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Marketing the Future: How Deep Uncertainty Shapes the Future of Marketing

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Abstract

In an era marked by profound and unpredictable changes – including climate change, the rise of artificial intelligence, and geopolitical tensions - customers and providers face deep uncertainty about the future. This paper explores the effects of such deep uncertainty on customers, providers, and the marketing field. We define deep uncertainty as uncertainty arising from both "unknown unknowns" and complex systems of "known unknowns," making it impossible to foresee future events. How does deep uncertainty challenge existing models of customer and provider decision-making, and what are the implications for marketing as a field? We develop new, testable propositions on how customers and providers make decisions under deep uncertainty, offering a foundation for future research. We also explore implications for the future of marketing itself, advocating for a shift from linear value chains to dynamic co-production networks, and from the traditional insights → strategy → execution paradigm to more agile, iterative exchange activities anchored in a shared customer-provider vision. We also outline an elaborate future research agenda to inspire more studies on customer- and provider decision-making under deep uncertainty and the future of marketing itself.

Keywords: Deep uncertainty; marketing the future; customer decision-making; provider decision-making; future of marketing; marketing organization.

Customers and providers face deep uncertainty about the future caused by unpredictable changes from major forces such as climate change, radical technological evolution (e.g., AI), and profound geopolitical tensions. For instance, both the speed and form in which AI is going to shape customer interfacing relationships is unknown at present; the only "certainty" we have is that its impact is going to be far-reaching (see Rust and Huang 2021).

Deep uncertainty manifests itself in two forms, each making it impossible to predict future events. Either, it is uncertainty stemming from "unknown unknowns" (e.g., an unforeseen military invasion) that arise because of the unpredictability of change. Or, it is uncertainty stemming from a complex system of "known unknowns" (e.g., climate change) making it impossible to foresee events. This paper examines the effect of deep uncertainty about the future on customers, providers and marketing as a field.

We define a *customer* as any entity that influences the present or prospective acquisition of a good or service, whereas a consumer is the one that experiences a good or service (Stremersch et al. 2025). In a broader perspective, stakeholders may surround the customer. For instance, a customer's mobility choices may affect other stakeholders' opportunities to consume clean air or choose alternative mobility options. A *provider* is any entity that provides benefits to another entity (e.g., a customer), in the form of services that may include the delivery of tangible goods. Provision extends beyond making and selling to the co-creation of value between provider and customer (Vargo and Lusch 2004). An agent can be both provider and customer in the same relational exchange. Finally, both customers or providers may also be automated (AI) agents, possibly bringing in different needs and wants from human agents.

In this conceptual paper, we elaborate on two perspectives. The first perspective, which we call 'marketing the future', considers the impact of deep uncertainty on decision-making about the

future by customers and providers. How does deep uncertainty affect customer decision-making models? How should the unprecedented degree of deep uncertainty shape future research on customer decision-making? How does deep uncertainty affect provider decision-making? Which factors become key in provider decision-making to navigate the future when it is deeply uncertain?

The second perspective, which we call the 'future of marketing' considers what marketing itself will look like as a field, practice or profession when deep uncertainty is imminent. How may marketing redefine itself? How can we view the marketing activities of the future compared to how we saw marketing activities in the past? Do we need new frameworks to conceptualize marketing decisions?

This conceptual paper aims to (Yadav 2010): (1) justify and inspire more research on deep uncertainty about the future and its consequences for marketing; (2) contrast customer and provider decision-making under deep uncertainty with decision-making under little or no risk, or under ambiguity and encourage theory development; and (3) creatively evoke elements that have special relevance in a context of deep uncertainty that may spark future research.

To do so, we review the literature in marketing and other business fields to conceptualize deep uncertainty and its effects. Second, we derive clear and testable propositions grounded in conceptual logic and analytical optimization. Third, we focus on the future of marketing itself and how some of the frameworks we routinely use can be more tailored to a deeply uncertain future. Fourth, we ground our thinking in discussions among leading scholars at a Conference we organized[1]. Fifth, we offer a future research agenda, intended to be frame-breaking and inspiring.

[1] We hide the identity of the conference during the review process for author anonymity.

Academic Research Reflecting on the Future of Fields in Marketing and Business

First, we review articles that reflect on the field's future from the last 20 years of premier marketing journals (i.e., marketing journals on the UT Dallas Research Ranking, plus *IJRM* and *JAMS*). Second, we review papers that undertake a quest similar to ours from premier scholarly journals in other business fields.

Prior Literature on the Future of Marketing

The marketing literature (Table 1) organizes reflections on the future of our field along three perspectives: the *impact of technology* on marketing (e.g., Rust and Huang 2021; Rust 2020), the *impact of societal changes* on marketing (e.g., Cotte 2024; Deshpandé 1999), and *the future of the marketing field* itself (e.g., Day and Montgomery 1999; Kumar 2018; Moorman et al. 2019).

Our research extends this literature in three ways. First, a large share of prior papers adopts a historical lens to suggest new research directions (e.g., Day and Montgomery 1999; Kumar 2015), while the present paper adopts a forward-looking lens. Second, prior literature typically isolates a single major force driving change, e.g., technology (as in Hoffman et al. 2022), AI (as in Huang and Rust 2024), digital and social media (as in Lamberton and Stephen 2016), while the present paper simultaneously considers a broad set of major changes.

Third, prior literature offers rich agendas for future research (as in Moorman et al. 2019), but lacks actionable frameworks. This paper develops robust, testable propositions in an organizing framework and offers new frameworks for marketing.

Prior Literature on the Future of Business

Table 2 offers an overview of how other business fields study the future of their fields. First, nearly every field studies the impact of technology. Mithas et al. (2022) in operations management discuss how AI and Industry 4.0 technologies enhance decision-making and execution. In information systems, researchers call for interdisciplinary approaches to handle new disruptive technologies, such as AI (e.g., Baird and Maruping 2021). In finance, Goldstein et al. (2019) explore how FinTech innovations such as blockchain are transforming financial services.

Second, scholars in other fields call for more attention to societal concerns. For instance, Hirshleifer (2020) in finance studies how the explosion of social interactions are affecting financial markets. In organizational behavior, Davis (2015) calls for a re-evaluation of how research should best serve societal needs. Graves (2021) in operations management calls for interdisciplinary research to address global challenges, such as privacy and inclusivity.

Third, scholars call for new frameworks that are more adept to the future. In organizational behavior, Walsh et al. (2006) call for new frameworks that address emerging organizational forms and societal needs. In accounting, Barth (2018) envisions that the future of accounting requires an integration of research, education, and practice to embrace major forces disrupting the field, such as big data and business analytics. In strategic management, Durand et al. (2017) warn of fragmentation due to the increasing complexity of research questions.

In sum, other business disciplines address the transformative impact of environmental factors fundamentally reshaping the discipline. These offer a parallel to the conceptual introspection on the future that we aim to contribute to in the present paper.

Table 1: Selected Papers on the Future of Marketing (1/2)

Paper	# Cites* (Google)	Focus†	Focus on marketers†	Temporal Focus†	Locus of change†	New Marketing Frameworks◊	Short Summary
Cotte (*JCR* 2024)	1	Impact of societal changes	No	**Forward-Looking**	**Multi-faceted**	No	Future research should address sustainability, inequality, and AI ethics through bold, cross-disciplinary efforts to tackle societal challenges.
Davenport et al. (*JAMS* 2020)	2723	Impact of technology	No	**Forward-Looking**	Single focus	No	AI will significantly impact marketing and raise ethical and privacy concerns. A research agenda for AI in marketing is proposed.
Rust (*IJRM* 2020)	555	Impact of technology	No	**Forward-Looking**	Single focus	No	AI, IoT, and big data will disrupt marketing, driving a shift towards relationship-centric strategies. Emphasis on personalization, privacy, and socioeconomic trends is critical.
Eckhardt et al. (*JM* 2019)	974	Impact of societal changes	No	**Forward-Looking**	Single focus	No	The sharing economy disrupts traditional marketing by shifting focus from ownership to access. Further research is needed on its impact on marketing activities, consumer roles, value generation, etc.
Moorman et al. (*JM* 2019)	116	Future of marketing	No	**Forward-Looking**	**Multi-faceted**	No	The paper advocates expanding marketing's conceptual boundaries, urging innovative and broader perspectives while questioning conventional approaches.
Kumar (*JM* 2018)	368	Future of marketing	**Yes**	**Forward-Looking**	**Multi-faceted**	No	Emphasizes technology and evolving consumer preferences as primary drivers, advocating for a data-driven approach via 'transformative marketing' to adapt to market changes and future trends.
Moorman and Day (*JM* 2016)	509	Future of marketing	**Yes**	Historical	**Multi-faceted**	**Yes**	The paper emphasizes the role of marketers as key agents. It introduces a framework to help firms achieve marketing excellence.
Lamberton & Stephen (*JM* 2016)	1877	Impact of technology	No	Historical	**Multi-faceted**	No	Integrating social media, digital, and mobile technologies into daily life requires new marketing strategies and research that aligns academic insights with industry needs.
This Study	**N/A**	**All three angles**	**Yes**	**Forward-Looking**	**Multi-faceted**	**Yes**	This paper considers marketers' active role in creating desirable societal outcomes in the future (marketing the future) and envisions the future of marketing as a field or profession.

