Table 2 – Main Table of Raw Data and Initial Analysis of the Entrepreneurship Literature related to Uncertainty

CITE	TYPE	U-DEFN(S)	MEASURED/ CONSISTENCY	DECISION /RQ	NOTES	LoA	TREATMENT	ONT = subj or obj	MAIN CONCEPTS	SOURCES OF UNCERTAINTY
Agrawal, A., Gans, J. S., & Stern, S. (2021). Enabling entrepreneurial choice. Management Science, 67(9), 5510-5524.	conceptual - theory - math model	[UNDER-DEFINED - value unknown of idea compounded with strategy effectiveness unknown, yet beliefs exist?] an entrepreneur faces two main sources of uncertainty. First, how "valuable" is the core idea of their venture? Second, how "effective" (in terms of creating and capturing value) are particular strategies associated with commercializing that idea?	[*simplified = two states of world, have prior probabilities, can learn about unknown through experiments, so not fully unknowable; no explicit mathematical expression of U, just verbal* NOISE vs U] entrepreneur's prior probability that the idea is of high value is p0… For any given strategy, the prior probability that it is effective is e0… can gather information before the implementation of a strategy by conducting a "test"… Critically, Pr[h|H], Pr[l|L], Pr[g|G], andPr[b|B] are all strictly less than 1... the parameters of the probability distribution governing the value of an idea are not known by the entrepreneur	Because the ultimate success of a venture depends both on the quality of the idea as well as the chosen strategy, reducing uncertainty about both of these dimensions is critical. It is, therefore, not surprising that a central question for entrepreneurs is how to design and interpret experiments that allow them to assess both the quality of their ideas and the value of particular strategies	Entrepreneurs must choose between alternative strategies for bringing their idea to market. They face uncertainty regarding both the quality of their idea as well as the efficacy of each strategy. Although entrepreneurs can reduce this uncertainty by conducting tests, any single test conflates the signal of the efficacy of the particular strategy and the quality of the idea. Resolving this conflation requires exploring multiple strategies	individuals - entrepreneurs	learning over time = entrepreneurial choice is enhanced by finding ways to lower the cost of testing multiple strategies, receiving guidance as to the types of tests likely to reduce signal conflation, and optimally sequencing tests based on previous beliefs, creating a role for judgment that may be provided by trusted third parties; exploring strategies that may be riskier may allow clarity at an earlier stage about the value of the underlying idea; consider multiple strategies will perform more highly than those that commit to the first viable strategy	obj = math modeled - idea and execution quality drawn probabilistically, as are test signals (noise involved); expectations are computable by agent [meant to capture indiv subj? experiences]	experimentation; strategy; Gans models; search;	uncertainty regarding both the quality of their idea as well as the efficacy of each strategy; parameters of the probability distribution governing the value of an idea are not known by the entrepreneur; uncertainty associated with most entrepreneurial environments makes it difficult to obtain signals that distinguish between the quality of the idea and effectiveness of the strategy
Alvarez, S. A. (2007). Entrepreneurial rents and the theory of the firm. Journal of Business Venturing, 22(3), 427-442.	conceptual - word model	KU = the probability distribution of outcomes associated with a decision is not known before a decision is made; the possible outcomes of this decision and the probability of those outcomes are not known, when a decision is made; decision makers are often ignorant of their ignorance of possible future outcomes;	[?NOT consistent, given uncertainty is knowable over time by acting/ learning] investments are made under conditions of uncertainty where there is no (empirically) valid basis of any kind for classifying instances to determine probability from past experience or statistical calculation;	paper describes how entrepreneurs can organize a firm to solve their rent creation and appropriation problems, even when the future economic value of exploiting a market opportunity is uncertain; [NEVER answers its own question of "why would parties in this exchange have the incentives to invest to create the potential for generating entrepreneurial rents?"] [no basis for beliefs provided under KU]**	entrepreneurial rents are created under conditions of uncertainty; [**many important investment decisions have to be made in order to create an entrepreneurial rent before