

## RESEARCH ARTICLE



# Are Entrepreneurs Probabilists or Possibilists? Observing Opportunity as Possibilities, Probabilistically

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**Abstract:** This paper explores uncertainty, possibility, and entrepreneurial inclination in entrepreneurship. It presents a novel probabilistic lens to comprehend uncertainty and its impact on entrepreneurial theory and practice, highlighted through analyzing decision-making behavior via the Monty Hall problem. The deterministic perspective is called into question when entrepreneurship is depicted as an agent whose outcomes are indeterminate and probabilistically predetermined. Entrepreneurs effectively handle risk and uncertainty, venturing into uncharted territories to attain possible benefits. The research distinguishes between probabilists, who base their decision-making on likelihoods, and possibilists, who investigate the attainable through imaginative potential. This possibilist approach incorporates concepts of contingency and potential, recognizing both the potential outcomes and the associated dangers, making a valuable contribution to practical application. Theoretically, this paper contributes to the entrepreneurship literature by offering the Many-Doors model as a tool for understanding the complex interplay between an individual's inclination toward probability or possibility and their entrepreneurial decisions. This conceptual model functions as a link integrating elements of risk, uncertainty, and strategic choice, thereby broadening the theoretical frameworks used to analyze entrepreneurial behavior, potentially resulting in a more holistic understanding of entrepreneurial dynamics.

**Keywords:** entrepreneurship, probability, possibility, propensity, Monty Hall problem, entrepreneurial action

## 1. Introduction

Are entrepreneurs probabilists or possibilists? In the face of uncertainty, foreknowledge and prediction are elusive to entrepreneurship. Uncertainty, ambiguity, fuzziness, and foggy feature prominently in the entrepreneurial process throughout the stages [1, 2]. Yet, despite the indeterminism, entrepreneurs are motivated to action. For a probabilist, the likelihood of occurrences suffices as a foundation for belief and action. The possibilist holds the view that the thinkable and imaginable are possible [3]. The notions of contingency, possibility, or impossibility and possible worlds are in Wittgenstein's [3] early theorization. These notions hinge on possibilism first and weigh on the probabilistic occurrence of these possibilities and the entrepreneurs' tolerance of the consequences of Dew et al.'s [4] "affordable loss," particularly failures in ventures. Possibilism in entrepreneurship is closely aligned with Sarasvathy's [5] effectuation theory, which posits that entrepreneurs often start with what they have and select amongst possible outcomes rather than targeting a predefined goal. Effectuation theory emphasizes the role of entrepreneurial agency within a context characterized by uncertain futures. It posits that entrepreneurs utilize their existing resources to generate novel possibilities and markets, aligning with the fundamental principles of possibilism [6].

This intrinsically adaptable strategy prioritizes the emergence of numerous endpoints rather than a single, predetermined pathway. Possibilism is the foundation for effectuation theory, which advocates for adaptability and creative utilization of resources in uncertain circumstances [7].

In contrast, probabilism is associated with predictive methods in entrepreneurship, namely through risk analysis. This approach emphasizes examining and extrapolating data to anticipate future outcomes [8]. Predictive strategies presuppose a deterministic perspective on future events and are organized using methodical analysis and probabilistic models in decision-making [9]. Probabilism facilitates these methodologies by offering a conceptual structure in which choices are made by considering the computed probabilities of probable outcomes, thus enhancing the efficiency of planning and allocation of resources in contexts characterized by uncertainty [10].

The ongoing debate centers on the range of entrepreneurial actions that are relevant and accessible to entrepreneurs as they contemplate possibilities and take action. It raises the question of what motivates entrepreneurs to embark on these venturesome paths despite their inherent uncertainties. "Even while the adventuring entrepreneur is unable at any point in time to comprehend fully what lies ahead, he or she is compelled to make a series of "stepping stone" decisions along the twisting river bends of irreducible uncertainty" [11].

Drawing parallels to the Monty Hall problem, these "stepping stone" decisions can be compared to either staying with a particular

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stone or switching to another stone to advance further. The Monty Hall dilemma involves the presentation of three doors to contestants, wherein one of the doors conceals a prize. Upon choosing one door, the host, Monty Hall, proceeds to unlock another, only to uncover the absence of any prize. Subsequently, the participant is presented with the opportunity to either retain their prior selection or transition to the remaining closed door.

Entrepreneurial decisions mirror “stepping stone” choices, requiring entrepreneurs to navigate uncertainties by continuing on their known path or exploring alternatives [12]. This critical juncture underscores the importance of making decisions under uncertain conditions and the consequences of staying with known paths or exploring unfamiliar territories [13]. The Monty Hall problem emphasizes the significance of strategic decision-making in entrepreneurship by establishing connections between the evaluation of probabilities and outcomes by game participants and the assessment of merits and risks by entrepreneurs about different courses of action.

This conceptual study investigates the impact of probabilistic versus possibilist decision-making strategies on entrepreneurial approaches in uncertainty, using the Monty Hall problem as a metaphor to symbolize risk and opportunity management in entrepreneurship. The methodology hinges on an exhaustive literature review, focusing on opportunities, uncertainty, and decision-making theories in entrepreneurship. The paper contrasts probabilistic and possibilist frameworks by examining empirical and theoretical literature. It draws an analogy between practical entrepreneurial actions and theoretical decision-making scenarios using the Monty Hall problem. A comprehension of how entrepreneurs navigate intricate decisions amidst uncertainty is enhanced through the implementation of this methodical approach.

Finally, the Many-Doors model emphasizes the significance of probability, possibility, and propensity in effective entrepreneurial decision-making by elucidating decision-making tendencies as a function of interactions within the agent-artifact-environment nexus.

