aptly suggested "to divide up the decision-making task among many specialists, [and] coordinating their work by means of a structure of communications and authority relations." It must be noted, however, that goal-related knowledge problems (i.e., unawareness or competition) on the owner's level are likely to be compounded when decision rights are transferred to lower hierarchy levels. If the owning entrepreneur suffers from vague, unclear, or contradictory goals, this issue will be even worse on the proxy-entrepreneur's level. Given that underlying goals impact both the identification of possible options and their evaluation, how is the proxy-entrepreneur supposed to exercise sound causality or appraisal judgments in line with the owner's interests if the ultimate decision-maker has no genuine understanding of the intended ends?

The delegation of judgment need not be limited to the firm's internal sphere. It might well concern its external relations. Firms can be viewed as vehicles to enable a more sophisticated level of specialization and division of labor than would otherwise be available in the market (Bylund, 2011). That does not mean, however, that the best capabilities to exercise delegated judgment are always to be found inside the firm. An economizing delegation of specific types of judgment is thus not necessarily limited to delegating judgment within the firm; it may, in some cases, go beyond its boundaries. If an owner-entrepreneur deems neither herself nor her current employees' capabilities acceptable to form a particular causality judgment in the best possible manner, for instance, (parts of) that judgment can be delegated to external parties, such as market analysts or (other) consulting firms, depending on how the entrepreneur evaluates both the (transaction) costs (Coase, 1937) and potential benefits of doing so. Given their insider experience and knowledge, it is also plausible to delegate judgment externally to former employees who own and run a spin-off of the entrepreneur's own venture, for instance. This is sensible because anyone who could theoretically be hired to manage the firm and exercise delegated judgment internally can also sell labor services via a contractual agreement other than an employment contract and exercise delegated judgment from an external stance;

the difference is not substantive but rather merely one of legal classification. While ultimate judgment, including judgment as to whom to employ, enter into contractual arrangements with, and delegate judgment to, necessarily remains with the owner-entrepreneur, as it is inherently non-contractible, non-tradable, and undelegatable (Foss, 1996; Foss & Klein, 2012; Knight, 1921), derived judgment can be exercised by individuals who are external to the firm. However, that raises the essential question as to whether non-contractibility (Foss, 1996; Foss & Klein, 2012; Knight, 1921) applies to all the manifestations of judgment. If specific judgment facets can be delegated beyond the boundaries of a single firm—which necessitates at least some kind of contractual agreement—can derived judgment be declared inherently non-contractible in the same way as ultimate judgment, or does the distinction between original judgment and delegated judgment, at least if the latter is exercised outside the owner-entrepreneur's firm, also distinguish contractible from non-contractible kinds of judgment? Should we conceive of external parties' judgment as such or simply as guidance or advice rather than genuine derived judgment? We believe these aspects deserve further attention in future research.

In sum, the ultimate decision-maker should coordinate and fine-tune the entrepreneurial division of labor in a way that best matches judgmental necessities with judgmental abilities (Berglund et al., 2020), whether the latter are to be found inside or outside of the firm.

4.3.2 | Judgment communicability

The judgment-based explanation for why entrepreneurs start their own firms is that judgment resides deep in the entrepreneurial mind and is hard—if not impossible—to articulate and communicate (Foss, 1996; Foss & Klein, 2012; Knight, 1921). To execute her vision, an entrepreneur must thus gain control over and experiment with assets complementing her judgment herself. Decomposing entrepreneurial judgment rather than conceiving of it as a unified whole, however, may—in a sense—improve upon its communicability. While the ultimate essence of judgment remains deep within the entrepreneur and is almost impossible to fully articulate (Knight, 1921), decomposing entrepreneurial judgment into the four types outlined in this article at least enables less complex, more structured, focused, and better guided communication about judgment. Suppose that an entrepreneur is seeking external funding from a venture capitalist. It might be more promising for that entrepreneur to explain her vision step-by-step in terms of the different judgment facets rather than as a complex whole. The venture capitalist might experience some unease with specific facets of the entrepreneur's judgment (such as the definition of the available options or the assumptions underlying the imagined outcomes) and try to concretely articulate and resolve the issue(s) with her for mutual benefit. Those issues—while more easily identifiable in a discussion that decomposes judgment—might not be identifiable as such if the entrepreneur tries to communicate her vision and judgment without breaking it down into its components. Failing to do so might result in the venture capitalist denying funding.

4.3.3 | Entrepreneurial success and failure: Judgment or (bad) luck?

Mises (1949) has argued that successful entrepreneurs' view of the past and present resembles that of other people; what differs is their specific anticipatory understanding or their perception of the future—the successful entrepreneur “judges the future in a different way” (p. 582). In this view, entrepreneurial success results from the exercise of superior judgment. Others have argued, however, that entrepreneurial success is largely random and that successful entrepreneurs benefit from persistent luck (Alchian, 1950; Taleb, 2007) rather than good judgment. Foss and Klein (2015, p. 593) opposed that view when locating “judgment [...] between ‘rational’, articulable decision-making and random behavior.” In other words, while judgment certainly differs from formalized decision rules, it is also not merely a different and obscuring label for randomness or luck; rather, it is a specific kind of decision-making residing between those extremes.