* We collected the number of Google Scholar citations for the listed papers on June 14th, 2025.

† While many papers cover multiple dimensions, we categorized each paper based on its primary focus. The three categories we used are: (1) *future of marketing*, for papers that take a broad, field-wide perspective rather than focusing on specific drivers; (2) *impact of technology*, for papers examining the influence of emerging technologies (e.g., AI, big data) on the field; and (3) *impact of societal changes*, for papers exploring broader societal trends (e.g., sustainability, inequality) and their effects on the field. Similarly, for temporal focus and locus of change, we categorized each paper based on its primary focus.

◊ By 'new marketing frameworks', we mean frameworks that help understand marketing activities and instruments (e.g., 4 P's, 3 C's), as opposed to frameworks to understand technological or societal change itself.

Note: For brevity, only the papers cited in the main text are included in the bibliography. The full list of references used in this table is available in the Web Appendix A.

Table 1: Selected Papers on the Future of Marketing (2/2)

Paper	# Cites* (Google)	Focus†	Focus on marketers†	Temporal Focus†	Locus of change†	New Marketing Frameworks◊	Short Summary
Kumar (*JM* 2015)	500	Future of marketing	No	Historical	**Multi-faceted**	No	The paper explores marketing's history, digital transformation, accountability, and integration with other business functions.
Lutz (*JM* 2011)	58	Future of marketing	No	**Forward-Looking**	**Multi-faceted**	No	The author advocates for open, collaborative scholarship, encourages embracing digital trends, and proposes using crowdsourcing in research.
Rust, Moorman & Bhalla (*HBR* 2010)	479	Future of marketing	**Yes**	**Forward-Looking**	**Multi-faceted**	**Yes**	Advocates a shift from product-centric to customer-centric strategies. It proposes new customer metrics and a new framework for customer relationships.
Shugan (*MKS* 2004)	175	Impact of technology	No	**Forward-Looking**	Single focus	No	The author discusses emerging technologies like biometrics and smart cards, calls for research on new marketing-mix elements, and emphasizes the need to adapt to technological changes.
Day & Montgomery (*JM* 1999)	759	Future of marketing	No	Historical	**Multi-faceted**	No	Stresses the need for adaptive strategies and integrated approaches across four marketing issues: consumer behavior, market dynamics, firm-market relations, and marketing's impact on performance.
Deshpandé (*JM* 1999)	145	Future of marketing	No	Historical	**Multi-faceted**	**Yes**	The paper emphasizes customer-centric, cross-disciplinary approaches and calls for engaging with broader societal issues.
Bass (*JMR* 1993)	181	Future of marketing	No	Historical	**Multi-faceted**	No	This paper examines the maturation of marketing as a science, emphasizing empirical generalizations and modeling. It calls for integrating theory and data to advance the field.
Capon & Glazer (*JM* 1987)	709	Impact of technology	No	Historical	Single focus	No	The paper advocates for aligning technology strategy with marketing to adapt to changing environments. It highlights the integration of technology into strategic marketing for sustainable growth.
This Study		**All three angles**	**Yes**	**Forward-Looking**	**Multi-faceted**	**Yes**	This paper considers marketers' active role in creating desirable societal outcomes in the future (marketing the future) and envisions the future of marketing as a field or profession.

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† While many papers cover multiple dimensions, we categorized each paper based on its primary focus. The three categories we used are: (1) *future of marketing*, for papers that take a broad, field-wide perspective rather than focusing on specific drivers; (2) *impact of technology*, for papers examining the influence of emerging technologies (e.g., AI, big data) on the field; and (3) *impact of societal changes*, for papers exploring broader societal trends (e.g., sustainability, inequality) and their effects on the field. Similarly, for temporal focus and locus of change, we categorized each paper based on its primary focus.

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Table 2: Selected Papers on the Future of Other Fields (1/2)

Paper	Field	# Cites* (Google)	Focus†	Short Summary
Byron (*AMR* 2024)	Management & Strategy	5	Future of the field	Advocates for more inclusivity of authors from non-elite institutions in top management journals to bring diverse knowledge and address complex emerging problems effectively.
Mithas et al. (*POMS* 2022)	Operations	215	Impact of technology	AI and Industry 4.0 will revolutionize operations management through enhanced sensing, analysis, and execution. Future research should explore dual strategies, trade-offs, and social-environmental impacts of these technologies.
Baird & Maruping (*MISQ* 2021)	Information Systems	520	Impact of technology	We must prioritize research into the interactions between humans and 'agentic artifacts' like AI and chatbots, and their effects on decision-making dynamics.
Graves (*MGS* 2021)	Operations	11	Future of the field	Operations management has evolved from tactical to strategic research (1976–2016), focusing on behavioral operations and interdisciplinary approaches. Future research should prioritize empirical validation, AI, global challenges, and new business models.
Hirshleifer (*JF* 2020)	Accounting & Finance	288	Impact of societal changes	New social transmission dynamics influence economic behavior (e.g., bubbles, booms, and swings in investor sentiment). Future research should investigate these societal dynamics.
Goldstein et al. (*RFS* 2019)	Accounting & Finance	813	Impact of technology	FinTech innovations like blockchain, peer-to-peer lending, and robo-advising are revolutionizing financial services. Start-ups and big tech are challenging traditional institutions. Future research should address regulation, disruption, and welfare effects.
Barth (*TAR* 2018)	Accounting & Finance	22	Future of the field	Accounting in 2036 will likely integrate research, education, and practice for informed decision-making, with a focus on collaboration and embracing big data and analytics.
Durand et al. (*SMJ* 2017)	Management & Strategy	306	Future of the field	The paper discusses the broadening scope of strategic management, advocating the integration of diverse theories for cohesiveness and progress while emphasizing methodological rigor.
Davis (*ASQ* 2015)	Organiz. Behavior	258	Impact of societal changes	The author criticizes organizational research for valuing novelty over cumulative knowledge, warns about big data's potential to produce unhelpful insights, and calls for reevaluating research's societal purpose over academic advancement.
Tilson et al. (*ISR* 2010)	Information Systems	2371	Impact of technology	The paper calls for IS research to focus on digital infrastructures, emphasizing their role in shaping IT evolution and societal changes. It advocates for new frameworks to address their flexibility and stability.

* We collected the number of Google Scholar citations for the listed papers on June 14th, 2025.

† While many papers cover multiple dimensions, we categorized each paper based on its primary focus. The three categories we used are: (1) *future of the field*, for papers that take a broad, field-wide perspective rather than focusing on specific drivers; (2) *impact of technology*, for papers examining the influence of emerging technologies (e.g., AI, big data) on the field; and (3) *impact of societal changes*, for papers exploring broader societal trends (e.g., sustainability, inequality) and their effects on the field.

Note: For brevity, only the papers cited in the main text are included in the bibliography. The full list of references used in this table is available in the Web Appendix B.

Table 2: Selected Papers on the Future of Other Fields (2/2)

Paper	Field	# Cites* (Google)	Focus†	Short Summary
Sidorova et al. (*MISQ* 2008)	Information Systems	778	Future of the field	The paper identifies five core areas in IS research and notes a shift towards the social context of technology use. It calls for future research on the evolving interaction between technology and humans across organizational levels.
Nerur et al. (*SMJ* 2008)	Management & Strategy	1028	Future of the field	Traces the evolution of strategic management through author co-citation analysis, identifying key subfields and scholars. It highlights the field's multidisciplinary roots and calls for integrating subfields to prevent fragmentation and boost innovation.
Walsh et al. (*Org Sci* 2006)	Organiz. Behavior	284	Future of the field	The paper criticizes organizational theory as "adrift" and calls for addressing emerging organizational forms and societal needs. It proposes focusing on modern organizations, their societal impact, and reconnecting with real-world relevance and human welfare.
Kleindorfer et al. (*POMS* 2005)	Operations	2687	Future of the field	The paper emphasizes the integration of sustainability into operations management, highlighting the importance of balancing profit, people, and the planet (the triple bottom line).
Banker & Kauffman (*MGS* 2004)	Information Systems	443	Future of the field	The paper highlights five key streams in IS research: decision support, design science, HCI, IS strategy, and IS economics. It emphasizes interdisciplinary approaches and calls for future research on emerging technologies, IT productivity, and e-commerce.
Chopra et al. (*MGS* 2004)	Operations	150	Future of the field	The paper reviews five decades of operations management, highlighting its focus on applied problems. It identifies challenges in supply chain, service operations, and integration with finance and marketing, advocating for interdisciplinary research and practical problem-solving.
Hinings & Greenwood (*ASQ* 2002)	Organiz. Behavior	491	Impact of societal changes	It criticizes organization theory's focus on managerial efficiency over societal consequences, calling for a renewed emphasis on societal impact and policy relevance issues.
Corbett & Wassenhove (*Ops Res* 1993)	Operations	204	Future of the field	The paper reflects on the evolution of operations research (OR), examining how it has naturally drifted away from its initial goals. It highlights the gap between theoretical developments and practical applications, calling for a renewed focus on real-world problems and industry relevance.