## 2. Literature Review

### 2.1. The Monty Hall problem

The Monty Hall problem originated from the “Let’s Make a Deal” game show. In this game, participants must select goats behind one of three doors, with a prize vehicle concealed behind the other two. The presenter then unveils a goat hidden behind a door not chosen by a contestant, giving them the chance to change their mind. According to vos Savant [19], changing one’s initial selection increases the likelihood of winning by two-thirds, contrary to the initial belief that the remaining doors have equal probabilities. The host consistently exposes a goat and suggests a transition after the initial selection, which gives rise to this counterintuitive consequence.

This problem has been a subject of much debate, with many mistakenly believing in the equiprobability of the remaining doors [14]. The fifty-fifty argument is often cited as an example of the equiprobability bias heuristic [15]. However, the probability of winning does not change after the host reveals a goat, and the unchosen and unrevealed doors hold a two-thirds chance of having the car. Therefore, switching the door provides a significant advantage in this game [14].

The Monty Hall problem highlights understanding probability and context in decision-making. The scenarios in which the car is positioned at a different door, and the host has the option to open a door with a goat to torment the contestant are illustrated in

Figure 1. This puzzle exposes cognitive biases and challenges deeply ingrained intuitive beliefs through the use of varying prize locations and scenarios in which the host must disclose a non-prize option to coerce the contestant into making a decision. Introduced by vos Savant [19] in Parade magazine’s “Ask Marilyn” column in 1990, the problem confounded many, including seasoned mathematicians, with over 10,000 readers contesting vos Savant’s assertion that opting to switch doors enhances the likelihood of winning to two-thirds [16]. Despite skepticism from notable figures like mathematician Paul Erdos, vos Savant’s solution was validated, illustrating that conventional probability models do not directly apply due to the host’s strategic intervention altering the odds [17]. This revelation of additional information shifts the conditional probability, mirroring the uncertainty entrepreneurs encounter when assessing whether to persist with their initial strategy or pivot toward a novel approach [18], thereby affirming the Monty Hall problem’s applicability in entrepreneurial contexts.

Figure 2 shows the branching of possibilities, with a conditional probability attached to each branch. Figure 3 expands on Figure 2’s branching possibilities with nine different choices and outcomes, and it is clear that by staying, there are three wins out of nine (one-third chance), whereas by switching, the contestant has six wins out of nine (two-thirds chance).

The Monty Hall problem is a randomized process with a one-third chance of selecting the correct door with a car. The statistical state and conditional probability change when Monty reveals a door with a goat. Figure 3 shows that by staying with the original choice, the chance of winning the car remains one-third, while switching the door increases the chance to two-thirds. Monty’s revelation changes the statistical state, and his suggestion to switch changes the conditional probability [16, 18, 19].

### 2.2. Risk and uncertainty

Entrepreneurship is fundamentally linked with risk and uncertainty, critical elements that shape entrepreneurial decision-making and actions [20]. McMullen and Shepherd [21] and Packard et al. [22] noted that risk and uncertainty are pervasive throughout the entrepreneurial journey, differing in degree and impact. Entrepreneurs tailor their behaviors based on their subjective perceptions of time, risk, and uncertainty [23], a concept dating back to 1975 [24], rendering entrepreneurial actions purposeful endeavors amidst uncertain conditions. Entrepreneurs draw on their experiences, which shape their understanding and reactions to perceived risks and uncertainties [25].

Entrepreneurial theories posit that entrepreneurs navigate within a realm of uncertainty, where their actions are influenced by their interpretations of risk and uncertainty [26]. They adjust their strategies based on evolving circumstances, speculating on future conditions [27]. Fisher et al. [28] underscore that grasping this uncertainty is crucial for navigating future uncertainties effectively.

Entrepreneurial activities often involve utilizing scarce resources, confronting entrepreneurs with the need to assess whether the potential benefits outweigh the costs [29]. Entrepreneurs employ strategies like the “affordable loss” principle to manage risks and make decisions under uncertainty [30, 31]. They innovate and optimize resources to fulfill their venture’s objectives, although existing theories like effectuation, bricolage, and causation explain the mechanisms of entrepreneurial behavior without delving into the motivations behind these actions [5].

