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DIALOGUE

ARTIFICIAL INTELLIGENCE FORCES US TO RETHINK KNIGHTIAN UNCERTAINTY: A COMMENTARY ON TOWNSEND ET AL.'S "ARE THE FUTURES COMPUTABLE?"

Recent technological advances have triggered unbridled enthusiasm about artificial intelligence (AI) systems. Townsend, Hunt, Rady, Manocha, and Jin (2024) resist joining the bandwagon. They draw on Frank Knight's (1921) theory of uncertainty to afford a rigorous examination of the predictive limits of AI. Knight's (1921) theory emphasizes the "inability of entrepreneurs to determine what will be possible" (Townsend et al., 2024: 22). Townsend and colleagues competently extend the Knightian critique to argue that "AI systems are *still* subject to the problems of Knightian uncertainty" (p. 18), "no matter how sophisticated these systems might become" (p. 19).

We do not dispute Townsend et al.'s (2024) skepticism about the ability of sophisticated systems to *eventually* know what will be possible. For we more fundamentally question the Knightian premise that entrepreneurs do *not already* know possibilities. We argue that this kind of knowledge existed before the advent of AI technologies. AI systems now only *augment* entrepreneurs' epistemic abilities, by facilitating a better overview of the possibility space. Alas, the legitimacy of possibility-knowledge has yet to be recognized, largely due to limited clarity on the knowledge problems of entrepreneurship. Thankfully, Townsend et al. (2024) considerably enhance conceptual clarity by grounding the analysis of knowledge problems on a *possibility*-based way of thinking about entrepreneurial opportunities (Ramoglou & McMullen, 2024). Yet, in so doing, they do not demonstrate the limitations of AI systems as much as they demonstrate the limitations of Knightian theory, and the concomitant need to rethink knowledge problems afresh.

TWO TYPES OF KNOWLEDGE PROBLEMS

The study of the knowledge problems of entrepreneurship typically unfolds along the lines of traditional epistemological skepticism (Townsend, Hunt, McMullen & Sarasvathy, 2018). Questions about the possibility of knowing the future largely rest on inductive skepticism (Hume [1748] 1993): What we know is the past, but since the future will not resemble the past, we cannot know the future. We agree that certain *events*—such as whether new entrepreneurial ventures will be profitable—are *ex ante* unknowable. However, we disagree with the Knightian implication that this is tantamount to "an entrepreneur's inability to know if something is *possible* or *impossible*" (Townsend et al., 2024: 11).

To understand why, we ought to draw a crucial distinction between two interrelated types of knowledge problems: knowledge of what *will* happen, vis-à-vis knowledge of what *can* happen. The former is more demanding because it presupposes knowledge of the latter and further requires knowledge of additional elements of a complex decision environment. Entrepreneur X may know that it is possible to generate profits Y by selling Z. But this is very different from knowing that the future will find X enjoying Y having sold Z. For even if one *knows* that all the critical ingredients for success do exist (Ramoglou, 2021) and *impeccably* executes the business project, there are always "unknown unknowns" (Feduzi, Faulkner, Runde, Cabantous & Loch, 2022) that may prevent the materialization of otherwise possible profits. Townsend et al. (2024: 19) are therefore correct to stress "the paradoxical limits on predicting future environments outlined in Knightian theory." However, the fact that we cannot know whether possibilities will *unavoidably* actualize does not entail that we cannot have knowledge of them. An earthquake could prevent the act of "grabbing a cup of tea." But we still know that we *can* (generally) do so.

Although Knight's (1921) epistemological skepticism directs attention to the problem of knowing the future, it inadvertently collapses into skepticism about the knowledge of possibilities (discussed as "profit opportunities" in his treatise). Having disentangled *event* uncertainty from *possibility* uncertainty, we can acknowledge that not knowing what will happen does not mean that what *can* happen must also be unknowable. As importantly, we can start appreciating that the knowledge of possibilities *is* possible—even when the knowledge of probabilities is impossible.

Accepted by Sebastian Raisch

THE KNOWABILITY OF POSSIBILITIES

Whenever entrepreneurs decide to act, they act on the belief that there exists an opportunity that *they* can actualize (McMullen & Shepherd, 2006; Ramoglou & McMullen, 2024). In other words, the choice to exercise entrepreneurial agency *de facto* means that entrepreneurs work on a set of beliefs about the existence of the conditions making what they imagine nonimaginary—"a theory of the possible" (see also Felin, Gambardella, Novelli & Zenger, 2023).