the information necessary to exercise fiat is available**[p435]]	individuals - entrepreneurs	have strongly held beliefs about the value of those investments going forward; be thought of as a Bayesian update model of decision making; in conditions of uncertainty, parties initially hold the residual control rights in common; over time, as uncertainty evolves – through the acquisition of information about the project – into risk; using the firm to gain knowledge; willingness and ability of parties to that exchange to monitor and adjust their investments in this exchange over time	obj = depends on the objective properties of that setting, not on the perceptions of decision makers; subj = beliefs;	theory of the firm; entrepreneurial rents; Knight; TCE; author's own TH;	new, untried market opportunities; new and untested technologies and new and unexplored market opportunities;
Alvarez, S. A., & Barney, J. B. (2020). Insights from creation theory: The uncertain context rendered by the COVID-19 pandemic. Strategic Entrepreneurship Journal, 14(4), 552-555.	conceptual - essay	Decision-making settings were uncertain when decision-makers did not know, ex ante, what an optimal decision was and also did not know the possible outcomes of a decision nor their probability..(cites Knight; KU)	[*NOT CONSISTENT with KU; speaking to treatments over time as social influence that is somehow immune to noise, competition, and ignorance] Knightian uncertainty makes it difficult to design optimally informative experiments; mixes TH (KU) with observation about entrepreneurial practice (where there is learning over time); uses Covid-19, BLM as examples of KU (mixing in bias, misinformation, of reality w/ hypotheticals of TH); last examples relate to people causing uncertainty (?) and doing post mortems (how has that worked out years later??)	[somehow paralleling 1918 pandemic of Knight to now with Covid??? ..somewhat rambling self-advert w/ minimal insight other than ex post commentary…]	Knightian uncertainty is a key assumption of the Creation Theory of the formation and exploitation of entrepreneurial opportunities; suggests that entrepreneurs often begin the process of forming opportunities—defined as competitive imperfections in a product or factor market—with limited or no information about the characteristics of the opportunity they may ultimately create	individuals - entrepreneurs	an iterative path-dependent learning process undertaken through a series of actions; multiple approaches; experimentation; heuristics	subj = real decision-makers; Covid is obj though	creation (authors' own)	exogenous events and others' actions

Alvarez, S. A., & Sachs, S. (2023). Where do stakeholders come from?. Academy of Management Review, 48(2), 187-202.	conceptual - process flow model	U = it is not yet possible to calculate the "present value" of such actions; KU; where neither the possible outcomes of investing in these endeavors nor their probability of occurring is known ex ante; there is no traditional economic rationale for investing in a nascent endeavor;	[*set-up language speaks to KU but nothing later; no text in body about probabilities or unknowns; speaks to different forms of U => INCONSISTENT in analysis, given treated by 'faith', or learning about people, not about what was uncertain*] act in the face of outcome uncertainty set into motion by their own actions; relational uncertainty is not present because of the process they have gone through together in forming this entrepreneurial endeavor; the stakeholders may not believe that they can navigate the uncertainty that their very actions created with their individual competencies, they believe that together they are invincible;	how do stakeholders self-identify in the earliest stages of an entrepreneurial endeavor when a firm has yet to exist and the outcomes of products and services and their effects on stakeholders are unknown? purpose of this paper is to develop a process model that explains how individuals come to self-identify as stakeholders and how this self-identification can lead to the emergence of an entrepreneurial endeavor.	there are no apparent traditional, rational economic reasons for an individual to make resources available to a nascent entrepreneurial endeavor;	individuals - entrepreneurs & stakeholders	the stakeholders can communicate about and develop their product and service ideas as if the market already existed - stakeholders can ignore uncertainty surrounding the acceptance of their product and service ideas and replace that uncertainty with cognitive certainty; through overconfidence and illusion of control; shared perceptions, attitudes, feelings, and behaviors in the face of outcome uncertainty [trust]; mutual admiration and expectations of each individual's different skill sets; learning over time; experiments;	subj = perceptions; BUT obj = shared perceptions;	stakeholder TH; author's own work; the TH of common ground; Knight;	early stages of entrepreneurial endeavor; new-to-the-world product or service; non-existent firm or 'opportunity' or market;