Figure 1  
The three-door scenarios

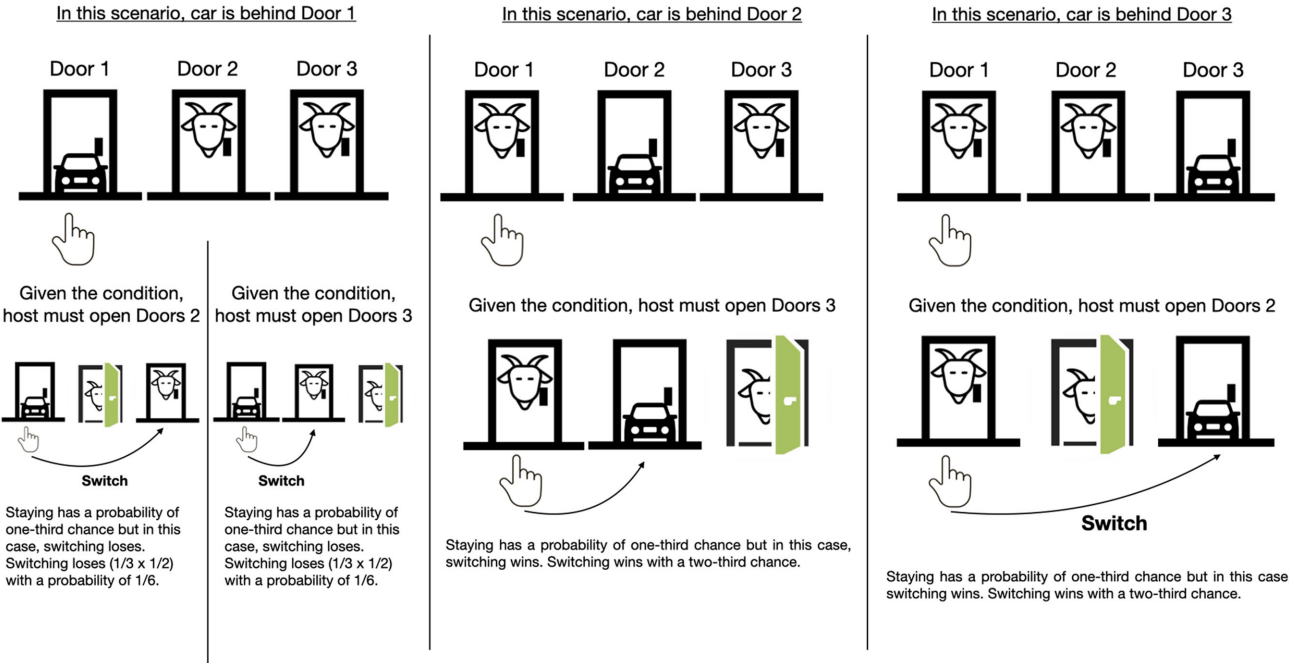
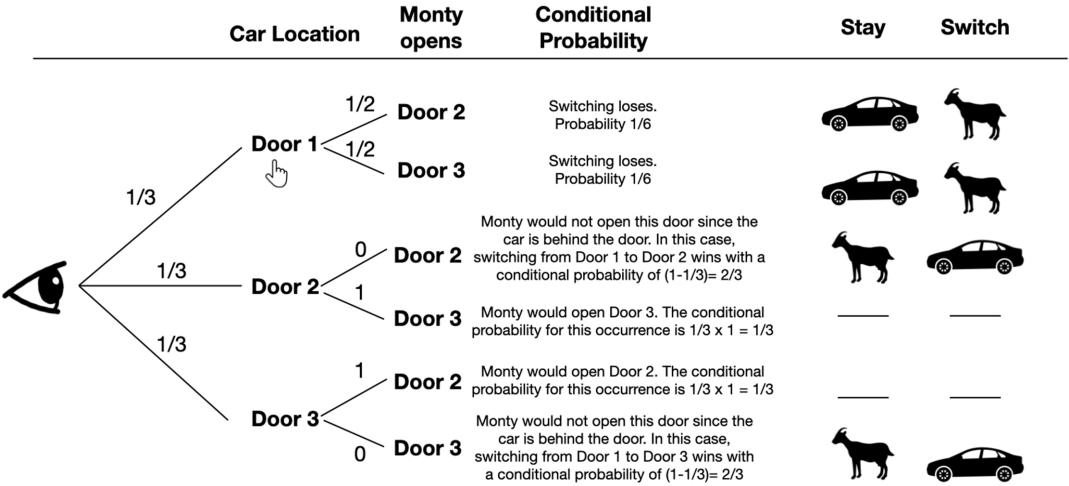


Figure 2  
Branching possibilities with conditional probability to each branch



Branching of possibilities showing the probability of each possible outcome **if the contestant initially picks Door 1**. The sample space consists of four possible outcomes. With switches ( to Door 2 and Door 3), there is 2/3 chance of getting a car behind a door.



















The essence of entrepreneurship revolves around action, driven by opportunity tension, resource scarcity, and an uncertain future [21]. Strategies such as effectuation and bricolage are employed to navigate environmental constraints and realize opportunities.

Schneider and Kay [32] highlighted that the response to opportunity tension is proportional to the available reactions and pathways for overcoming obstacles. Entrepreneurs’ actions are informed by their subjective knowledge and experiences, shaping

their approach to uncertain situations [33]. Entrepreneurship is characterized by epistemic diversity, responding to dynamic opportunities and the evolving landscape of uncertainties [34, 35].

Knight’s [36] distinction between risk and uncertainty introduces the concept of probabilistic versus non-probabilistic situations, further elaborated by Langlois and Cosgel [37] as a challenge in the face of true uncertainty. Entrepreneurs navigate this landscape by relying on intuition for absolute uncertainties and probabilistic assessments for insurable risks [38]. Their decision-making process is iterative,

**Figure 3**  
**“Stay” and “Switch” conditional probabilities**

Selected Door	Car Location	Monty Opens	Stay	Switch
Door 1	Door 1	Door 2 or Door 3		
Door 1	Door 2	Door 3		
Door 1	Door 3	Door 2		
Door 2	Door 1	Door 3		
Door 2	Door 2	Door 1 or Door 3		
Door 2	Door 3	Door 1		
Door 3	Door 1	Door 2		
Door 3	Door 2	Door 1		
Door 3	Door 3	Door 1 or Door 2		
			<b>3 wins</b>	<b>6 wins</b>
			<b>1/3</b>	<b>2/3</b>
			<b>chance</b>	<b>chance</b>

incorporating continuous learning and adaptation grounded in experience [39].

In summary, entrepreneurship is a purposeful action under uncertainty [33], where entrepreneurs leverage opportunities considering possibilities under uncertainties. The unpredictability in entrepreneurship arises from indeterminism, incomplete information, and ignorance, requiring a nuanced approach to decision-making and implementation to achieve entrepreneurial success.