Decomposing judgment into distinct types, as this article suggests, aids in better specifying what judgment is and thus how it differs from pure luck. Entrepreneurs do not simply act at random and hope for the best; instead, they explicitly or implicitly address a diverse set of decision problem characteristics utilizing different types of judgment in a relatively structured manner, ultimately aiming for purposeful action. While luck might certainly factor into successful entrepreneurship (Knight, 1921) and occasionally complement good judgment or compensate for bad judgment, it is not the essence of entrepreneurship (Fetter, 1915; McCaffrey, 2016) and cannot explain continuous entrepreneurial success (Giménez Roche & Calcei, 2021).

Hogarth and Karelaia (2012, p. 1734) have identified fallible judgment as a crucial causative factor in entrepreneurial failure and emphasized “the need to understand the role of judgmental fallibility in producing economic outcomes.” Attempts to further explore judgment fallibility and its relationship with entrepreneurial failure may benefit from the dimensionalization of types of judgment developed in this study, as it unveils different judgment facets, all of which hold the potential for flawed judgments. For instance, an entrepreneur might experience failure not because she struggled to pragmatically define her goal and option sets but rather because she did not appraise her options well enough, or vice versa.

The taxonomy of types of judgment developed in this article does more than facilitate a deeper exploration of entrepreneurial failure. Each type can also be viewed as a potential causative factor in entrepreneurial success. A particular entrepreneur might be more successful than others due to superior causality or appraisal judgment but also because she has mastered the ability to define the set of goals underlying her endeavor to a degree that surpasses others.

Decomposing the judgment construct into its components, that is, judgment types, can also shed new light on why entrepreneurs act or fail to act (Wood et al., 2017) and what alters entrepreneurs' judgment over time (Holmes Jr. et al., 2014; Packard et al., 2017). Each of the four judgment types potentially impacts entrepreneurial (in)action. Suppose that two independent entrepreneurs could act on the very same financially desirable option, imagine identical outcomes, and appraise the option in the same way. One of them might decide to act on the option, while the other declines to do so, the underlying cause being that the two differ in terms of the goals motivating their actions. While one entrepreneur may strive for financial profit and thus embrace the financially attractive option, the other might primarily aim at some nonfinancial goal that is unreachable through that option.

How to best utilize available resources is not fully known a priori in real-structured settings. Entrepreneurs must explore it by experimenting with resource bundles and continuously arranging and rearranging heterogeneous human and capital assets (Foss & Klein, 2012; Lachmann, 1956), which entails the exercise of continuous judgment. Peeking into the judgment black box by delineating distinct judgment types offers fresh insights into the reasons entrepreneurs ultimately adjust their actions during their experimental journey. Specifically, they might do so in response to the redefinition of their set of available options, an adjustment in their imagination of the option outcomes, a renewed appraisal of the available options, or an update to their goals.

4.3.4 | Effectuation: Entrepreneurial logic without judgment?

Another important implication of the extended JBA is that it helps resolve the alleged contradiction between the JBA and effectuation (Sarvasathy, 2001, 2008). Sarvasathy and Dew (2013) have fundamentally questioned the notion of entrepreneurial judgment and claimed a contradictory relationship between effectuation and the JBA. “Entrepreneurial judgment,” the authors (p. 292) argue, “is in fact neither necessary nor sufficient for entrepreneurship.” In particular, their criticism builds on the fact that entrepreneurs have limited knowledge and thus suffer from ignorance, pursuing goals that might be unclear, and that human judgment is flawed and evidently “deviate[s] from the rational ideal” (p. 284). Foss and Klein (2015, p. 592) have argued, correctly we believe, that this alleged contradiction “is largely semantic, not substantive.” In a similar fashion, McMullen (2015, p. 675)—addressing this alleged contradiction between effectuation and entrepreneurial judgment—“redefined the judgment dilemma as one of

scope rather than existence.” We agree that Sarasvathy and Dew (2013) are mistaken in their assessment for one reason in particular: They confuse judgment with a mysterious rational ideal where decision-making inevitably involves elaborate planning and extensive prediction.

Effectuation (Sarasvathy, 2001, 2008) depicts entrepreneurship as an incremental, adaptive, short-term, means-oriented, and open-ended process based on affordable loss, in which entrepreneurs build stakeholder networks and utilize contingencies along the way, making it a process that sidesteps well-formulated goals and long-term predictions. Read, Sarasvathy, Dew, and Wiltbank (2017, p. 158, emphasis added) concluded: “Effectuation [...] is in part a mindset, a way of viewing opportunity and uncertainty. But ultimately, it's a *series of actions*.”

Human action in general and entrepreneurial action in particular result from decisions (Packard et al., 2017), whether those are impulse-driven or deliberate (Lerner, Hunt, & Dimov, 2018). While some disagree (e.g., Hunt & Lerner, 2018; Wiklund, 2019), we follow Brown et al. (2018) in arguing that, under conditions of Knightian uncertainty, both types of decisions involve judgment, albeit of different kinds. The specific series of actions summarized under the label *effectuation* is no exception in this regard; each action taken throughout the effectuation process is in itself the immediate outcome of judgmental decision-making. Indeed, Read et al. (2016, p. 531) have emphasized that “[c]onceptually, effectuation is most useful where traditional notions of optimality and bias break down or simply do not apply,” that is, under conditions of real-structuredness necessitating entrepreneurial judgment.