* We collected the number of Google Scholar citations for the listed papers on June 14th, 2025.

† While many papers cover multiple dimensions, we categorized each paper based on its primary focus. The three categories we used are: (1) *future of the field*, for papers that take a broad, field-wide perspective rather than focusing on specific drivers; (2) *impact of technology*, for papers examining the influence of emerging technologies (e.g., AI, big data) on the field; and (3) *impact of societal changes*, for papers exploring broader societal trends (e.g., sustainability, inequality) and their effects on the field.

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Deep Uncertainty

Early views on uncertainty were influenced by physical objects and games of chance (e.g., tossing a fair coin) in which the possible states of the world can be enumerated and probabilities can be calculated. This serves as the basis for a large literature allowing decision-makers to apply probabilistic reasoning and optimization with great success (Machina 1987). About 100 years ago, researchers have started questioning the validity of this conceptualization of decision making under risk. Knight (1921) was one of the first to acknowledge there may also be situations where some outcomes and their probabilities are inherently unknown to the decision maker. Ellsberg (1961) later refined the distinction between known and unknown probabilities of outcomes and introduced the notion of ambiguity, where outcomes are known but probabilities remain unclear. Einhorn and Hogarth (1986) further explored how dynamic and complex decisions under ambiguity often force decision-makers to rely on heuristics. However, Hogarth and Kunreuther (1995) argued that in many real-world situations, people must also make choices when they fundamentally lack information (i.e., decision-making under ignorance).

In this paper, we put forward that this latter kind of uncertainty is more prominent in today's and tomorrow's world. New major sources of uncertainty create fundamentally different futures for our world, leading to a state of what is called *deep uncertainty*: a decision environment where outcomes, probabilities, and even models are not known (Marchau et al. 2019; Lempert, Popper, and Bankes 2003). This means that many decision variables are also

unknown to customers or providers, creating a state of the world with profound uncertainty where traditional customer and provider decision models fail (Marchau et al. 2019). Next, we develop new, testable propositions on how customers and providers make decisions in that state of world under deep uncertainty, offering a foundation for future research (Table 3).

Table 3 - Inventory of All our Propositions

Prop.	Proposition Formulation
P1	Humans face an unprecedented degree of deep uncertainty
P2	Existing customer decision-making models ((a) without risk, (b) under risk or (c) under ambiguity) break down under deep uncertainty. The reason therefore is that under deep uncertainty, the possible outcomes, their probabilities and the timing of the outcomes of customer decision-making are not defined.
P3	Future consequences of decisions taken under deep uncertainty will have a lower impact on such decisions, as compared to decisions made (a) without risk, (b) under risk, or (c) under ambiguity.
P4a	Customer decision-making with short-term consequences and known probabilities is overstudied.
P4b	Customer decision-making with long-term consequences under deep uncertainty is understudied.
P5	(a) Reducing upfront cost barriers or (b) aligning short-term and long-term value in customer decisions will aid adoption of transformative products in a decision context with deep uncertainty and long-term consequences.
P6	Aligning provider and customer beliefs about (a) outcomes, (b) probabilities, and (c) timing will aid customer decision-making under deep uncertainty with long-term consequences.
P7a	Customer decision-making on decisions with high societal stakes is understudied.
P7b	Customer decision-making on decisions with low societal stakes is overstudied.
P8a	The better the vision of providers the more profitable providers are.
P8b	The larger the expected change, the more providers' profits will benefit from better vision.
P9	The better the provider's vision, the lower the profits the provider obtains from agility.
P10	The higher the degree of (a) expected, or (b) unexpected change, the higher the profits the provider obtains from agility.
P11	The provider's profits derived from being agile are higher the smaller the error the provider makes in observing the market.
P12	The (a) better the provider's vision, the (b) higher the provider's agility or (c) the better the provider's market monitoring ability, the more the provider will outperform other providers, in an environment characterized by deep uncertainty.

Providers and customers must make decisions in that 'state of the world' as is or they can effectively try to reduce deep uncertainty and change 'the state of the world'. In the former, we can see decision outcomes as gambles, with unknown probabilities and linkages. For instance, for many individual customers and providers climate change is not something they can influence but it presents unknown outcomes with unknown probabilities. In the latter, both customers and providers can influence probabilities. For example, providers of heat pumps may introduce long-term savings-based pricing models that make adoption easier by changing the probabilities customers perceive. Customers can influence providers' or government actions by, for instance, social movements, reducing climate uncertainty. Thus, we see deep uncertainty as a state of the world that is malleable.

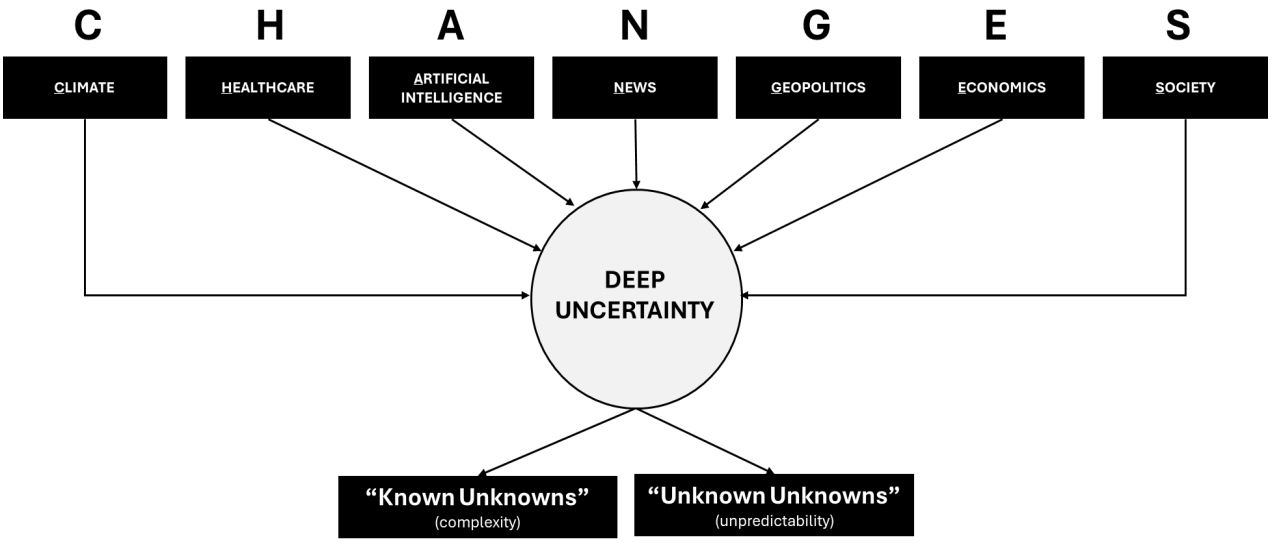
Deep uncertainty manifests from two types of unknowns: (1) "unknown unknowns" reflecting the reality that some possible outcomes or states of the world and their probabilities, are not knowable (i.e., unpredictable) at the time of the decision; and (2) "a complex system of known unknowns," reflecting a reality in which determinants of outcomes are highly variable and interconnected (i.e., form a complex system) such that the probability of outcomes and their impact are not known. For example, when social media started at the beginning of the century, it may have been obvious that they might affect advertising for traditional newspapers, but quantifying that impact depended on too many factors to be knowable (i.e., it represented a complex system of known unknowns). At the start of the century, nobody foresaw the rise of

fake news and its impact on political choice and collective action, such as the storming of the Capitol (i.e., it represented an unknown unknown). As examples, we can discern the following CHANGES that drive deep uncertainty (Figure 1):

- ***C****limate*: We are approaching the end of the Holocene period (the last 11,650 years of recorded human history) and transitioning to the Anthropocene, an epoch marked by human dominance over the Earth and a significant rise in global temperature.
- ***H****ealthcare*: The COVID-19 pandemic has exposed significant vulnerabilities in global healthcare systems. Disparities in access to healthcare and the rising prevalence of chronic diseases have created uncertainty on healthcare access.
- ***A****rtificial Intelligence*: The rise of AI will fundamentally reshape commerce and the labor market, among others.
- ***N****ews*: The press, as the fourth pillar of democracy (1) has lost its independence, and (2) has a harder time distinguishing truth from fiction. Social media and disinformation have risen to an all-time high, making it difficult to distinguish fake from fact.
- ***G****eopolitics*: Geopolitical threats have not been this high in decades, with covert conflicts between superpowers such as the U.S., China, and Russia escalating into open conflicts.
- ***E****conomics*: Supply chain disruptions are creating volatility, impacting market confidence in economic growth and future job security - in turn intensified by an automation revolution driven by the rise of AI.
- ***S****ociety*: Drug problems create massive issues in major cities. Uncontrolled immigration strains the cohesiveness of societies. Rising income inequality fuels social unrest and dissatisfaction with existing systems. Political institutions face all-time lows on trust.