Amoroso, S., Moncada-Paternò-Castello, P., & Vezzani, A. (2017). R&D profitability: the role of risk and Knightian uncertainty. Small Business Economics, 48(2), 331-343.	empirical - sample of top corporate R&D investors worldwide	The 'true' uncertainty, on the other hand, applies to situations where no probability can be computed, as agents do not have the information necessary to assign a probability measure "because the situation dealt with is in a high degree unique" (Knight 1921, p. 233).. notion of ambiguity derives from the interpretation of uncertainty as the lack of predictability due to the lack of sufficient information or to the complexity of information.. Ontological uncertainty refers to a situation where the nature of an event and its associated probability to happen are not known	[*NOT consistent with KU; regression-based proxy of the inestimable*?] - To proxy for uncertainty, we take a firm-level measure of ambiguity attitude.. we take the absolute deviation of the residual term of a regression that estimates the expected returns to R&D and to physical capital and other control variables xit. We assume that the set of functions deviating from the entrepreneur's forecast model is bounded and corresponds to the forecast error, which includes both the expected ranges of favourable and unfavourable business scenarios. The ambiguity parameter also captures the individual attitude towards ambiguity.. Ghosal and Ye (2014) use a similar methodology to proxy for the unsystematic, or unforeseeable component of GDP, inflation	Consistent with the Knightian theory that relates risk to profitability, we model the impact of risk and uncertainty on profits and provide a first empirical attempt to model the effect of ambiguity, a particular type of uncertainty, on R&D returns.	the first empirical attempt of linking firms' profits and investment in R&D revisiting Knight's distinction between uncertainty and risk.. On the one hand, we find that ambiguity lowers the company's profits as a consequence of a more cautious innovative investment decision. On the other hand, when facing an ambiguous scenario, the R&D effort yields an additional premium to the investing companies	firms	R&D investment is crucial when uncertainty and turbulence are high; when facing an ambiguous scenario, the R&D effort yields an additional premium to the investing companies	obj = calculated measures from published data; (subj = uses some perceptions as inputs)	Knight; Bronk (ontological U); Ellsberg; info-gap TH	innovation from R&D; investment returns unpredictability; novelty/ uniqueness (of R&D project); complexity; lack of info
Andries, P., Debackere, K., & Van Looy, B. (2020). Simultaneous experimentation as a learning strategy: Business model development under uncertainty — Relevance in times of COVID-19 and beyond. Strategic Entrepreneurship Journal, 14(4), 556-559.	conceptual - (reflective)	that they are confronted with fundamental "Knightian uncertainty" (Knight, 1921) In situations of Knightian uncertainty, however, this is no longer the case: Relevant variables and their functional relationships are, to a considerable extent, unknown.. and it is initially unclear to the actors involved what information is needed to solve these differences.. the set of feasible opportunities and viable business models is simply not predictable in advance.. U due to technological and consumer/market evolutions and discontinuities	[*questionable consistency; no arguments made that examples are KU; the ability to treat KU is NOT consistent with its definition] no formal measure; Covid-19 as case of KU; digital disruptions as a case of KU;	the case for technology ventures in emerging industries where what the market will become depends on multiple decisions by various stakeholders, and clarity will only arise when entrepreneurial activities result in tangible industry and market developments; an advert for authors' previous work;	we advanced the idea that, in emerging industries, opting for experimentation during the initial phases of the venture's life would be more beneficial than choosing focused commitment; the relevance of scenario-driven thinking as a basis for developing systematically a portfolio of experiments, resulting in a culture and practice of systematic experimentation; not only new entrants but also incumbents operating in established markets may benefit from institutionalizing simultaneous experimentation to explore novel business models	individual managers/ firms	in emerging industries, opting for experimentation during the initial phases of the venture's life would be more beneficial; simultaneous experimentation to explore b-models; create new options	seemingly obj, given not specified other than theoretically w/ Knight	the relevance of scenario-driven thinking as a basis for developing systematically a portfolio of experiments, resulting in a culture and practice of systematic experimentation	due to technological and consumer/market evolutions and discontinuities