Specifying a particular amount of affordable loss (Read & Sarasvathy, 2005), for instance, necessitates an act of judgment because affordable loss is not the definitive measure it seems to be at first glance (Rapp, 2022), and determining it involves a real-structured problem. It would be misleading to merely look at the funds readily available and not currently earmarked for alternative use. Ultimately, the amount an entrepreneur can afford to lose is a derivative of uncertain future events that may or may not occur (e.g., Arend, Sarooghi, & Burkemper, 2015; Rapp, 2022). Specifying affordable loss is thus inherently uncertain and necessitates judgment; the controllability Dew, Sarasvathy, Read, and Wiltbank (2009) associate with the affordable loss criterion is an illusion. Given that entrepreneurs cannot be certain about the future state of affairs, including the outcomes of their own actions, the decision problem they face features causality at minimum, requiring the application of causality judgment to resolve the real-structured decision problem of determining affordable loss. When deciding on an affordable amount of loss, entrepreneurs might also face additional facets of real-structuredness, for example, in terms of the bounded ability of accurately appraising imagined future states of affairs, which requires the exercise of appraisal judgment.

Forging alliances to build a stakeholder network is no less of a prototypical real-structured decision problem demanding the effectual entrepreneur's or effectuator's judgment than specifying an affordable amount of loss. Sarasvathy and colleagues emphasized that stakeholders willing to embark on an entrepreneurial journey essentially self-select (Read, Sarasvathy, Dew, & Wiltbank, 2016; Read et al., 2017; Sarasvathy, 2008; Sarasvathy, Kumar, York, & Bhagavatula, 2014). Sarasvathy and Dew (2013, p. 289) phrased it as follows: “It is more a process of stakeholders *self-selecting* into the venture rather than entrepreneurs masterminding a chase for the ‘right’ people.” However, it is quite obvious that the effectuator cannot work with any number of stakeholders who unilaterally self-select to contribute to the venture; rather, they must distill the group of potential stakeholders down to a manageable level that offers a potential benefit. Achieving this involves the entrepreneur evaluating candidates' worthiness for cooperation, which necessitates resolving a real-structured problem characterized by several facets of real-structuredness. First, the effectuator is neither aware of all the available (stakeholder) options nor can she know for certain the outcomes the known (stakeholder) options will yield in the future (causality). Moreover, the ability to appraise potential future outcomes is likely to be bounded. How can the effectuator suitably appraise and compare different stakeholder candidates' potential contributions given that they are fundamentally unique in terms of their skill sets, assets, networks, creativity, (industry) experience, financial capabilities, and the like? The decision to select stakeholders can involve weighing unclear or conflicting goals; that is, it can necessitate exercising goal judgment. Entrepreneurs who lack a clear goal—a core assumption of effectuation—also lack a gauge to assist in selecting the most valuable network partners in terms of their potential contribution to the venture. Mises (1949) and others

emphasized that means (here, stakeholders) are only valuable insofar as they have the ability to contribute to attaining a particular goal.

As outlined above, following Mises, we consider entrepreneurial action as rational per se, despite the fact that it occurs in the face of real-structuredness, simply because it—like any other human action—aims to improve the current state of affairs given the underlying ends (Mises, 1949). Since it is unclear what particular path of action contributes the most to such improvement, entrepreneurs attempting to remove their felt uneasiness (Mises, 1949) (need to) apply judgment and eventually make decisions based on the available information and their subjective perception of both the environment and plausible imagined futures. Hence, entrepreneurial judgment in no way presupposes a well-informed, “perfectly” rational actor who is well aware of her underlying goal(s), as Sarasvathy and Dew (2013) have implied. Attributing rationality to real-world human action, that is, action under conditions of real-structuredness, is perfectly plausible, if properly defined. Rational action in this sense merely means that the actor believes the chosen action is the best available way to attain the underlying goal (Packard & Bylund, 2021).

Extending the JBA (which is inextricably linked to Knightian uncertainty) to explicitly cover the concept of real-structuredness (which is inextricably linked to Simonian problem structures) vindicates both Foss and Klein's (2015) and McMullen's (2015) assessment that the JBA and effectuation are *not* irreconcilable. Indeed, Sarasvathy (2001) explicitly linked effectuation to both Knight (1921) and Simon (1959), among others. Entrepreneurial judgment is essential not despite but precisely because of the real-structured nature of the vast majority of entrepreneurial decision problems (similarly, McCaffrey et al. (2021, p. 17) argued that “judgment is a useful concept precisely *because* uncertainty exists throughout the production process and in a variety of different decision-making contexts”) including unclear or conflicting goals, limited information, and the resulting absence of the well-informed, supposedly ideal form of rationality. Essentially, the existence of real-structuredness gives rise to judgmental decision-making. Hence, the contradiction Sarasvathy and Dew (2013) have claimed is artificial. In fact, each action taken in the effectuation process, be it, for example, determining a particular affordable loss or entering into alliances with other stakeholders, is in itself the outcome of a specific entrepreneurial judgment. In that sense, effectuation is not a distinct logic of entrepreneurial action sidestepping judgment; on the contrary, it is simply one of several possible expressions of entrepreneurial judgment (Bylund & Gupta, 2021; Packard et al., 2017). However, Sarasvathy and Dew (2013, p. 292) presented the issue in reverse, concluding that “if such judgment actually does exist, effectual logic can leverage it as well.”