### 2.3. Indeterminism, unknowingness and ignorance

Indeterminism encompasses both the observer’s computational limitations and the inherent unpredictability of phenomena [40]. It manifests in two forms: market dynamics, embodying risk as defined by Knight, and inherent uncertainty, reflecting Knight’s [36] concept of uncertainty [41]. Entrepreneurs navigate a reality perceived through a coarse-grained macroscopic lens, sensitive to minor variations in numerous antecedent factors that can significantly alter outcomes [34]. This perspective, composed of interrelated fine-grained elements, is constrained by entrepreneurial capabilities and their interpretation of these elements.

Entrepreneurial action, especially in uncharted territories, is a social, iterative process of adaptation to evolving conditions, employing either rational expectations (objective probabilities) or Bayesian (subjective probabilities) methods for decision-making [42]. Despite Knight’s [36] differentiation between risk and uncertainty, entrepreneurship ventures into the domain of possibilities fuelled by epistemic diversity. This diversity underlines varied entrepreneurial responses to identical phenomena, attributed to differences in knowledge completeness and contextual

understanding [43]. Popper [44] distinguished between subjective and objective interpretations, with the former hinging on probability theory and personal knowledge to conceptualize phenomena. Subjectivism, emphasizing agent preferences, suggests that knowledge discovery is a gradual process, contrasting with generating new knowledge through environmental interaction [45]. Subjective interpretation relies on extrapolating from repeatable experiences, using the frequency of outcomes to validate entrepreneurs’ interpretations of their environment [46].

### 2.4. Possibility, probability, and propensity

Uncertainty encompasses intertwined elements of possibility, probability, and propensity, each contributing distinctively to the comprehension of uncertainty. This paper delves into these aspects to clarify their interrelations and the impact of information—or its absence—on uncertainty. Griffin and Grote [47] observed that heightened uncertainty diminishes the inclination toward action, underlining the importance of understanding uncertainty’s effects on entrepreneurial behavior as fertile ground for future research.

Propensity is conceptualized by Popper [44] as the measure of possibility, embodying tendencies or dispositions that underpin statistical frequencies in repeated experiments. Propensities, therefore, are potentialities with an inherent disposition to manifest under certain conditions [48], playing a pivotal role in explaining and predicting statistical outcomes of sequences. Ramoglou and Tsang [49] offered a realist view of entrepreneurship, interpreting opportunities as propensities that materialize under conducive conditions rather than pre-existing entities awaiting discovery.

The manifestation of propensity hinges on specific conditions, underscoring the latent potentialities within entrepreneurial ventures [40]. Realizing these propensities is contingent on time and the presence of triggering conditions, which are not guaranteed but probable [50]. Popper [44] likened propensity to forces, emphasizing its relational nature and role in the physical system as a property of the entire system rather than individual components.

Popper [44] further discussed the predictive function of probability measures, distinguishing between the mere possibility of an event and its propensity, the latter suggesting a disposition or tendency toward realization. Ballentine [51] categorized interpretations of probability into inferential probability, ensemble probability, and propensity, each offering unique insights into the nature of probability and its application. Inferential probability encompasses objective and subjective dimensions, reflecting an entrepreneur’s unique perspective based on accumulated knowledge and biases [52]. Ensemble probability relates to the frequency of outcomes in repeatable conditions, whereas propensity is viewed as a causal factor within a specific arrangement conducive to its emergence.

This exploration of uncertainty through the lenses of possibility, probability, and propensity reveals the complexity of entrepreneurial decision-making. It highlights how propensities, conditioned by the arrangement of circumstances, differ from probabilities, which may also depend on additional variables such as information [53]. This nuanced understanding of uncertainty, incorporating the roles of frequency, repeatability, opportunistic beliefs, and propensity, provides a comprehensive framework for analyzing entrepreneurial dynamics.

## 3. Discussion

Entrepreneurship evolves around opportunity, particularly around discovering, creating, and actualizing opportunities [54].



However, a central issue remains that entrepreneurial opportunities are distributed in space, as objectively existing for discovery and co-created by embedded actors or even described as propensity waiting for the right conditions to emerge [49, 55]. Chen and Wang [56] demonstrated that individuals who were exposed to a simplified iteration of the Monty Hall Problem, specifically their 100-door suggestion, exhibited enhanced performance with Monty Hall's three doors in comparison to a control group that was only presented with the three-door version.

Figure 4 illustrates the Many-Doors model, encapsulating entrepreneurial decision-making's uncertainty, where each door symbolizes potential outcomes influenced by entrepreneurs' subjective probabilities, highlighting the necessity of choice to unveil future possibilities.

Phase 1 of the model commences with observing or recognizing an opportunity, a pivotal concept in entrepreneurship. "Opportunity is a central concept within the entrepreneurship field" [57]. Subsequently, entrepreneurs experience tension [58] arising from the opportunity (described as Lichtenstein's [59] opportunity tension), characterized by an imposed gradient. During this stage of observation and recognition, a clear strategy may not yet be apparent, leading entrepreneurs to navigate the opportunity in an exploratory and indeterminate manner, akin to a tumble-and-run approach [60].

van Lent et al. [61] discussed an impulse-driven behavioral logic that compels entrepreneurial action, emphasizing that such action is not solely driven by rationality but by the tension experienced. The existing literature on entrepreneurship recognizes various logic, including causal, heuristic, and effectual, which underpin the decision-making process. Lerner et al. [62] contended that entrepreneurial sense is initially driven by impulses and tension (Phase 1), followed by intendedly rational actions (Phase 2), with the acquisition of more information influencing judgmental decisions before subsequent actions are taken. This inclusive perspective, encompassing impulse-driven and intendedly rational logic, provides a comprehensive and descriptive understanding of entrepreneurial action.