These changes are increasingly exponential and abrupt instead of linear and gradual. Exponential and abrupt change implies that predicting long-term outcomes becomes nearly impossible since only small changes in the present can have a very large impact in the future.

Figure 1: Sources and Types of Deep Uncertainty for the Future



Based on the above, we argue that humans are facing an unprecedented degree of deep uncertainty. Although humanity has endured world wars and political upheavals, we now face a new climate era and a technological revolution that threaten human survival. We propose:

P1: Humans face an unprecedented degree of deep uncertainty.

Deep Uncertainty and Customer Decision-Making

In this section, we aim to establish that deep uncertainty about the future fundamentally challenges existing customer decision-making models and suggest how it should shape future research on customer decision-making.

Deep Uncertainty Challenges Existing Customer Decision-Making Models

The implications of P1 are profound, because current customer decision-making models do not consider deep uncertainty about the future (see Table 4 for an overview). In fact, the marketing literature has traditionally focused on customer decisions with certain outcomes or with known risks (rows 2 and 3 in Table 4), but largely ignored decisions under ambiguity or deep uncertainty (Johnson 2004)

For example, the literature contains a fair number of studies of decisions under risk, as per row 3 in Table 4 (e.g., applied to Finance or Health). Standard normative models of customer decision-making under risk consist of three main components: (1) the immediate customer value of the outcome; (2) the probability with which each outcome will materialize, and (3) a time-based discounting component to reflect that outcomes in the future are valued less than outcomes in the present (Atlas, Johnson and Payne 2017).

While this work on decisions under risk assumes that outcomes and probabilities are known, research suggests that consumers make decisions based on subjective transformations of the known probabilities. The prospect theory probability weighting function is a good example thereof (Tversky and Kahneman 1992). This causes observed customer behavior to deviate from normative expectations, as is found in areas such as consumer finance (Johnson et al. 1993).

There is also a smaller stream of research that addresses what happens when outcomes are known but probabilities are unknown, which is referred to as decision-making under

ambiguity (row 4 of Table 4) (Einhorn and Hogarth 1986). A robust conclusion of this literature is that consumers devalue ambiguous decision options.

Under deep uncertainty, decision-makers cannot determine (1) what the possible outcomes of their decisions are, (2) what the (predicted) likelihood of future outcomes is, and (3) how to value the alternative outcomes of their decisions. In short, both outcomes and probabilities are unknown. Prediction models that assume known outcomes and known probabilities (decision-making under risk), will be highly sensitive to prediction error if, in reality probabilities and outcomes are unknown. Most importantly, even models that assume known outcomes and unknown probabilities (decision-making under ambiguity) miss important potential future outcomes. Therefore, decisions based on these models may value future opportunities incorrectly and ignore new future opportunities.

Moreover, decision-making under deep uncertainty about the future often co-occurs with long-term consequences, while we have more routinely studied customer decision-making where the consequences are immediate and not long-term (Sussman, Hershfield and Netzer 2023). However, customers routinely make decisions in the present that will affect their welfare in the long-term future. Normative theory suggests customers exponentially discount future outcomes (Samuelson 1937). However, behaviorally, future outcomes, even when they are certain, are often discounted ‘too much’ in customer decision making relative to exponential discounting (Frederick, Loewenstein and O’Donoghue 2002). Much of this stronger discounting seems to be

caused by the difficulty of considering future events which may be hard to retrieve, visualize and assess (Gabaix and Laibson 2017).

Table 4: Customer Decision-Making Models about the Future and Deep Uncertainty

Decision Making Model	**Characteristics**	**Decision-making models…**	**Illustrative references**	**Under deep uncertainty?**
Decisions without risk	Known outcomes over time with probabilities of either 0 or 1	Can determine optimal decision based on known future outcomes.	Becker and Brownson (1964) Frederick, Loewenstein and O'Donoghue (2002) Samuelson (1937)	Break down as outcomes and probabilities are unknown.
Decisions under risk	Known outcomes over time and known probabilities.	Can calculate expected values and optimize expected outcome based on model predictions. Traditional risk management frameworks work.	Kahneman and Tversky (1979) Machina (1987) Savage (1954) Von Neumann and Morgenstern (1944)	Break down as both outcomes and probabilities are unknown.
Decisions under ambiguity	Known outcomes over time but unknown probabilities.	Can devise scenarios that are relevant for decisions and prepare contingency plans.	Ellsberg (1961) Einhorn and Hogarth (1986) Tversky and Fox (1995)	Break down as outcomes are unknown.
Decisions under deep uncertainty	**Both outcomes over time and probabilities are unknown.**	**Are not available at present**	**Future research**	**Fit for purpose**

In summary, deep uncertainty implies that it is impossible to make meaningful predictions about what possible events can occur in the future, when in the future a possible event will occur, and what the likelihood is that this possible event will occur. Even the possible

event itself may be impossible to define or foresee. These changes push customer decision making theory into relatively unknown territory. Traditional models of customer decision-making require known probabilities (decision-making under risk) or at least known possible outcomes (decision-making under ambiguity). And traditional models of discounting require a (predicted) timeline and known possible outcomes. Under deep uncertainty about the future, neither possible outcomes nor the probabilities of these outcomes nor their predicted timelines are defined. Thus, we propose:

> *P2: Existing customer decision-making models ((a) without risk, (b) under risk or (c) under ambiguity) break down under deep uncertainty. The reason therefore is that under deep uncertainty, the possible outcomes, their probabilities and the timing of the outcomes of customer decision-making are not defined.*

Prior literature has found that options under risk or ambiguity are valued less than options that are certain (e.g., Ellsberg 1961). We assume that options that are characterized by deep uncertainty will be devalued to an even larger extent. Moreover, future outcomes are discounted compared to present outcomes. This discounting is likely to be even stronger if deep uncertainty exists. Think of energy transition. Customers considering to adopt photovoltaics may delay their adoption given the political uncertainty presented by changes in government policies. Moreover,

the biggest reduction in costs of electricity happens in the long term and is thus likely to be heavily discounted relative to what is expected by a standard decision model.

> *P3: Future consequences of decisions taken under deep uncertainty will have a lower impact on such decisions, as compared to decisions made (a) without risk, (b) under risk, or (c) under ambiguity.*

Deep Uncertainty Shapes Future Research on Customer Decision-Making

Figure 2 identifies two dimensions along which we need to shift our research focus (if P1 and P2 are true). Our research should shift from focusing solely on short-term consequences to studying more long-term consequences, and from focusing on known outcomes and probabilities to cases where both outcomes and probabilities are unknown.

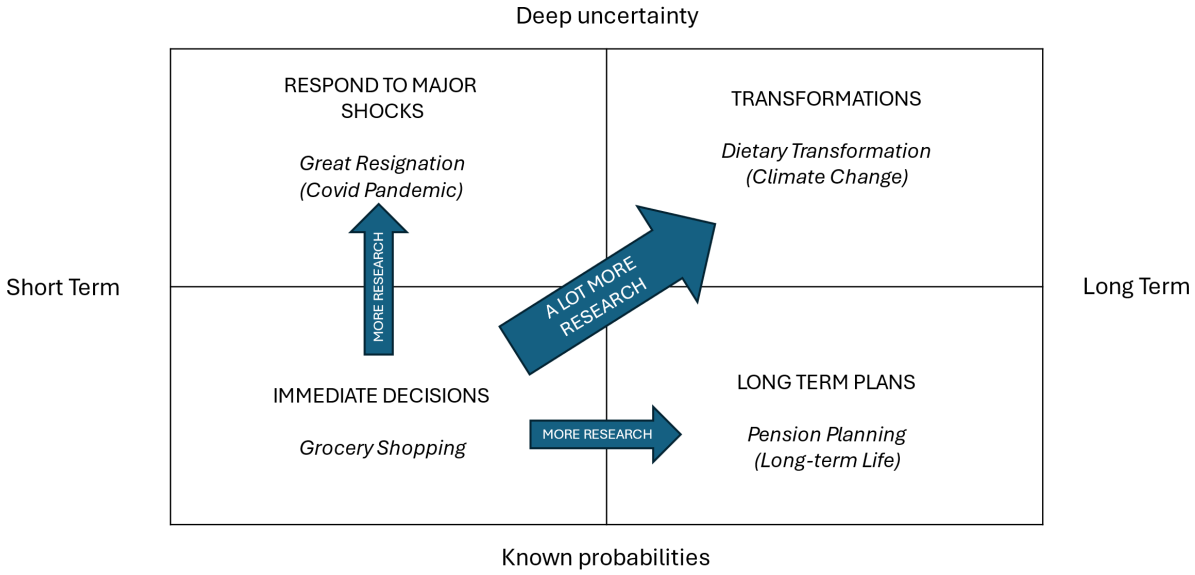
We label the four cells as "*immediate decisions*" (bottom left), "*long term plans*" (bottom right), "*respond to major shocks*" (top left) and "*transformations*" (top right). Traditionally, most of our customer research has focused on immediate decisions under known probabilities, likely because these are easier to study and easier to extract cause-consequence conclusions, given the temporal proximity of cause and consequence. Less studied are *long-term plans* that do not involve deep uncertainty, such as pension planning. Rather exceptionally, marketing research studied what we call *shocks*, i.e., short-term decisions taken under deep uncertainty (e.g., studies on the COVID-19 pandemic). We have conducted too little research on *transformational*

customer decision-making. A good example of such decision-making is the change in dietary habits as a response to global warming. Therefore, we propose:

P4a: Customer decision-making with short-term consequences and known probabilities is overstudied.