5 | CONCLUSION

This article attempts to contribute to further opening the black box of entrepreneurial judgment by proposing a dimensionalization of types of judgment based on the Simonian notion of decision problem structures. We juxtapose the problem structure typology with existing uncertainty and knowledge problem taxonomies to show that the former goes well beyond the latter; we also identify additional entrepreneurial knowledge problems. Moreover, we label decision problems entrepreneurs typically face as real-structured and illustrate through a processual analysis how entrepreneurs exercise four different types of judgment—namely, causality, appraisal, goal, and solution judgments—culminating in purposeful action. Viewing entrepreneurial judgment as decomposable into subtypes linked to decision problems' structural characteristics has several crucial implications. First, it sheds new light on economic organization by supporting the argument that the delegation of judgment may be limited to *specific* types of judgment while other types remain with the ultimate decision-maker. It thus paves the way for a more nuanced understanding of judgment delegation and the entrepreneurial division of labor. Second, while judgment remains hard to articulate, decomposing it improves its communicability. Specifically, decomposition reduces the complexity and allows for more structured, focused, and better guided communication about judgment, which helps, for instance, in negotiations with venture capitalists. Third, it aids in better distinguishing judgment from pure luck and informs research on entrepreneurial success and failure by revealing particular types of judgment, which are potential sources of fallibility or profits. Fourth, explicitly integrating real-structuredness into the JBA reveals that effectuation

represents one of a variety of forms of entrepreneurial judgment. It thus helps resolve effectuation theorists' claim of a (pseudo-)contradiction between effectuation and judgment.

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REFERENCES

- Adam, D. (1983). Planung in schlechtstrukturierten Entscheidungssituationen mit Hilfe heuristischer Vorgehensweisen. *Betriebswirtschaftliche Forschung und Praxis*, 35(6), 484–494.
- Adam, D. (1996). Planung und Entscheidung. Wiesbaden: Gabler.
- Adam, D., & Witte, T. (1979). Merkmale der Planung in gut- und schlechtstrukturierten Planungssituationen. *Das Wirtschaftsstudium*, 8(8), 380–386.
- Alchian, A. A. (1950). Uncertainty, evolution, and economic theory. *Journal of Political Economy*, 58(3), 211–221.
- Arend, R. J., Sarooghi, H., & Burkemper, A. (2015). Effectuation as ineffectual? Applying the 3E theory-assessment framework to a proposed new theory of entrepreneurship. *Academy of Management Review*, 40(4), 630–651.
- Ariely, E. (2009). Predictably irrational: The hidden forces that shape our decisions. New York, NY: Harper Collins.
- Baer, M., Dirks, K. T., & Nickerson, J. A. (2013). Microfoundations of strategic problem formulation. *Strategic Management Journal*, 34(2), 197–214.
- Beckert, J., & Bronk, R. (2018). An introduction to *uncertain futures*. In J. Beckert & R. Bronk (Eds.), *Uncertain futures* (pp. 1–36). Oxford: Oxford University Press.
- Berglund, H., Bousfiha, M., & Mansoori, Y. (2020). Opportunities as artifacts and entrepreneurship as design. *Academy of Management Review*, 45(4), 825–846.
- Brösel, G., Matschke, M. J., & Olbrich, M. (2012). Valuation of entrepreneurial businesses. *International Journal of Entrepreneurial Venturing*, 4(3), 239–256.
- Brown, L., Packard, M. D., & Bylund, P. (2018). Judgment, fast and slow: Toward a judgment view of entrepreneurs' impulsivity. *Journal of Business Venturing Insights*, 10(November), e00095.
- Busenitz, L. W., & Barney, J. B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing*, 12(1), 9–30.
- Bylund, P. L. (2011). The division of labor and the firm: An Austrian attempt at explaining the firm in the market. *Quarterly Journal of Austrian Economics*, 14(2), 25–52.
- Bylund, P. L., & Gupta, V. K. (2021). *Effectuation and the logic of action: A critical assessment from a praxeological perspective* (Working Paper). Oklahoma State University, The University of Alabama.
- Bylund, P. L., & Manish, G. P. (2016). The Mises-Knight theory of uncertainty and its implications for entrepreneurship, equilibrium, and the theory of the firm. In L. Fiorito, S. Scheall, & C. E. Suprinyak (Eds.), *Including a symposium on Albert O. Hirschman* (pp. 305–336). Bingley: Emerald.
- Bylund, P. L., & McCaffrey, M. (2017). A theory of entrepreneurship and institutional uncertainty. *Journal of Business Venturing*, 32(5), 461–475.
- Bylund, P. L., & Packard, M. D. (2022). Subjective value in entrepreneurship. *Small Business Economics*, 58(3), 1243–1260.
- Cantillon, R. (1755). In H. Higgs (Ed.), *Essai sur la nature du commerce en general*. London: Macmillan (1931).
- Casson, M. (1982). *The entrepreneur. An economic theory*. Totowa, NJ: Barnes & Noble Books.
- Coase, R. H. (1937). The nature of the firm. *Economica*, 4(16), 386–405.
- Cope, J. (2011). Entrepreneurial learning from failure: An interpretative phenomenological analysis. *Journal of Business Venturing*, 26(6), 604–623.
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York, NY: HarperCollins.
- Dean, J. (1951). *Capital budgeting*. New York, NY: Columbia University Press.
- Demsetz, H. (1969). Information and efficiency: Another viewpoint. *The Journal of Law and Economics*, 12(1), 1–22.
- Dequech, D. (2011). Uncertainty: A typology and refinements of existing concepts. *Journal of Economic Issues*, 45(3), 621–640.
- Dew, N., Sarasvathy, S., Read, S., & Wiltbank, R. (2009). Affordable loss: Behavioral economic aspects of the plunge decision. *Strategic Entrepreneurship Journal*, 3(2), 105–126.