Antoncic, B., Antoncic, J. A., Gantar, M., Li, Z., & Kakkonen, M. L. (2015). Chance non-control and entrepreneurship. Jour nal of Developmental Entrepreneurship, 20(0 3), 1550019.	empiric al - survey (of students)	uncertainty avoidance = has to do with the way in which a society deals with the fact that the future can never be known; it deals with the question of trying to control the future or just letting it happen; *NO definition of U directly given, nor measured*	[*consistent with definition, given the definition is based on the existing measure; it is blunt - given at societal level (un-dynamic?)] uncertainty avoidance is a dimension of the culture of a society; countries with high uncertainty avoidance maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas; in countries with a low score on uncertainty avoidance, such as China, people can have a particular notion of truth, truth may be relative; score of uncertainty avoidance was derived from Hofstede and measures the extent to which members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid ambiguous or unknown situations	hypothesis about the relationship between a person's chance non-control and his or her entrepreneurship (activities or intentions) was developed and empirically tested by using data collected through a structured questionnaire from 645 students in three countries (China, Finland and Slovenia); [questionable measure of ENT (DV), under-explained (!*), given multiple categories];	chance non-control can be defined as a person's disbelief in chance- or luck-based outcomes; key contribution of the study is the explanation of the role of chance non-control in entrepreneurship and the notion the relationship between chance non-control and entrepreneurship tends to be moderated depending on uncertainty avoidance; a research gap exists because less emphasis has been given to external locus of control, in particular chance control, and no relationship has been found between locus of control and entrepreneurial intentions; enter entrepreneurship when they do not perceive the results of business activities as being beyond their control.	individu als - entrepre neurs	when people are flexible and comfortable with ambiguity, they may enter entrepreneurship when their belief in chance and luck is high;	subj = individuals/ traits; summed by country to provide UA measure; once measured = obj	chance non-control; startup; uncertainty avoidance;	unspecified; implied environmental
Arend, R. J. (2021). The option value in Jack-of-all-trades investment. Strategic Entrepreneurship Journal, 15(1), 121-143.	concept ual - math model	[*RISK, given distribution known, outcome resolved over time; known possible outcomes - may not be true IRL* - assumption acknowledged] entrepreneurial uncertainty = 'selling at uncertain prices'; value uncertain but with known distribution	[*RISK, not U; variance for option valuations] adding risk-related variance—specifically in terms of volatility in the future value of entrepreneurship to the individual decision-maker—is important for the development of the JAT model; use of binomial lattice model of U;	Adding risk (and its related volatility) necessitated a consideration of optionality, and we analyzed the consequent effects through the lens of the two main predictions of the JAT—that more balanced skills will produce entrepreneurship (IP1), and that entrepreneurs with more balanced skillsets will be more successful (IP2); we found that a completely new set of predictions based on the contextual volatility exists for the modified JAT. For example, balanced skills investment will increase with volatility (due to optionality); and further, that testable prediction can be used to separate JAT-related explanations for skills investments from alternative explanations; and, it identifies when the original JAT is wrong	In this conceptual paper, we correct the original Jack-of-all-trades model of entrepreneurial activity for risk (and for uncertainties that can be captured as risk). Decision-makers in human skills investments can