In the Knightian framework, such theories do not merit the status of knowledge without quantifiable probabilities. However, the theory of knowledge has made great strides since the publication of Knight's (1921) treatise more than a century ago. Contemporary epistemology permits the accordance of knowledge status to possibility claims—regardless of whether these can be measured or empirically tested (even in principle) (e.g., Williamson, 2013). This is not to say that possibility beliefs invariably qualify as knowledge. However, entrepreneurs often have good reasons to hold tight to theories of the possible. They are not in the dark, even in the absence of calculable probabilities.

Note, in this regard, that much of logic-based AI theory is erected on common-sense epistemologies that question the importance of probabilistic reasoning for the development of sound judgments (McCarthy, 1986). Moreover, theorists of knowledge often remark that humans do develop justifiable knowledge of what can happen through their engagement with the world, and without the guidance of probabilities (e.g., LeCun, 2022; Scheffler, 1991). It is only our commitment to restrictive epistemologies that sustains overstated conceptions of uncertainty.

MOVING FORWARD

Moving forward, we ought to retain the Knightian insight about the impossibility of knowing whether the world-states desired by entrepreneurs *will* actualize—"no matter how sophisticated [AI] systems might become" (Townsend et al., 2024: 19). Yet, having conceded the plausibility of possibility knowledge in otherwise unknowable futures, we may revisit Townsend et al.'s (2024: 11) pessimism about the role of AI in helping entrepreneurs "know if something is possible." Our analysis suggests that what is truly limited is not AI systems, but the Knightian lenses through which we conventionally think about possibilities. Entrepreneurs have never been epistemically helpless, and AI systems only help augment their epistemic powers.

In this vein, organizational researchers have already examined how the use of predictive and generative AI systems can enhance organizations' ability to create possibility knowledge (Lebovitz, Lifshitz-Assaf & Levina, 2022; Raisch & Fomina, 2024; Raisch & Krakowski, 2021; Shrestha, Ben Menahem, & Von Krogh, 2019). Entrepreneurship researchers have also started paying attention to the various ways in which entrepreneurs may best collaborate with such systems (Chalmers, MacKenzie & Carter, 2021; Shepherd & Majchrzak, 2022), and future research can more squarely focus on the types of tasks and knowledge problems for which different AI systems could be most reliably employed. For example, predictive AI is particularly adept at spotting new possibilities that may not be readily identifiable by human observers. Consider how such systems can help spot the emergence of opportunities from trends in consumer behavior—for instance, the opportunity to boost sales via the development of eco-friendly products after noticing an increasing interest in sustainability. In turn, generative AI systems can readily generate candidate eco-friendly products with specific characteristics, thus alerting entrepreneurs to previously unimagined possibility spaces as to what they—or competitors—may conceivably offer.

Moreover, our analysis makes us more optimistic than Townsend et al. (2024: 8) about the promise of AI in yielding probabilistic knowledge that can help evaluate opportunity-beliefs. As explained, uncertainty about what will happen does not rule out possibility knowledge, and it is dogmatic to deny that components of this knowledge can be susceptible to quantification. In this respect, predictive AI could aid entrepreneurs in transforming problems that previously belonged to the domain of the unknowable into problems of probability. In fact, we can grant that probabilistic knowledge—even for entirely new products—may now be within the reach of most entrepreneurs. Consider, in this respect, how researchers in pharmaceutical industries can now assess the predicted performance of nonactual but possible drugs, thus providing probabilistic insights into such drugs' market potential (Raisch & Fomina, 2024).[1] To be clear, this is *not* to say that, valuable as it may well be, meaningful quantification is *always* possible or useful,

[1] To be sure, while this could inform the probability of market acceptance, the much more complex problem of calculating eventual venture success remains formidable (Raisch & Fomina, 2024; Ramoglou, 2021), and the question of knowing whether success *will* follow is, still, unanswerable.

let alone necessary. But that is precisely our point: We ought to make room for knowledge that is not certain but is knowledge nevertheless, as well as acknowledge that there are various paths to knowing—quantitative reasoning offering only one.

In effect, AI advances not only boost entrepreneurs' ability to know what can happen; they also help us question some of our most cherished theories. Thankfully, Townsend et al.'s (2024) important contribution forces us to rethink the knowledge problems of entrepreneurship along more nuanced and productive modes of analysis—free from the Knightian straightjacket.

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