The Many-Doors model is designed to illustrate the intricacies of entrepreneurial uncertainty, delineating the process from initial opportunity recognition influenced by impulsivity (Phase 1) to more rational decision-making informed by accumulated knowledge (Phase 2) [63]. The model proposes that entrepreneurial action is initiated by an imposed tension which stimulates the entrepreneur's attention toward new opportunities through a signaling process. This tension often arises from information asymmetries where different interpretations of the same information can lead to the identification of diverse entrepreneurial opportunities [64].

In Phase 1, the model describes entrepreneurial responses to these signals as instinctual and non-deliberative, driven by immediate impulses rather than structured analysis. These signals—indications of potential market needs or opportunities—are decoded by entrepreneurs to reduce information asymmetry [65]. For example, signal strength—how well a signal indicates potentially profitable opportunities—is crucial in guiding the entrepreneurs' initial reactions [60, 66].

An increased reliance on rationality marks the transition to Phase 2, where entrepreneurs reassess their earlier impulses against a broader spectrum of accumulated knowledge and contextual information. Here, new insights and a more comprehensive understanding of the opportunity landscape influence decisions to "switch doors" or continue on the established path. The model suggests that these phases represent a spectrum of actions from instinctive to informed, mirroring the decision-making process in uncertain environments [62].

The interplay between signaling and information asymmetry is critical in our model. Signaling does not act in isolation; it is deeply embedded within the fabric of information asymmetry. Entrepreneurs navigate these asymmetries by interpreting signals that may indicate under-recognized opportunities or overlooked market niches. As signals are processed, entrepreneurs can progressively align their actions with the most probable paths to success, reducing the initial uncertainty due to information gaps [60].

Furthermore, the Many-Doors model now integrates insights from McMullen and Shepherd's [21] discussion on entrepreneurial action under uncertainty. It uses it to illustrate how decision-making evolves from an initial, often chaotic interpretation of incomplete information to a more structured and reasoned strategy as more information becomes available. The synthesis of signaling theory and opportunity recognition within the Many-Doors framework allows for a holistic view of the entrepreneurial process from the nascent impulsive actions driven by raw signals to the more refined, rational strategies underpinned by comprehensive opportunity assessments. This integration clarifies the individual roles and impacts of impulses and rational decisions in entrepreneurial activities [67]. It illustrates how these components are interconnected through continuous information feedback loops [68]. These loops represent the iterative process of reducing information asymmetry [69]. As entrepreneurs act on initial signals, they gather more detailed information confirming or refuting their initial perceptions. This dynamic is crucial for understanding how opportunities are continuously shaped and reshaped by new information. It allows entrepreneurs to navigate [70] through multiple "doors" of potential opportunities until they find one that aligns with their strategic goals and market realities.

Refining the explanations of how signaling interplays with information asymmetry and how these influence the initial impulsive and subsequent rational phases of entrepreneurship provides a clearer, more detailed depiction of the Many-Doors model. This not only addresses the feedback provided but also significantly enriches the theoretical underpinnings of this study. It solidifies the model's role as a comprehensive framework that aptly illustrates the complex dynamics of decision-making in entrepreneurship under conditions of uncertainty. This model bridges the theoretical gaps by demonstrating how each theory informs specific aspects of the model, offering a more robust and integrated understanding of how entrepreneurs navigate through the iterative process of opportunity recognition and exploitation.

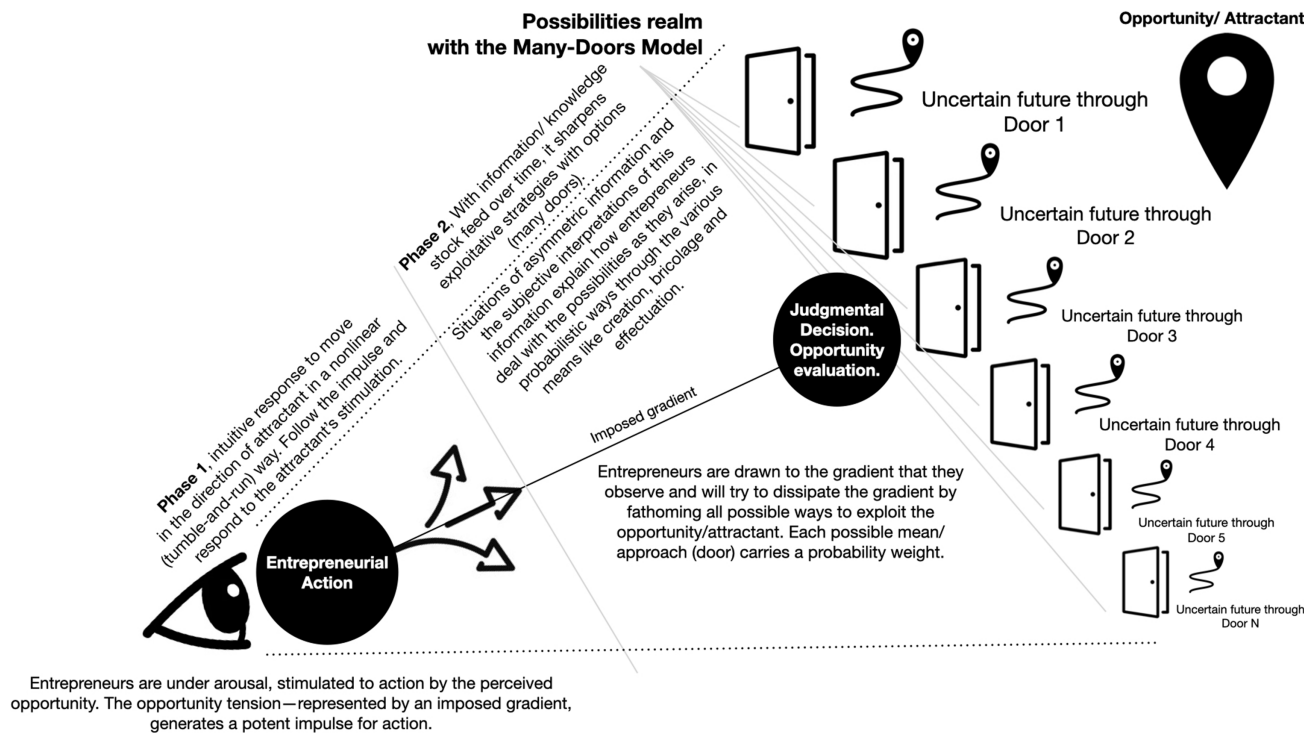
#### 4. The Probabilistic Perspective of Opportunity Using Monty Hall's Example