exploit that risk using an options approach. Our correction affects the original model's predictions in several ways, including increasing expected entrepreneurial activity in contexts of high volatility concerning the economic value of such activity	individu als - entrepre neurs	recommend understanding the value of options thinking in personal skills investments, as well as the effects on scale that tightly held generalist skills imply; we assume that uncertainty can be reduced to such risk, and so calculations, such as those involved option valuation, can proceed; for instances where this assumption is not valid, or where decision-making is not rational, the analysis here is silent; higher volatility over the value of entrepreneurship will increase investment in generalist skills, entrepreneurial activity, and the strength of the relationship between balanced skills and entrepreneurial success	obj = risk/ variance (of option); rational dec-mkg (given model); distrbn known	jack of all trades model; options TH; innovation;	risk (in entrepreneurial activity) arising from: the effects of the economic changes that the new product, service, or organizational form will entail; the question of whether the underlying technology will work; the effects from regulators and incumbents reactions; the questions of whether consumers will understand the product and buy it, or whether the supply chain will cooperate in a timely manner;
Arikan, A. M., Arikan, I., & Koparan, I. (2020). Creation opportunities: Entrepreneurial curiosity, generative cognition, and Knightian uncertainty. Academy of Management Review, 45(4), 808-824.	concept ual - strawma n discover y vs somethi ng else for inventio n	refers to Knightian uncertainty W/O actual definition** use quote - absolute unpredictability of things… cannot be anticipated and then only in so far as even a probability calculation in regard to them is impossible and meaningless;	[altho not measured; NOT consistent b/c these are known unknowns that can be made knowable thru knowable means w/o a big strategic investment first] unknown but knowable - thru action - first, via curiosity = the curiosity arousing stimulus-independent thoughts and associated cognitive processes that are triggered by self-initiated "positive constructive" mind-wandering (or adaptive and beneficial daydreaming) [post-it notes example - doing a job, experimenting, then finding a market for a new adhesive]; finding-generating a new substance (as part of the job) w/o a ready market => surprise vs confronting a known unknown (pops up a new unknown)	This paper posits that entrepreneurial curiosity, as opposed to entrepreneurial alertness or cognitive biases per se, sparks the formation of creation opportunities under Knightian uncertainty;	no rational, profit-maximizing reason to begin the process of forming an opportunity under conditions of Knightian uncertainty, why do they do so? The present paper suggests that entrepreneurial curiosity sparks the creation of opportunities	individu als - entrepre neurs	curiosity (the emergence of self-initiated and stimulus independent thoughts that are triggered by divergent or contrarian thinking with the intent to resolve gaps in knowledge or cognitive incongruities) + cognitive generative processes (Expanding and reconfiguring composite memory/ categorical memory)	subj = perceptual curiosity; personal memories;	creation TH (feedback from its authors; eds); Knight; cognition; alertness; entrepreneurial action; Hayek;	exogenous - results of human activity cannot be anticipated

Audretsch, D. B., & Belitski, M. (2021). Frank Knight, uncertainty and knowledge spillover entrepreneurship. Jour nal of Institutional Economics, 17(6), 1005-1031.	empiric al - panel data	KU = the results of human activity cannot be anticipated and then only in so far as even a probability calculation in regard to them is impossible and meaningless; (citing Knight)	[*NOT CONSISTENT - asks for the constraint effect NOT the underlying cause - uncertainty; and, does not define it in terms of unknown states or probabilities*] the uncertain demand for innovative goods or services as a constraint on innovation and activities in influencing a decision to innovate (0 – none; 3 – very high) [UKIS survey];	purpose of this paper is to fill this gap in the literature by explicitly identifying the extent to which knowledge spillover spurs innovation within the organizational boundaries of an incumbent organization through intrapreneurship, or by contrast through entrepreneurship;	applies Knight's concept of uncertainty to knowledge generated in incumbent organizations to explain the inherent difficulty in assessing potential innovations along with the key role