- Dimov, D. (2016). Toward a design science of entrepreneurship. In J. A. Katz & A. C. Corbett (Eds.), *Models of start-up thinking and action: Theoretical, empirical and pedagogical approaches* (pp. 1–31). Bingley: Emerald Group Publishing.
- Dimov, D. (2018). Uncertainty under entrepreneurship. In A. Fayolle, S. Ramoglou, M. Karatas-Ozkan, & K. Nicolopolou (Eds.), *Philosophical reflexivity and entrepreneurship research* (pp. 184–196). London: Routledge.
- Dosi, G., & Egidi, M. (1991). Substantive and procedural uncertainty. *Journal of Evolutionary Economics*, 1(2), 145–168.
- Fetter, F. A. (1915). *Economic principles*. New York, NY: The Century Co.
- Folta, T. B. (2007). Uncertainty rules the day. *Strategic Entrepreneurship Journal*, 1(1–2), 97–99.
- Forrester, D. A. R. (1977). *Schmalenbach and after: A study of the evolution of German business economics*. Glasgow: Strathclyde Convergencies.
- Foss, K., & Foss, N. J. (2006). Simon on problem solving: Implications for new organizational forms. *International Journal of Learning and Intellectual Capital*, 3(4), 339–356.
- Foss, K., Foss, N. J., & Klein, P. G. (2007). Original and derived judgment: An entrepreneurial theory of economic organization. *Organization Studies*, 28(6), 1–20.
- Foss, N. J. (1996). The “alternative” theories of Knight and Coase, and the modern theory of the firm. *Journal of the History of Economic Thought*, 18(1), 76–95.
- Foss, N. J., & Klein, P. G. (2005). Entrepreneurship and the economic theory of the firm: Any gains from trade? In S. Alvarez, R. Agarwal, & O. Sorensen (Eds.), *Handbook of entrepreneurship research: Disciplinary perspectives* (pp. 55–80). New York, NY: Springer.
- Foss, N. J., & Klein, P. G. (2012). *Organizing entrepreneurial judgment*. Cambridge: Cambridge University Press.
- Foss, N. J., & Klein, P. G. (2015). Introduction to a forum on the judgment-based approach to entrepreneurship: Accomplishments, challenges, new directions. *Journal of Institutional Economics*, 11(3), 1–15.
- Foss, N. J., & Klein, P. G. (2020). Entrepreneurial opportunities: Who needs them? *Academy of Management Perspectives*, 34(3), 366–377.
- Foss, N. J., Klein, P. G., & Bjørnskov, C. (2019). The context of entrepreneurial judgment: Organizations, markets, and institutions. *Journal of Management Studies*, 56(6), 1197–1213.
- Foss, N. J., Klein, P. G., & McCaffrey, M. (2019). *Austrian perspectives on entrepreneurship, strategy, and organization*. Cambridge: Cambridge University Press.
- Foss, N. J., Klein, P. G., & Murtinu, S. (2019). *Entrepreneurial finance under Knightian uncertainty* (Working Paper). Bocconi University, Baylor University, University of Groningen.
- Gartner, W. B. (2007). Entrepreneurial narrative and a science of the imagination. *Journal of Business Venturing*, 22(5), 613–627.
- Garud, R., & Van de Ven, A. (1992). An empirical evaluation of the internal corporate venturing process. *Strategic Management Journal*, 13(S1), 93–109.
- Gigerenzer, G. (2008). Why heuristics work. *Perspectives on Psychological Science*, 3(1), 20–29.
- Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic decision making. *Annual Review of Psychology*, 62(1), 451–482.
- Giménez Roche, G., & Calcei, D. (2021). The role of demand routines in entrepreneurial judgment. *Small Business Economics*, 65(1), 209–235.
- Godley, A. C., & Casson, M. C. (2014). ‘Doctor, Doctor...’ Entrepreneurial diagnosis and market making. *Journal of Institutional Economics*, 11(3), 601–621.
- Hallberg, N. L. (2015). Uncertainty, judgment, and the theory of the firm. *Journal of Institutional Economics*, 11(3), 623–650.
- Hansson, S. O. (1994). *Decision theory*. Stockholm: Royal Institute of Technology.
- Herbener, J. M., & Rapp, D. J. (2016). Toward a subjective approach to investment appraisal in light of Austrian value theory. *Quarterly Journal of Austrian Economics*, 19(1), 3–28.
- Hering, T. (2000). Das allgemeine Zustands-Grenzpreismodell zur Bewertung von Unternehmen und anderen unsicheren Zahlungsströmen. *Die Betriebswirtschaft*, 60(3), 362–378.
- Hering, T. (2010). Produktionsprogrammplanung bei eindeutigem Engpaß und Dilemma der wertmäßigen Kosten. In R. Rollberg, T. Hering, & H. Burchert (Eds.), *Produktionswirtschaft* (2nd ed., pp. 18–26). Munich: Oldenbourg.
- Hering, T. (2021). *Unternehmensbewertung* (4th ed.). Munich: De Gruyter Oldenbourg.
- Hering, T., Olbrich, M., & Rapp, D. J. (2021). Net present value, duration, and CAPM in light of investment theory: A comment on Kruk. *Quarterly Journal of Austrian Economics*, 24(2), 348–359.
- Hertz, D. B. (1964). Risk analysis in capital investment. *Harvard Business Review*, 42(1), 95–106.
- Hoffman, F. O., & Hammonds, J. S. (1994). Propagation of uncertainty in risk assessments: The need to distinguish between uncertainty due to lack of knowledge and uncertainty due to variability. *Risk Analysis*, 14(5), 707–712.
- Hogarth, R. M., & Karelaia, N. (2012). Entrepreneurial success and failure: Confidence and fallible judgment. *Organization Science*, 23(6), 1733–1747.
- Holmes, R. M., Jr., Holcomb, T. R., Klein, P. G., & Ireland, R. D. (2014). A judgmental decision-making approach to entrepreneurship: Toward a behavioral model. *Academy of Management Annual Meeting Proceedings*, 2014(1), 15844.