The decision to switch to the Monty Hall problem is counterintuitive. The equal probability assumption is intuitively rooted [71], with an overwhelming majority assuming each door (after the host's revelation of the door with a goat) has an equal probability, so switching does not matter. The behavior of staying (by not switching) is explained in the psychology literature [72]. Kahneman et al. [73] demonstrated that most behaviors are difficult to rationalize and discussed endowment effect, status quo bias, and loss aversion as anomalies:

- 1) The endowment effect describes the valuation of an object such that the owned object is valued higher, often irrationally, than the actual market value. It is an emotional bias and can be defined as "an application of<sup>1</sup> prospect theory positing that loss aversion

<sup>1</sup>Prospect theory was first proposed by Kahneman and Tversky [74], and Kahneman and Tversky [75] presented prospect theory as a descriptive model and theory of choices

**Figure 4**  
Many-Doors model describing the probability of the possibilities realm



associated with ownership explains observed asymmetries" [76]. It is also known as the divestiture aversion and mere ownership effect [77].

- 2) The status quo bias is an emotional bias preferring to stay put in a current situation and oppose actions that may change the state of affairs. Simply put, staying the same by doing nothing, where inertia deters action [78].
- 3) Loss aversion is a tendency to avoid losses to acquire equivalent gains.

Thus, these are probable explanations for the contestants choosing to stay rather than switch. Brown [79] conducted the first comprehensive experimental test by simulating the standard Monty Hall scenarios with the participants and found that only 13% chose to switch doors. Most contestants preferred to stay, thinking that staying and switching have equal probability, and decided to remain (likely resulting from endowment effect, status quo bias, or loss aversion). Falk [71] termed the belief in the equiprobability of the two remaining doors as a "uniformity belief." Krauss and Wang [80] suggested that even though the naïve contestants strongly prefer to stay when left to their own devices, psychological components can counteract this tendency.

Experimental psychologists use the Monty Hall problem to study aspects of human probabilistic reasoning and decision-making [80]. The case of the Many-Doors model illustrates the same predicament entrepreneurs face with similar probabilistic reasoning and decision-making. vos Savant [19] suggested the visualization of a million doors (consistent with the Many-Doors model) and further explained:

"and you pick door #1. Then the host, who knows what's behind the doors and will always avoid the one with the prize, opens them all except door #777,777. You'd switch to that door pretty fast." In reality, there is no host to open the door, but many interacting agents<sup>2</sup> (with roles in information revelation) are locked in inevitable entanglements and correlations that offer new information. "In a game of incomplete information, there is no doubt that information revelation rules play a crucial role in players' strategies. They affect players' beliefs" [18]. Each information revelation eliminates one of the million doors (metaphorically), and many actors are proffering fine-grain-level information, one way or another. Through intuitive judgment and cognitive analysis, entrepreneurs assimilate and interpret information to guide their decision-making processes [81]. This bifurcated approach aligns with cognitive science and entrepreneurship literature findings, suggesting that entrepreneurs often rely on heuristic-driven processes when uncertain [82], which can swiftly guide their initial assessment of opportunities. However, as the decision-making process unfolds, they increasingly incorporate more systematic and analytical information-processing methods, indicating a dual-process approach to reasoning in cognitive psychology [83]. These information-processing mechanisms—intuitive and analytical—are not mutually exclusive but operate on a continuum within the entrepreneurial context [84]. Intuition allows for rapid, experience-based recognition of patterns and potential opportunities, often called "entrepreneurial alertness" [85].

- 4) The dynamics between these two modes of processing information are crucial in uncertain environments, where entrepreneurs must swiftly identify and act on opportunities yet remain vigilant and adaptive to new information that could influence the opportunity's potential. This dual processing

in decision making under risk "in which value is assigned to gains and losses rather than to final assets and in which probabilities are replaced by decision weights" (p. 99). Put differently, the prospect theory advocates that individuals value gains and losses differently putting more weight on perceived gains than losses. Prospect theory is also known as loss-aversion theory.

<sup>2</sup>Agents are competitors, imitators, suppliers, clients, and any stakeholder involved within the entrepreneur's circle

capability is critical for opportunity exploitation, as it allows entrepreneurs to balance quick action with thoroughness and caution in decision-making.