played by knowledge spillover entrepreneurship as a conduit for transforming new knowledge created by an incumbent organization but ultimately commercialized through the creation of a new firm and innovation;	individu als - entrepre neurs	judgment (purposeful action under uncertainty, 'regardless of the decision-maker's skill'); entrepreneurs (relative to incumbents) embrace uncertainty to commercialize knowledge via innovation activity; exploit knowledge spillovers;	subj = personal judgment; survey; perception; (but, obj in TH - to meet KU defn)	institutions; knowledge spillover; Knight; Kirzner; entrepreneurial judgment;	uncertainty related to knowledge appropriation, development, and market demand for products and services; the uncertainty in an estimate of human capacity, which is always a capacity to meet uncertainty; market volatility; radical innovation; the inherent, absolute unpredictability of things; novelty;
Bao, Y., Wei, Z., & Di Benedetto, A. (2020). Identifying the tacit entrepreneurial opportunity of latent customer needs in an emerging economy: The effects of experiential market learning versus vicarious market learning. Strategic Entrepreneurship Journal, 14(3), 444-469.	empiric al - survey (China)	U = demand + institutional: demand uncertainty, defined as the fast changes in customer needs and compositions; legal inefficiency, fostered by the underdeveloped legal infrastructures to protect property rights and market transactions creates uncertainty about law enforcement and protection and thus embodies a type of institutional uncertainty .	[*consistent with language; though fast changes are not necessarily hard to predict*] demand U = not easily understandable, hard to predict (survey Qs); institutional U = difficult to rely on …so, not great as measures? …also, technological turbulence (Cronbach's α = .758) adapted from Jaworski and Kohli(1993),	How do experiential learning and vicarious learning influence a firm's ability to identify latent customer needs and vary under different environmental conditions of market uncertainty and institutional uncertainty?	the contingency of such learning effects on different dimensions of environmental uncertainty in an emerging economy: demand uncertainty of the task environment… Facing high demand uncertainty, firms should rely more on VML than EML to identify latent needs, whereas in an uncertain institutional environment with a weak legal system, firms should place less emphasis on VML and more on EML in the identification of latent needs	firms	experiential market learning and vicarious market learning; high demand uncertainty, firms should rely more on VML than EML to identify latent needs, whereas in an uncertain institutional environment more on EML	subj = survey (likert scaled answers - 5Q re legal; 4Q re demand [e.g., Customers demand is not clearly understandable]) + tech turbulence	organizational learning theory, we explore the effects of experiential market learning and vicarious market learning;	different dimensions of environmental uncertainty in an emerging economy: demand uncertainty (changing customer needs) of the task environment and legal inefficiency of the institutional environment
Baptista, R., Karaöz, M., & Leitão, J. C. (2020). Diversification by young, small firms: The role of pre-entry resources and entry mistakes. Small Business Economics, 55(1), 103-122.	empiric al - longitud inal data	environmental U = uncertainty associated with high growth volatility; great uncertainty concerning the evolution of demand; the uncertainty of entrants about efficiency and customer preferences	[*INDIRECT of ENV by growth; this is RISK not KU*] we measure volatility in industry growth using the logarithm of the standard deviation of the growth rate of the industry where the firm entered [employment vs demand?] Logarithm of standard deviation of employment growth rates in the industry (six-digit sector)	This paper examines first-time diversification decisions by young (i.e., new-born) firms in Portugal. We investigate the determinants of the timing of the diversification decision (i.e., how long it takes from start-up to diversification) and observe the relationship between timing of diversification and eventual exit or survival	Firms entering volatile markets are more likely to diversify earlier as well, suggesting that entry mistakes and escape from uncertain, Schumpeterian environments also influence diversification	firms	entering volatile markets are more likely to diversify earlier as well	obj = Logarithm of standard deviation of employment growth rates in the industry; also subj = in describing reality	the resource-based view of diversification; Nelson & Winter; M&A triggers;	market instability and the uncertainty of entrants about efficiency and customer preferences; growth rate volatility; Schumpeterian environments; m investment in R&D and the uncertainty of the partly random outcomes