- Hunt, R. A., & Lerner, D. A. (2018). Entrepreneurial action as human action: Sometimes judgment-driven, sometimes not. *Journal of Business Venturing Insights*, 10(November), e00102.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–291.
- Kahneman, D., & Tversky, A. (1982). Variants of uncertainty. *Cognition*, 11(2), 143–157.
- Klein, P. G. (2008). Opportunity discovery, entrepreneurial action, and economic organization. *Strategic Entrepreneurship Journal*, 2(3), 175–190.
- Klein, P. G., Barney, J. B., & Foss, N. (2013). Strategic entrepreneurship. In E. H. Kessler (Ed.), *Encyclopedia of management theory* (pp. 778–782). Thousand Oaks, CA: Sage Publications.
- Klein, P. G., & Bylund, P. (2014). The place of Austrian economics in contemporary entrepreneurship research. *Review of Austrian Economics*, 27(3), 259–279.
- Klein, P. G., & Foss, N. J. (2008). The unit of analysis in entrepreneurship research: Opportunities or investments? *International Journal of Entrepreneurship Education*, 6(3), 145–170.
- Klein, P. G., & Klein, S. K. (2001). Do entrepreneurs make predictable mistakes? Evidence from corporate divestitures. *Quarterly Journal of Austrian Economics*, 4(2), 3–23.
- Knight, F. H. (1921). *Risk, uncertainty, and profit*. Boston, MA: Houghton Mifflin Co.
- Kuechle, G., Boulu-Reshef, B., & Carr, S. (2016). Prediction- and control-based strategies in entrepreneurship. *Strategic Entrepreneurship Journal*, 10(1), 43–64.
- Lachmann, L. M. (1956). *Capital and its structure*. Kansas City, MO: Sheed Andrews and McMeel.
- Lachmann, L. M. (1976). From Mises to Shackle: An essay on Austrian economics and the kaleidic society. *Journal of Economic Literature*, 14(1), 54–62.
- Lerner, D. A., Hunt, R. A., & Dimov, D. (2018). Action! Moving beyond the intendedly-rational logics of entrepreneurship. *Journal of Business Venturing*, 33(1), 52–69.
- Macher, J. T. (2006). Technological development and the boundaries of the firm: A knowledge-based examination in semiconductor manufacturing. *Management Science*, 52(6), 826–843.
- Maitland, E., & Sammartino, A. (2015). Decision making and uncertainty: The role of heuristics and experience in assessing a politically hazardous environment. *Strategic Management Journal*, 36(10), 1554–1578.
- Manimala, M. J. (1992). Entrepreneurial heuristics: A comparison between high PI (pioneering-innovative) and low PI ventures. *Journal of Business Venturing*, 7(6), 477–504.
- March, J. G., & Simon, H. A. (1958). *Organizations*. New York, NY: John Wiley & Sons.
- McCaffrey, M. (2013). Book review: ‘Organizing entrepreneurial judgment: A new approach to the firm,’ by Nicolai J. Foss and Peter G. Klein. *Organization Studies*, 34(7), 1007f–1011f.
- McCaffrey, M. (2016). Good judgment, good luck: Frank Fetter’s neglected theory of entrepreneurship. *Review of Political Economy*, 28(4), 1–19.
- McCaffrey, M., Foss, N. J., Klein, P. G., & Salerno, J. T. (2021). Breaking out of the Kirznerian box: A reply to Sautet. *Review of Austrian Economics*. <https://doi.org/10.1007/s11138-021-00552-x>
- McGrath, R. G. (1999). Falling forward: Real options reasoning and entrepreneurial failure. *Academy of Management Review*, 24(1), 13–30.
- McKelvie, A., Haynie, J. M., & Gustavsson, V. (2011). Unpacking the uncertainty construct: Implications for entrepreneurship action. *Journal of Business Venturing*, 26(3), 273–292.
- McMullen, J. S. (2015). Entrepreneurial judgment as empathic accuracy: A sequential decision-making approach to entrepreneurial action. *Journal of Institutional Economics*, 11(3), 651–681.
- McMullen, J. S., & Dimov, D. (2013). Time and the entrepreneurial journey: The problems and promise of studying entrepreneurship as a process. *Journal of Management Studies*, 50(8), 1481–1512.
- McMullen, J. S., & Shepherd, D. A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31(1), 132–152.
- Miller, K. D. (2007). Risk and rationality in entrepreneurial processes. *Strategic Entrepreneurship Journal*, 1(1–2), 57–74.
- Milliken, F. J. (1987). Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *Academy of Management Review*, 12(1), 133–143.
- Mises, L. (1942). Social science and natural science. *Journal of Social Philosophy & Jurisprudence*, 7(3), 240–253.
- Mises, L. (1949). *Human action*. New Haven, CT: Yale University Press.
- Mitchell, J. R., Mitchell, R. K., Hunt, R. A., Townsend, D. M., & Lee, J. H. (2022). Stakeholder engagement, knowledge problems and ethical challenges. *Journal of Business Ethics*, 175(1), 75–94.
- Mousavi, S., & Gigerenzer, G. (2014). Risk, uncertainty, and heuristics. *Journal of Business Research*, 67(8), 1671–1678.
- Neessen, P. C. M., Caniëls, M. C. J., Vos, B., & de Jong, J. P. (2019). The intrapreneurial employee: Toward an integrated model of intrapreneurship and research agenda. *International Entrepreneurship and Management Journal*, 15(2), 545–571.
- Newell, A. (1969). Heuristic programming: Ill-structured problems. In J. Aronofsky (Ed.), *Progress in operations research* (Vol. 3, pp. 360–414). New York, NY: Wiley.