P4b: Customer decision-making with long-term consequences under deep uncertainty is understudied.

Figure 2: Future Research Needs on Customer Decision-Making



Regarding shifting focus from the short term to the long term, it seems pivotal to overcome hyperbolic discounting, where customers disproportionately prioritize immediate costs and benefits over long-term value (Laibson 1997). Transformative products like electric vehicles

(EVs) or photovoltaic (PV) cells with high upfront costs and long-term benefits (e.g., reduced energy costs, environmental impact) are harder for customers to value. If customers discount future rewards too steeply, we may wrongly assume that customers do not value these products, when in reality, the perception of value is skewed by this discounting bias, limiting adoption below its true potential. Future research could test whether transactions can be structured better to better align with customer psychology. We need to evaluate the effectiveness of long-term payment plans where the upfront purchase is "free" with ongoing costs spread over time. In the healthcare industry, similar thoughts are emerging, such as leasing life-saving therapies to mitigate high upfront costs against uncertain long-term benefits. We propose:

> *P5: (a) Reducing upfront cost barriers or (b) aligning short-term and long-term value in customer decisions will aid adoption of transformative products in a decision context with deep uncertainty and long-term consequences.*

Regarding shifting focus from known probabilities to deep uncertainty, the main challenge is that neither normative models nor empirical behavioural research have fully defined what successful decision-making looks like in conditions of deep uncertainty. Behaviourally, under deep uncertainty, we expect customers to simplify their decision-making using heuristics—mental shortcuts that help them process complex information (Hogarth and Kunreuther 1995).

We envision customers might use two types of heuristic principles in such conditions, moving further away from the normative model into two opposing ends. They are:

1. Long-term abstract principles: Customers could use high-level rules to guide their decisions over time, focusing on broad, enduring values like sustainability or safety. Abstract principles can be applied even when detailed information is lacking.

2. Short-term practical decisions: Customers may also focus on immediate, tangible benefits. This approach emphasizes quick, simple decisions that offer immediate rewards, helping them navigate day-to-day uncertainty without overthinking long-term risks.

Customers may also over- or underweight certain factors in ways that normative models would not predict. For example, a person deciding whether to get vaccinated might see social media stories about future side effects and weigh them more heavily than reports by scientists. Under deep uncertainty, mismatched beliefs about future outcomes may make traditional tools such as risk-sharing mechanisms ineffective. These logics lead us to the following proposition:

P6: Aligning provider and customer beliefs about (a) outcomes, (b) probabilities, and (c) timing will aid customer decision-making under deep uncertainty with long-term consequences.

Decisions with long-term consequences that are taken in a deeply uncertain context may also involve higher stakes for society. We propagate that customer decision-making research should focus more on high stakes societal decisions, despite being more effortful and difficult to

conduct. Think of studies on global warming, economic inequality, gender biases, war economies, and technology anxiety, among others. Thus, we propose:

P7a: Customer decision-making on decisions with high societal stakes is understudied.

P7b: Customer decision-making on decisions with low societal stakes is overstudied.

Deep Uncertainty and Provider Decision-Making

Next, we examine how deep uncertainty about the future affects provider decision-making. We conjecture that under deep uncertainty it is harder for providers to maintain the right focus and to allocate resources properly. Thus, in Figure 3, providers facing deep uncertainty may more easily drift from the top right cell to the bottom left cell than providers that face a context of no uncertainty, risk or ambiguity. Think of incumbent automotive firms as a case in point. They face deep uncertainty in multiple ways: (1) environmental regulation has shifted repeatedly; (2) AI fundamentally shifted needs and solutions; (3) business models have shifted from owning to using a car. For incumbent manufacturers it is hard to find the right focus and optimize resource allocation.

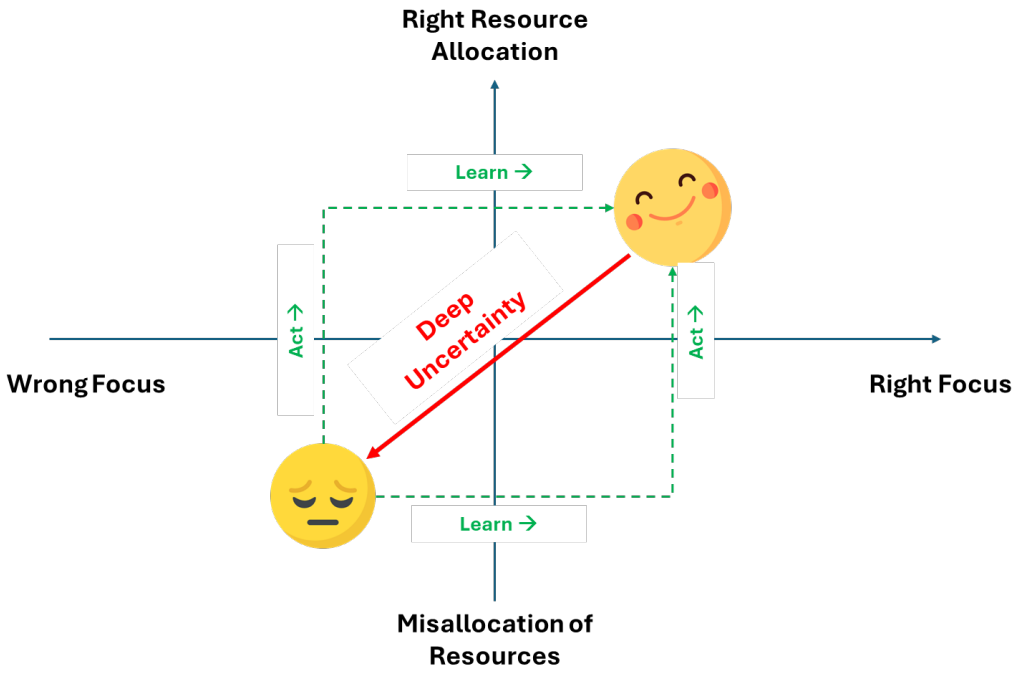
To re-enter or maintain position in the upper right cell, we envision two fundamental pathways for providers, both of which combine vision and agility:

- Pathway 1: Learn + Act: Providers learn the right vision, after which they act in properly allocating resources. A good example is Patagonia, which positions itself as a steward of

the planet - famously declaring that '*Earth is now our only shareholder*'- while empowering employees to be not just contributors, but advocates for its products and activism campaigns.

- Pathway 2: Act + Learn: Providers act through experimentation first, after which they learn the right focus. A prototypical example is Booking.com running 100s of A/B experiments weekly to optimize short-term decisions as it defines its right long-term focus.

Figure 3: Providers Struggle to Maintain the Right Focus and Resource Allocation



We derive propositions on the optimality of vision and agility for providers under deep uncertainty from a stylized mathematical model. Let us assume a continuum on which the provider positions itself, with the provider location at time t being X_t. Let us set the true location

of the market at time t as M_t. Note that in general the provider will not be perfect at matching the market. In other words, usually X_t is not equal to M_t. We assume that the provider's profitability at time *t* is a function of how far away it is from the true market location:

$$\Pi_t = \Pi_{max} - \beta(X_t - M_t)^2 \quad (1)$$

where $\beta > 0$, and Π_{max} is the profit that the provider would achieve if it was perfectly matched to the market. Now assume that the provider receives errorful market information, M_t^*, such that:

$$M_t^* = M_t + \varepsilon_t \quad (2)$$

where $\varepsilon_t \sim N(0, V_1)$. The error term, ε_t, is the error in observing the market at time t, and the variance, V_1, is a measure of the magnitude of this error. We model changes in the market as a random walk around a trend line:

$$M_t = M_{t-1} + T + \delta_t \quad (3)$$

where $\delta_t \sim N(0, V_2)$, and T is the trend in the market over time. The trend T is our measure of expected change (not all of which will be anticipated by the provider), and the error term, δ_t, is the unexpected change at time t. We will show that the optimal amount of agility is a function of the provider's vision, as well as the degree of expected and unexpected change (V_2). We assume that the provider selects its position, X_t, at time t, as a linear combination of the current market information, M_t^*, and the provider's estimate of the market, $M_t^{\wedge}$, based on what was observed in the past. This leads to:

$$X_t = \alpha M_t^* + (1 - \alpha)M_t^{\wedge} \quad (4)$$

where

$$\hat{M_t} = M_{t-1} + \upsilon T \quad (5)$$

with $\upsilon \sim U(0, 1)$. That is, if $\upsilon = 1$, then the provider has perfect vision, and sees exactly where the market is headed long-term. On the other hand, if $\upsilon = 0$, then the provider has no ability to see the expected change in the market. Based on this model, we derive the following propositions:

P8a: The better the vision of providers the more profitable providers are.