## 5. Contribution to Theory and Practice

The Many-Doors model advances existing theories in entrepreneurship by providing a framework that incorporates the iterative processes of signaling and information asymmetry reduction [60]. This model supports a deeper understanding of how entrepreneurs navigate uncertainty, a core aspect of entrepreneurial studies. It offers a novel way to synthesize various theoretical perspectives, such as impulsivity in decision-making linked to behavioral economics [67] and the rational analysis rooted in traditional business strategy theories. The significance of the Many-Doors model lies in its ability to articulate a clear, actionable framework that helps decode the complex nature of entrepreneurial decision-making. For theoretical contribution, it provides a model that can bridge gaps in the current understanding of how entrepreneurs react to and capitalize on uncertainties. In practice, it offers actionable insights that can lead to more deliberate and successful entrepreneurial strategies. This model encourages interdisciplinary research, blending elements from psychology, economics, and management science. It invites scholars to examine entrepreneurial decision-making through various lenses, potentially leading to richer, more comprehensive insights into how entrepreneurs can succeed in diverse and dynamic environments.

Overall, the Many-Doors model enriches the discussion on entrepreneurial dynamics and highlights the critical role of combining intuition with systematic analysis based on information revelation in navigating the entrepreneurial landscape. This integrated approach is crucial for developing a resilient, adaptable, and successful entrepreneurial practice.

The Monty Hall problem illustrates the impact of information revelation on altering probabilities within decision-making contexts. Entrepreneurs often exhibit biases such as the endowment effect, status quo bias, and loss aversion, preferring the known over potential risks associated with change [81].

An essential practice is embracing uncertainty, recognizing the multitude of complex, interrelated information as cues for action [86]. The unpredictable nature of these interactions requires entrepreneurs to engage with this complex information network to navigate potential outcomes. Ashby's law of requisite variety suggests that managing complexity is about adapting to the variety within the environment, implying that entrepreneurs need a diverse set of strategies to match their environment's complexity [87].

Entrepreneurship is fundamentally about navigating a web of connections and relationships, where uncertainty stems from the dynamics of these interactions [88]. Opportunities, viewed as propensities, emerge from the confluence of the observer, environment, and situation, activated under the right conditions [89]. This paper underscores the importance of recognizing entrepreneurial ventures' embedded, hierarchically nested relationships and information complexities.

Information scarcity and the inherent uncertainty of knowledge [90] bring to light Knight's distinction between risk (where probabilities can be assigned) and uncertainty (where they cannot). Entrepreneurs interpret and navigate these conditions probabilistically, utilizing strategies like creation, bricolage, and effectuation to exploit business opportunities [91].

The Monty Hall problem metaphorically illustrates the complex decisions entrepreneurs confront, highlighting how probability theory aids rational decision-making under uncertainty. The Many-Doors

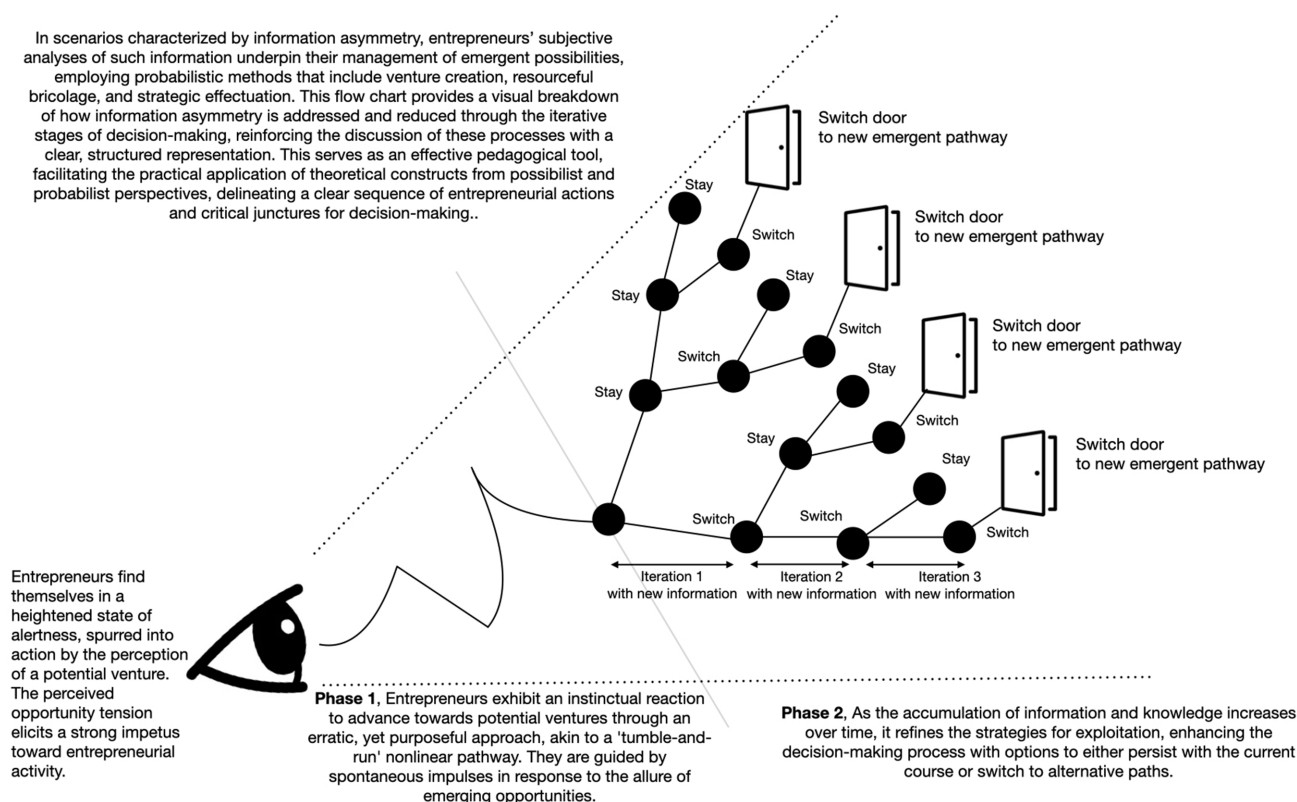
model recommends a probabilistic strategy for navigating entrepreneurial decisions, focusing on potential outcomes. Figure 5 flowchart explains the process where entrepreneurs interpret market signals through cognitive biases and past experiences, depicting decision nodes at crucial junctures—opting between intuition (possibilist approach) and analytical reasoning (probabilistic approach). This flowchart also visualizes how information asymmetry is progressively resolved throughout the decision-making iterations, serving as a tool that translates theoretical concepts into practical applications. Moreover, this structured depiction supports deeper academic inquiry and practical understanding by outlining entrepreneurial behaviors and decision-making points, thus fostering a comprehensive understanding of entrepreneurship's dynamic nature under uncertainty.