- Nickerson, J., Yen, J., & Mahoney, J. T. (2012). Exploring the problem-finding and problem-solving approach for designing organizations. *Academy of Management Perspectives*, 26(1), 52–72.
- Olbrich, M., Quill, T., & Rapp, D. J. (2015). Business valuation inspired by the Austrian school. *Journal of Business Valuation and Economic Loss Analysis*, 10(1), 1–43.
- Olbrich, M., Rapp, D. J., & Follert, F. (2020). Eugen Schmalenbach, Austrian economics, and German business economics. *Review of Austrian Economics*. <https://doi.org/10.1007/s11138-020-00520-x>
- Packard, M. D., & Bylund, P. L. (2021). From homo economicus to homo agens: Toward a subjective rationality for entrepreneurship. *Journal of Business Venturing*, 36(6), 106159.
- Packard, M. D., & Clark, B. B. (2020a). Probability logic fails in immitigable uncertainty, but strategic logic does not. *Academy of Management Review*, 45(3), 704–707.
- Packard, M. D., & Clark, B. B. (2020b). On the mitigability of uncertainty and the choice between predictive and non-predictive strategy. *Academy of Management Review*, 45(4), 766–786.
- Packard, M. D., & Clark, B. B. (2020c). Mitigating versus managing epistemic and aleatory uncertainty. *Academy of Management Review*, 45(4), 872–876.
- Packard, M. D., Clark, B. B., & Klein, P. G. (2017). Uncertainty types and transitions in the entrepreneurial process. *Organization Science*, 28(5), 840–856.
- Rapp, D. J. (2022). Predictive vs. non-predictive entrepreneurial strategies: What's the difference, anyway? *Review of Managerial Science*. <https://doi.org/10.1007/s11846-022-00519-7>
- Rapp, D. J., Haßlinger, M., & Olbrich, M. (2018). Investments as key entrepreneurial action: The case of financially distressed target companies. *International Journal of Entrepreneurial Venturing*, 10(5), 558–580.
- Rapp, D. J., & Olbrich, M. (2020). On entrepreneurial decision logics under conditions of uncertainty: An attempt to advance the current debate. *Journal of Innovation and Entrepreneurship*, 9, 21.
- Rapp, D. J., & Olbrich, M. (2021). On predictive entrepreneurial action in uncertain, ill-structured conditions. *Review of Managerial Science*, 15(7), 1961–1979.
- Read, S., & Sarasvathy, S. D. (2005). Knowing what to do and doing what you know: Effectuation as a form of entrepreneurial expertise. *The Journal of Private Equity*, 9(1), 45–62.
- Read, S., Sarasvathy, S. D., Dew, N., & Wiltbank, R. (2016). Response to Arend, Sarooghi, and Burkemper (2015): Cocreating effectual entrepreneurship research. *Academy of Management Review*, 41(3), 528–536.
- Read, S., Sarasvathy, S. D., Dew, N., & Wiltbank, R. (2017). Effectual entrepreneurship (2nd ed.). London: Routledge.
- Reitman, W. R. (1964). Heuristic decision procedures, open constraints, and the structure of ill-defined problems. In M. W. Shelley & G. L. Bryan (Eds.), *Human judgments and optimality* (pp. 282–315). New York, NY: Wiley.
- Rothbard, M. N. (1962). *Man, Economy, and State*. Princeton, NJ: Van Nostrand Company with the William Volker Fund.
- Salerno, J. T. (2008). The entrepreneur: Real and imagined. *Quarterly Journal of Austrian Economics*, 11(3–4), 188–207.
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2), 243–263.
- Sarasvathy, S. D. (2008). Effectuation. Elements of entrepreneurial expertise. Cheltenham: Edward Elgar.
- Sarasvathy, S. D., & Dew, N. (2005). New market creation through transformation. *Journal of Evolutionary Economics*, 15(5), 533–565.
- Sarasvathy, S. D., & Dew, N. (2013). Without judgment: An empirically-based entrepreneurial theory of the firm. *Review of Austrian Economics*, 26(3), 277–296.
- Sarasvathy, S. D., Kumar, K., York, J. G., & Bhagavatula, S. (2014). An effectual approach to international entrepreneurship: overlaps, challenges, and provocative possibilities. *Entrepreneurship Theory and Practice*, 38(1), 71–93.
- Savage, L. J. (1954). *Foundations of statistics*. Oxford: Wiley.
- Schmalenbach, E. (1909). Über Verrechnungspreise. Rede zum Geburtstag des Deutschen Kaisers am 27. Januar 1909 in der Aula der Handelshochschule zu Köln. *Zeitschrift für handelswissenschaftliche Forschung*, 3(3), 165–185.
- Schmalenbach, E. (1947). *Pretiale Wirtschaftslenkung* (Vol. 1). Bremen: Industrie- und Handelsverlag Walter Dorn.
- Schmalenbach, E. (1949). *Pretiale Wirtschaftslenkung* (Vol. 2). Bremen: Industrie- und Handelsverlag Walter Dorn.
- Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217–226.
- Shepherd, D. A., Williams, T. A., & Patzelt, H. (2015). Thinking about entrepreneurial decision making: Review and research agenda. *Journal of Management*, 41(1), 11–46.
- Sieben, G., & Diedrich, R. (1990). Aspekte der Wertfindung bei strategisch motivierten Unternehmensakquisitionen. *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung*, 42(9), 794–809.
- Simon, H. A. (1959). Theories of decision-making in economics and behavioral science. *American Economic Review*, 49(3), 253–283.
- Simon, H. A. (1962). The architecture of complexity. *Proceedings of the American Philosophical Society*, 106(6), 467–482.
- Simon, H. A. (1973). The structure of ill structured problems. *Artificial Intelligence*, 4(3–4), 181–201.
- Simon, H. A. (1976a). *Administrative behavior* (3rd ed.). New York, NY: The Free Press.