P8b: The larger the expected change, the more providers' profits will benefit from better vision.

From Equation 1, we see that Π_{max} is constant, which means that the controllable part of profit is $-\beta(X_t - M_t)$. Minimizing this function with respect to α gives us the optimal agility level, α^*. This sets up the following likelihood function:

$$L = [\alpha\varepsilon_t - (1 - \alpha)T - (1 - \alpha)\delta_t + (1 - \alpha)\upsilon T]^2 \quad (6)$$

From this function, after some algebra, we can obtain:

$$E[L] = \alpha^2 V_1 + (\alpha - 1)^2(1 - \upsilon)^2 T^2 + (\alpha - 1)^2 V_2 \quad (7)$$

Taking the partial derivative with respect to α yields:

$$\partial E[L]/\partial\alpha = 2\alpha V_1 + 2(\alpha - 1)(1 - \upsilon)^2 T^2 + 2(\alpha - 1)V_2 \quad (8)$$

From this, we get the second order condition:

$$\partial^2 E[L]/\partial\alpha^2 = 2[V_1 + (1 - \upsilon)^2 T^2 + V_2] > 0 \quad (9)$$

This ensures that the solution is a minimum. From Equation (8), setting $\partial E[L]/\partial \alpha = 0$, we obtain the optimal degree of agility, α^*:

$$\alpha^* = [V_2 + (1 - \upsilon)^2 T^2]/[V_1 + V_2 + (1 - \upsilon)^2 T^2] \quad (10)$$

From Equation 10, we can examine the corner cases for υ. When $\upsilon=0$ (no vision), we have:

$$\alpha^* = [V_2 + T^2]/[V_1 + V_2 + T^2] \quad (11)$$

On the other hand, if the provider has perfect vision ($\upsilon=1$), then we have:

$$\alpha^* = [V_2]/[V_1 + V_2] \quad (12)$$

From Equation 10, we can derive proposition 9, with a derivation as follows:

$$\partial \alpha^*/\partial \upsilon = [-2(1 - \upsilon)T^2 V_1]/[V_1 + V_2 + (1 - \upsilon)^2 T^2]^2 < 0 \quad (13)$$

Thus, better vision implies less agility, all else being equal, or in proposition form:

P9: The better the provider's vision, the lower the profits the provider obtains from agility.

The conceptual logic underlying this proposition is that agility and vision are compensatory. The better developed the vision of a provider, the less it benefits from increments in agility and vice versa. This is logical as one considers that agility mostly serves to reallocate resources in response to expected (T) and unexpected change (V_2). If the provider knows where the market is going, it might benefit more from its long-term vision and benefit less from responding to short-term shocks. Given expected and unexpected change are assumed to be high under deep uncertainty, providers will benefit from both vision and agility.

We derive from equation (10), our next propositions on the effect of the degree of expected and unexpected change, captured by the values of T and V_2, as follows:

$$\partial\alpha^*/\partial T = [2V_1T(1-\upsilon)^2]/[V_1 + V_2 + (1-\upsilon)^2T]^2 > 0 \quad (14)$$

$$\partial\alpha^*/\partial V_2 = V_1 / [V_1 + V_2 + (1-\upsilon)^2T^2]^2 > 0 \quad (15)$$

Thus, more expected and unexpected change calls for more agility, all else being equal:

P10: The higher the degree of (a) expected, or (b) unexpected change, the higher the profits the provider obtains from agility.

From equation 10, we can also derive the following (V_1 measures the magnitude of error the provider makes in observing the market):

$$\partial\alpha^*/\partial V_1 = -[V_2 + (1-\upsilon)^2T^2]/[V_1 + V_2 + (1-\upsilon)^2T^2]^2 < 0 \quad (16)$$

P11: The provider's profits derived from being agile are higher the smaller the error the provider makes in observing the market.

Thus, worse ability to monitor the market implies the firm obtains lower benefits from being agile. The underlying idea is that responding to erroneous signals can be counterproductive, if the degree of error is large. Taken together, given environments with deep

uncertainty will show much higher expected and unexpected change than environments without deep uncertainty, we propose:

P12: The (a) better the provider's vision, the (b) higher the provider's agility or (c) the better the provider's market monitoring ability, the more the provider will outperform other providers, in an environment characterized by deep uncertainty.

Implications for the Future of Marketing

Now that we understand the impact of deep uncertainty on customer decision-making on the one hand and provider decision-making on the other hand, we turn to how deep uncertainty will transform marketing itself. We consider *marketing* to be essentially the set of activities that providers undertake to co-create value with customers[2]. We can separate out the locus of these activities from the actual activities themselves (e.g., Polanyi, 1992):

1. *Locus:* In the past, the locus of exchange was a stable linear value chain. In the future of marketing, the locus of exchange is a dynamic co-production network, where customers, providers, and other stakeholders collaborate in flexible constellations to co-create value.

[2] This definition is consistent with AMA's latest definition of marketing ("the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large"), but emphasizes the customer-provider co-creation in line with our theorizing.

2. *Activities*: In the past, we defined marketing activities as a hierarchical process of gathering Insights, setting Strategy and Execution on strategy, with a feedback loop from execution back to insights and strategy. In the future, we propose that marketing activities involve rapid iterations between insights and decisions without clearly distinguishing between strategy and execution. Customers and providers will share a vision how they execute four critical relational activities: connecting, informing, moving, and settling.

From Stable Linear Value Chains to Dynamic Co-Production Networks

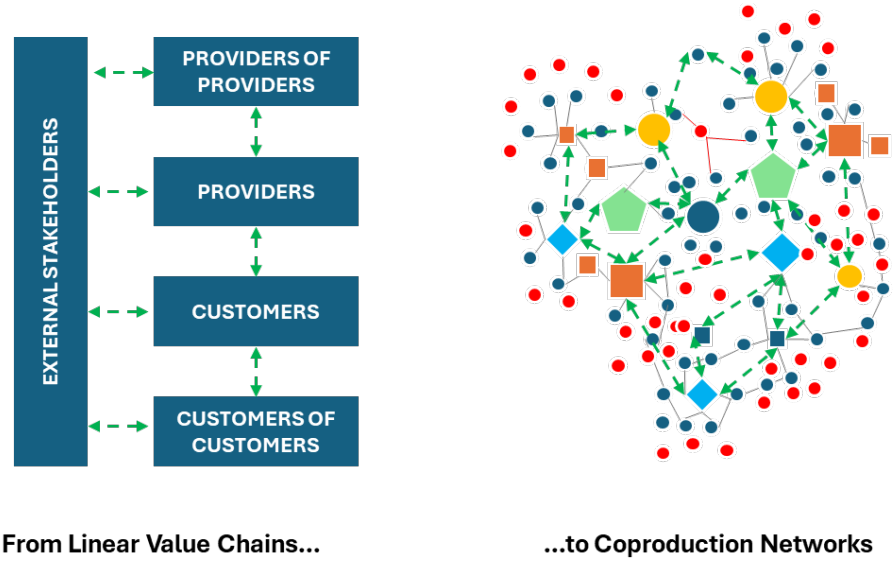
Shifting the *locus of exchange* from stable linear value chains to dynamic co-production networks (see Figure 4) helps providers mobilize resources to adapt to unpredictable shocks. In linear value chains, value flows sequentially from providers to customers who have clear and relatively fixed roles. In contrast, in dynamic *co-production networks* a diverse set of stakeholders (customers, providers, partners, community) interact to co-create value (Davis 2016). The more fluid and adaptive nature of these co-production networks help firms efficiently mobilize resources and adapt in the face of deep uncertainty for two reasons.

First, in linear value chains, stakeholders have fixed roles and rely on rigid agreements (Adner and Kapoor 2010). Thus, high resource mobilization costs arise when trying to change and re-organize these to address unpredictable shocks. In contrast, in dynamic co-production networks different stakeholders establish flexible roles and collaboration agreements that can adapt to shocks efficiently (Sodhi and Tang 2017). In a dynamic co-production network, providers can

distribute the response across multiple stakeholders, with each stakeholder in the network responding to the shocks they are best equipped to handle (Durand et al. 2019).

Second, in linear value chains, providers rely on long-lasting partnerships that operate on a fixed set of pre-agreed responses and decision rules (Adner and Kapoor 2010), which slows down adaptation. In contrast, in dynamic co-production networks, stakeholders build a capacity to share knowledge, self-organize and rapidly redirect attention to new signals to efficiently adapt to unforeseen shocks (Tonellato et al. 2024). For instance, during the COVID-19 pandemic, pharmaceutical firms rapidly formed dynamic networks with biotech companies, governments, academia, logistics providers, and competitors to accelerate the development, manufacturing, and distribution of vaccines.