## 6. New Inquiries for Future Research

Based on the preceding discussion, several potential avenues for future research can be proposed:

- 1) Investigation of Decision-Making Strategies: Further exploration is warranted to examine the decision-making strategies employed by entrepreneurs when faced with uncertainties. This can involve exploring the interplay between intuitive impulses and intended rational actions in different entrepreneurial contexts. Comparing and contrasting the effectiveness of various decision-making approaches, such as effectuation, causation, and bricolage, can shed light on their implications for entrepreneurial outcomes.
- 2) Understanding Subjective Perception of Uncertainty: Future studies can delve deeper into entrepreneurs' subjective interpretation and perception of uncertainty. Exploring how entrepreneurs subjectively perceive and interpret uncertainty can offer insights into their risk attitudes, entrepreneurial behaviors, and propensity for probabilistic thinking. Examining the impact of subjective probabilities and risk aversion on entrepreneurial decision-making can contribute to our understanding of the mechanisms underlying entrepreneurial actions.
- 3) Incorporating Probabilistic Thinking and Mental Models: Further research could explore how entrepreneurs create mental models [91, 92] and utilize probabilistic thinking [34] to navigate uncertainty. Investigating the development and application of mental models in entrepreneurial practice could provide valuable insights into how entrepreneurs anticipate and respond to various outcomes. Exploring the intuitive and relational nature of probabilistic interpretations and their influence on entrepreneurial decision-making can deepen our understanding of the dynamic nature of entrepreneurship.
- 4) Expanding the Many-Doors Model: The Many-Doors model presented in this paper provides a foundation for examining entrepreneurial action under uncertainty. Future studies could develop and refine this model by incorporating additional variables and contextual factors. The model could be tested and validated in different entrepreneurial settings to assess its applicability and generalizability. Moreover, exploring the Many-Doors model's practical and managerial implications can provide valuable insights for entrepreneurs and decision-makers.
- 5) Exploring the Role of Information and Knowledge: Given the significance of information and knowledge in entrepreneurial decision-making, future research could focus on understanding how entrepreneurs acquire, process, and utilize information in uncertain environments. Investigating how entrepreneurs handle information scarcity and deal with the inherent uncertainty in their knowledge could offer insights into their adaptive responses

**Figure 5**  
The Many-Doors model is depicted as a flowchart that outlines a non-linear path and a branching decision tree



and strategies. Furthermore, examining the role of information asymmetries, information revelation, and information-seeking behavior could contribute to a comprehensive understanding of the information dynamics in entrepreneurship.

This conceptual study aims to establish a theoretical framework from which empirical investigation may be derived. By clearly defining phases of decision-making and the roles of different entrepreneurial behaviors, the Many-Doors model lays a foundational framework for empirical studies. Researchers can test hypotheses regarding how specific signals influence entrepreneurial actions at various stages or how variations in information processing affect opportunity recognition and exploitation. This model could guide empirical research to explore the predictive power of initial impulses versus the effectiveness of subsequent rational decisions.

By addressing these research inquiries, scholars can advance our understanding of the complex nature of entrepreneurship, decision-making under uncertainty, and the practical implications for entrepreneurs and decision-makers. Such investigations can contribute to developing robust theories, effective practices, and valuable insights for fostering entrepreneurial success in dynamic and uncertain environments.

## 7. Conclusion

Entrepreneurship unfolds within a complex ecosystem, marked by many variables and interactions, particularly at the micro-level, where human dynamics introduce a layer of chaos and uncertainty [93]. This complexity necessitates an entrepreneurial approach grounded in theories of change, nonlinearity, and emergence [94],

with the Many-Doors model exemplifying the multifaceted nature of entrepreneurial endeavors.

Entrepreneurs traverse a dynamic landscape to exploit opportunities as subjective agents, engaging with emergent phenomena and the dynamics of motivation and outcomes. This investigation highlights the significance of strategic alliances and agent clustering in unveiling opportunities, transforming the entrepreneurial environment, and fostering new ventures. It underscores the essence of confronting uncertainty and probabilistic outcomes, disputing a deterministic worldview. Entrepreneurs navigate risks and uncertainties with foresight and resilience, focusing on potential gains. The study accentuates the importance of uncertainty acceptance, the transformation of intricate information into actionable insights, and probabilistic reasoning within entrepreneurship. Introducing the Many-Doors model proposes a fresh approach to exploring the entrepreneurial realm, underlining the value of strategic collaborations and opportunity emergence in an unpredictable world. By adopting these principles, entrepreneurs can effectively navigate environmental complexities, making informed “switch” decisions that facilitate successful outcomes.

## Ethical Statement

This study does not contain any studies with human or animal subjects performed by the author.

### Conflicts of Interest

The author declares that he has no conflicts of interest to this work.



## Data Availability Statement

No data was used in this research as this is a conceptual paper.

## Author Contribution Statement

**David Leong:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition.

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