- Simon, H. A. (1976b). From substantive to procedural rationality. In T. J. Kastelein, S. K. Kuipers, W. A. Nijenhuis, & G. R. Wagenaar (Eds.), *25 years of economic theory* (pp. 65–86). Boston, MA: Springer.
- Simon, H. A. (1979). Rational decision making in business organizations. *American Economic Review*, *69*(4), 493–513.
- Simon, H. A. (1986). Rationality in psychology and economics. *The Journal of Business*, *59*(4), S209–S224.
- Simon, H. A. (1996). *The sciences of the artificial* (3rd ed.). Cambridge, MA: MIT Press.
- Simon, H. A., & Newell, A. (1958). Heuristic problem solving: The next advance in operations research. *Operations Research*, *6*(1), 1–10.
- Taleb, N. N. (2007). *The black swan: The impact of the highly improbable*. New York, NY: Random House.
- Toll, C., & Kintzel, O. (2019). A nonlinear state marginal price vector model for the task of business valuation. A case study: The dimensioning of IT-service companies under nonlinear synergy effects. *Central European Journal of Operations Research*, *26*(4), 1079–1105.
- Townsend, D. M., & Hunt, R. A. (2019). Entrepreneurial action, creativity, and judgment in the age of artificial intelligence. *Journal of Business Venturing Insights*, *11*, e00126.
- Townsend, D. M., Hunt, R. A., McMullen, J. S., & Sarasvathy, S. D. (2018). Uncertainty, knowledge problems, and entrepreneurial action. *Academy of Management Annals*, *12*(2), 659–687.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*(4157), 1124–1131.
- von Böhm-Bawerk, E. (2005). *Basic principles of economic value*. Grove City, PA: Libertarian Press.
- von Neumann, J., & Morgenstern, O. (1944). *Theory of games and economic behavior*. Princeton, NJ: Princeton University Press.
- von Wieser, F. (1893). *Natural value*. London: Macmillan and Company.
- von Wieser, F. (1927). *Social economics* (2nd ed.). New York, NY: Adelphi Company.
- Wiklund, J. (2019). Entrepreneurial impulsivity is not rational judgment. *Journal of Business Venturing Insights*, *11*(June), e00105.
- Wilson, C. Z., & Alexis, M. (1962). Basic frameworks for decisions. *Journal of the Academy of Management*, *5*(2), 150–164.
- Witte, T. (1979). *Heuristisches Planen, Vorgehensweisen zur Strukturierung betrieblicher Planungsprobleme*. Wiesbaden: Gabler.
- Wood, M. S., Williams, D. W., & Drover, W. (2017). Past as prologue: Entrepreneurial inaction decisions and subsequent action judgments. *Journal of Business Venturing*, *32*(1), 107–127.
- Wu, B., & Knott, A. M. (2006). Entrepreneurial risk and market entry. *Management Science*, *52*(9), 1315–1330.
- York, J. G., & Venkataraman, S. (2010). The entrepreneur–environment nexus: Uncertainty, innovation, and allocation. *Journal of Business Venturing*, *25*(5), 449–463.

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