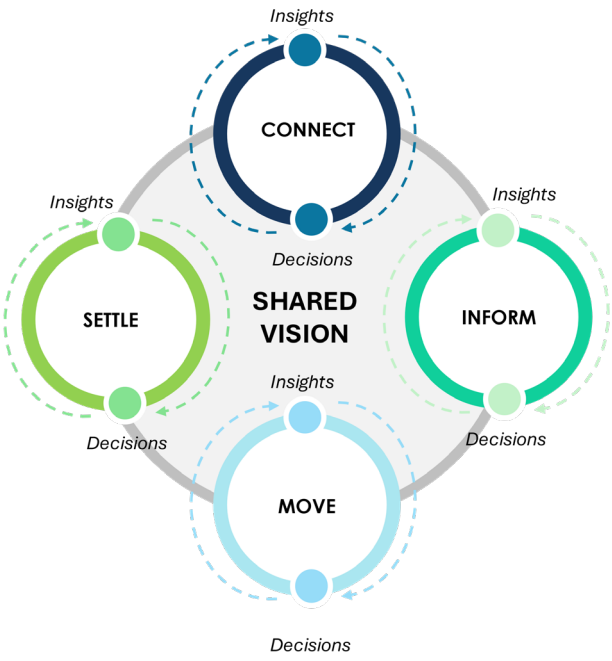
Figure 4: From Linear Value Chains to Coproduction Networks



Exchange Activities: Agile with a Shared Vision

To respond to deep uncertainty, providers need to build rapid, iterative loops between insights and decisions across four relational (CIMS) exchange activities: *connect*, *inform*, *move*, and *settle* (see Figure 5). Customers and providers need to develop a shared vision on their co-creation interactions, allowing them to respond in the short term effectively while also pursuing mutually beneficial outcomes (Dyer and Singh, 1998).

Figure 5: Agile Exchange Activities with a Shared Vision



Derived from Mintzberg (1994), we expect that, in contrast, the Insights → Strategy → Execution chain struggles under deep uncertainty due to three fallacies: (i) the fallacy of *prediction* (i.e., overestimating one's own ability to forecast), (ii) the fallacy of *detachment* (i.e.,

underestimating the costs of separating strategy from execution), (iii) and the fallacy of *formalization* (i.e., overestimating one's own capacity to unilaterally execute as planned). Agile exchange with shared vision delivers three key benefits to providers and customers:

First, it abandons the assumption that the future can be forecasted. Providers and customers adjust decisions dynamically as new insights emerge from their exchange. Second, it rejects the traditional separation between strategy and execution. The shared vision between providers and customers establishes a high level of trust between both and confers greater autonomy to local agents of providers for greater speed and responsiveness. Third, it rejects the notion that providers can plan marketing activities through a one-directional sequence (Insights → Strategy → Execution) to which customers passively respond. Future marketing activities are inherently co-created and relational.

Mission Command, rooted in the Prussian principle of *Auftragstaktik*, exemplifies how modern militaries like NATO and the US Army navigate deep uncertainty by combining agility with a shared vision (Shamir 2010). Leaders define a clear intent guiding all efforts, while frontline units make decisions based on local insights, ensuring alignment and responsiveness to changing conditions. Tony's Chocolonely, a Dutch chocolate manufacturer, centers its marketing around the vision of 100% slave-free chocolate. This vision functions much like the 'mission intent'- it provides long-term direction and coherence while leaving room for experimentation and bold marketing decisions in the short-term. This vision guides bold decisions like the controversial 2021

Sweet Solution campaign, which highlighted exploitation in the cocoa supply chain by mimicking major brands, such as KitKat and Toblerone (Myers 2021). For Tony's marketers, highlighting ongoing exploitation in the cocoa supply chain fits perfectly with their shared vision.

In short, the future of marketing lies in enabling faster, decentralized value co-creation within dynamic co-production networks. Adopting a more agile view of marketing's exchange activities anchored in a shared vision enables customers and providers to join forces to better navigate deep uncertainty.

Future Research Agenda

We initiate a future research agenda for our field on: (1) the concept of deep uncertainty; (2) customer decision-making; (3) provider decision-making; (4) the future of marketing, and (5) the potential role of AI. We discuss each in turn and provide an overview in Table 5.

Theme 1: The Concept of Deep Uncertainty

The first theme for future research centers on deep uncertainty as a concept. Although the notion of unknowns in decision-making theory dates back over a century (Knight 1921), deep uncertainty has emerged as a distinct concept relatively recently (Marchau et al. 2019). Future research should rigorously conceptualize and empirically ground deep uncertainty in marketing, clarifying its core dimensions, antecedents, and consequences.

Table 5: Future Research Opportunities

Theme	Selected future research questions	Possible research designs	So what?
Theme 1: Deep uncertainty as a concept	How can deep uncertainty be conceptualized and measured in marketing?	Conceptual development; Scale development and validation.	Establish a clear, cumulative foundation for studying deep uncertainty in marketing.
	Can we classify marketing decisions along a continuum of uncertainty?	Analytical models; Surveys of marketing managers and key informants.	Equip marketers with diagnostic tools to assess the nature of uncertainty they face.
	When and why do customers and providers perceive uncertainty as deeply uncertain?	Surveys; Behavioral experiments; Ethnographic and qualitative studies.	Describe how customers and providers experience deep uncertainty and uncover coping mechanisms.
Theme 2: Customer decision-making	How do customers make decisions and cope with deep uncertainty?	Longitudinal studies (e.g., diary methods, apps); Large-scale surveys; Ethnographic studies.	Model decision behavior under deep uncertainty, informing theory and practice.
	Which heuristics help customers make robust decisions under deep uncertainty?	Behavioral experiments varying uncertainty type and intensity.	Identify evidence-based, practically robust decision strategies. Reveal barriers to heuristic adoption.
Theme 3: Provider decision-making	How do providers adapt organizational processes and governance structures under deep uncertainty?	Comparative case studies; Managerial surveys; Key informant interviews.	Identify strategic and operational innovations for organizational resilience.
	How do providers recalibrate their objective functions under deep uncertainty?	Conceptual development; Analytical models; Multi-method studies with senior decision-makers.	Reveal shifts beyond short-term profit toward long-term and ecosystem-based goals.
Theme 4: The future of marketing	How can providers build and manage co-producer networks around a shared vision?	Theories-in-use; Network analysis; Mixed methods (e.g., text analysis, interviews, surveys).	Guide the design of co-production networks and reveal how shared vision sustains cooperation.
	Do iterative insight-to-decision cycles outperform traditional approaches under deep uncertainty?	Agent-based simulations; Multi-case studies; Comparative qualitative research.	Understand the structure of agile organizations.
	How do agile exchange activities ("CIMS") enable providers and stakeholders to co-create value?	Multi-case studies; Comparative qualitative research; Field or quasi-experiments.	Equip providers to build adaptive relationships that remain effective as conditions change.
Theme 5: The role of AI	How will AI transform the marketing profession?	Conceptual development; Qualitative studies.	Reframe AI as a catalyst for systemic change.
	How can GenAI support customer decisions under deep uncertainty?	Prototyping and testing GenAI-powered support tools; Lab and field experiments.	Build AI tools that help customers think ahead and make better decisions under deep uncertainty.
	How can AI 'upgrade' decisions contexts from deep uncertainty to manageable risk or ambiguity?	Analytical models; Field experiments; Simulations.	Show how AI can help providers better manage deep uncertainty.
	How can AI enhance coordination and trust in co-production networks?	Coordination experiments; Case studies of adaptive networks.	Reveal how AI can facilitate stakeholder alignment in dynamic ecosystems.
	How can AI support faster, more agile, and more ethical marketing decisions?	Field experiments; Ethical audits of AI decision systems.	Show how providers can use AI to unlock speed without sacrificing trust and responsibility.
	How can GenAI boost creativity and high-stakes decisions under deep uncertainty?	Lab experiments; Managerial and key informant surveys an interviews to assess decision quality.	Leverage AI to unlock new ways to augment creativity and judgment in complex decisions.

A first key step to take for future research is to develop and empirically validate measures for "unknown unknowns" and a complex web of "known unknowns", grounded in the unknowability of outcomes, probabilities and timing as distinctive for deep uncertainty to arise.

Next, future research should map marketing activity and decision contexts along a continuum from truly unknowable to complex yet potentially predictable. Scholars can leverage related decision theories such as epistemic versus aleatory uncertainty (Walters et al. 2023) – to conduct such mapping, either through analytical models, or through surveys of marketing managers and key informants. A validated taxonomy of marketing activity and decision contexts would equip marketers with a diagnostic tool to assess the nature of uncertainty they face and to design targeted coping strategies for customers and providers.

Also future research on mental models on deep uncertainty would be valuable. Analytical classifications of marketing problems in terms of their deep uncertainty may deviate from the mental models of different provider or customer typologies. Such future research can build on research in consumer behavior, anthropology, and sociology that has explored how people experience and navigate an increasingly uncertain society (Bardhi and Eckhardt 2017; Giesler 2008). Future research could examine whether customers perceive uncertainty as deeply uncertain, and whether this perception shapes different consumption practices. For providers, research could build on studies of managers' mental models under uncertainty (Gary and Wood

2011), and investigate whether and how managers recognize deep uncertainty in marketing problems and what marketing strategies and tactics they envision to cope with it.

Theme 2: Customer Decision-Making

A growing literature in consumer research has explored high-impact decisions in domains such as consumer finance (e.g., Shu, Zeithammer, and Payne 2016), healthcare (e.g., Dellaert et al. 2024), and sustainability (e.g., White, Habib, and Hardisty 2019). Yet, this literature has not explicitly addressed deep uncertainty. A first research priority, therefore, is to develop descriptive research of how customers make decisions under deep uncertainty (as opposed to decisions without risk, with risk, or under ambiguity) and assess the consequences of deep uncertainty on those decisions. For example, future research could track individuals and families over time (e.g., diaries, apps, surveys, ethnography) to model the relationship between customer decisions and their perceptions of deep uncertainty. Such insights could lead to practical evidence-based guidelines to help customers make better decisions and help providers understand customer decisions under deep uncertainty.

Second, future research could identify practical decision rules to help customers make *robust* decisions under deep uncertainty, which are decisions that yield acceptable – though not necessarily optimal - outcomes across a wide range of unknown futures (Lempert et al. 2003). Prior research has demonstrated that simple heuristics can perform surprisingly well in complex, though not deeply uncertain, decision contexts (Payne, Bettman and Johnson 1993). A promising

research direction is to test the effectiveness of a new set of heuristics particularly suited to deep uncertainty decision-making, in the style of the work of Marchau et al. (2019). One can think of behavioral experiments that vary the type and intensity of uncertainty and compare subjects using (versus not using) such heuristics on proxies of decision quality.

Two research questions are particularly relevant here. First, which heuristics are most effective in dealing with deep uncertainty triggered by geopolitical tensions, climate changes, technological disruption, or any other major changes? While no single heuristic can guarantee optimal outcomes, it is likely that some heuristics will be more robust than others. Second, which heuristics are acceptable and usable for customers in practice? Ethical and emotional concerns, for example, may lead customers to reject heuristics that feel like 'gambling' on the future – even when such approaches are more practically feasible than in-depth optimization under deep uncertainty (Andersson 2023).

Theme 3: Provider Decision-Making

The demand for research on how organizations manage decision-making under deep uncertainty is likely to grow rapidly. Currently, empirical research in marketing on how organizations adapt their structures to handle uncertainty remains scarce (Vargo et al 2023). Future research can examine how providers adapt their organizational processes and governance structures in response to deep uncertainty. Initial insights can be generated through comparative case studies, managerial interviews, and key informant surveys that map strategic and

operational innovations across industries, together with conceptual development, answering the call in Yadav (2010) for more conceptual work in marketing.

Good examples of such emerging studies exist in creative industries (Tan 2015) and insurance (Baker and Shortland 2023). Researchers can start with qualitative studies on specific contexts to then expand to large-scale archival studies, managerial surveys, or field experiments to study different organizational responses to changes that create deep uncertainty.

Second, future research should investigate how providers adapt their objective functions in response to deep uncertainty. Traditional short-term profit maximization may not align well with deep uncertainty. Analytical models, longitudinal case analyses, experiments with role-playing in simulations, surveys of senior decision-makers or multi-method approaches could explore how firms adjust their objectives – such as prioritizing long-term organizational health, aligning a shared vision across multiple stakeholders, or promoting broader ecosystem health.

Think of Bremmer and Eisenhardt (2022) as an example. They conducted a multi-case study in the drone industry using archival data, interviews, observations, and emails to compare firm-based versus community-based innovation structures under uncertainty. They found firm-based structures to be more effective when uncertainty was high.

Theme 4: The Future of Marketing

We highlight the following directions for future research on the future of marketing itself. First, future research should develop guidance on how to build and manage co-producer

networks around a shared vision. For instance, how can providers align stakeholders around a shared vision while balancing competing priorities, interests and time horizons? In line with classic work on moral dilemmas (Marcus 1980), such tensions may reflect deeper goal-based conflicts that, if unmanaged, can destabilize co-producer networks. Descriptive research, using theories-in-use approaches, could examine how successful co-producer networks emerge, how they adapt to unpredictable events, and how variations in shared vision affect network performance. Empirical studies could also apply network analysis methods to study the evolution of co-producer networks over time and how variations relate to the performance of participating agents. Mixed-method studies that combine network data with measures of agents' adherence to a shared vision (e.g., through text analyses of digital interactions of platform organizations, interviews, or surveys) can offer valuable insights into the mental models that shape collaboration in co-production networks.

Second, future research may validate whether decentralized, rapid insights-to-decision cycles outperform traditional insights-strategy-execution approaches, as we conceptually argue in this paper, for instance through agent-based simulation. This research could be inspired, for instance by Koçak, Levinthal and Puranam (2023), who compare how flat versus hierarchical teams adapt in uncertain environments, showing that coordination structures can shape agility and adaptiveness. Another possibility is to draw on qualitative methods, such as in Alexy et al. (2021), who use a multi-case design to study how ventures revise or persist in their strategic

direction over time. A comparable research design could explore how more versus less effective marketing teams differ in their use of iterative (vs. linear) insights-to-decision cycles, or decentralized (vs. centralized) decision-making.

Third, future research should examine how connecting, informing, moving, and settling shape a provider's ability to navigate deep uncertainty. Key questions for future research include: (1) How can providers *connect* with stakeholders when traditional contracts fail to account for unpredictable change?; (2) How can providers and customers *inform* each other to enable agile responsiveness?; (3) How can providers enable frontline actors to *move* with customers and stakeholders toward a shared vision?; and (4) How can providers and customers *settle* value exchange in flexible ways that adapt as conditions evolve? Answering these questions can help providers design adaptive relationships that stay effective as conditions change – which can be explored through multi-case studies, comparative qualitative research, field- and quasi-experiments.

Theme 5: The Role of AI

Building on Huang and Rust (2018) and Rust and Huang (2021), more work is needed on the impact of AI on markets, marketing activities and the marketing profession. Beyond incremental field work on specific AI interventions, we see room for conceptual work on how AI will affect entire subdomains of marketing as customer service (e.g., Huang and Rust 2024), omnichannel marketing or innovation.

Second, future research should explore how AI agents can help customers navigate deep uncertainty. GenAI has the potential to take over many marketing-related tasks (Schmitt 2025), but also creates important concerns (Huang and Rust 2025). GenAI chatbots can help customers generate a broader repertoire of future scenarios than they could generate by themselves (Spaniol and Rowland 2023) facilitating decision-making despite deep uncertainty. Future research could test whether LLMs can effectively support customers' long-term decision-making under deep uncertainty in lab and field experiments.

Third, future research should explore how providers can use predictive AI to push back the boundaries of deep uncertainty. For instance, future research could guide marketing practitioners in deciding when to invest in predictive AI to 'upgrade' marketing decision contexts from deep uncertainty to ambiguity or risk, where outcomes and probabilities are at least partially known and more established decision models are available. Future research could also generate AI tools for the discovery and description of alternative futures so they can be managed better, augmenting or replacing traditional scenario analysis (Rezazadeh et al. 2025).

Fourth, how can AI strengthen co-producer network formation under deep uncertainty? Scholars can investigate how AI tools can enable the alignment and coordination of different stakeholders by supporting adaptive interaction, mutual responsiveness, and trust in these networks. In addition, by 'hard coding' shared goals into AI systems and leveraging technologies

such as blockchain, future research can investigate how AI can reduce misalignment and improve collaboration in coproduction networks.

Fifth, a big area of research future lies in the use of AI to enable agile marketing decisions. For instance, there is some initial evidence that AI can help providers respond more effectively to market shocks (Han et al. 2025). Future research could: (1) test how AI can accelerate insight generation; (2) study how AI can speed up providers' marketing responses to insights under deep uncertainty; and (3) study how to avoid abuse of such systems.

Sixth, research on the role of generative AI as a sounding board for provider decision-making could be valuable to practice, for instance to augment creativity. Future research could also examine how to combine predictive and generative AI to assist in making high-stakes marketing decisions under deep uncertainty.

Envoy

In conclusion, this paper has highlighted the profound impact of deep uncertainty on markets, marketing, and marketers. From examining how deep uncertainty affects customer and provider decision-making and how it shapes the future of marketing, we have derived many actionable future research avenues that we hope will be pursued by marketing scholars. Future research that prioritizes the many research avenues, for instance by surveying practitioners and academics, may provide a good immediate starting point.

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