Barney, J. B., Ketchen Jr, D. J., & Wright, M. (2021). Resource-based theory and the value creation framework. Journal of Management, 47(7), 1936-1955.	concept ual - theory - answeri ng Qs about RBV	[unknown values (levels) altho historic precedents w/ limits; reference to KU*] uncertainty about the market value of a firm's resources and capabilities, more akin to Knight's (1921) use of the term	[*consistent - luck as unknowables*] Given the existence of this type of uncertainty, it will often be the case that a firm's financial success may be attributable, at least in part, to good luck and good fortune	Does resource-based theory incorporate uncertainty?	By linking resource-based logic to Brandenburger and Stuart's (1996) value creation and appropriation model, this paper suggests an approach to extending the theory in some interesting and powerful ways	firms	exploit luck; don't imitate firms with luck when don't have it; follow VRIO if not lucky (?)	? [implied subj re: beliefs about resource value; but obj as theory]	resource-based view; value creation; dynamic capabilities	uncertainty about the market value of a firm's resources and capabilities; may be attributable, at least in part, to good luck and good fortune;

Bennett, D. L., Boudreaux, C., & Nikolaev, B. (2022). Populist discourse and entrepreneurship: The role of political ideology and institutions. Journal of International Business Studies, 1-31.	empiric al - multi-year, country, at indiv level	[*implied unpredictability of probability, not states - of main U*] regime uncertainty = the pervasive lack of confidence among investors and entrepreneurs in their ability to foresee the extent to which future government actions will alter their private-property rights and other market-supporting institutions that they rely on to reduce uncertainty; unpredictable policies; Institutional uncertainty is a particular source of perceived environmental uncertainty (Milliken, 1987) that exists when there is a perceived increase in the level of unpredictability of the institutional environment; Populist discourse creates regime uncertainty by undermining confidence among entrepreneurs that a nation's institutions will continue to support market exchange and protect business and private property rights in the future, resulting in entrepreneurs anticipating a future increase in transaction costs and reducing their incentive to engage in new venture creation; entrepreneurship takes place in fundamental market uncertainty?	[*unknowability/ probability can be reduced, so more RISK than U? measures of variance*] Strong checks and balances, therefore, reduce the regime uncertainty associated with populist discourse; institutions reduce exchange uncertainty; several measures of macro-economic uncertainty = macroeconomic uncertainty (i.e., the standard deviation of inflation rates), macropolitical uncertainty (i.e., the standard deviation of relative political extraction (Feng, 2001), and trade uncertainty (i.e., the standard deviation of tariff rates); Leader tenure also serves as an inverse measure of political change, which is often associated with political uncertainty	Using institutional economic theory as our guiding framework, we develop a model to describe how populist discourse by a nation's political leader influences entrepreneurship. We hypothesize that populist discourse reduces entrepreneurship by creating regime uncertainty concerning the future stability of the institutional environment, resulting in entrepreneurs anticipating higher future transaction costs	By exploring the relationship between populism and entrepreneurship, our study addresses the recent call by Audretsch and Moog (2020, p. 19) for entrepreneurship scholars to engage with theories and ideas from political science, as well as Mudde and Rovira Kaltwasser's (2018) recent challenge to link the study of populism; entrepreneurs should keep abreast of the political conditions in their country, and be concerned when politicians start espousing populist rhetoric, as this may provide a signal of forthcoming institutional changes that undermine their business and property rights. Entrepreneurs should be especially vigilant of left-wing populism	individu als - entrepre neurs	strong checks and balances, therefore, reduce the regime uncertainty associated with populist discourse; market-supporting institutions that they rely on to reduce uncertainty; entrepreneurs should keep abreast of the political conditions in their country, and be concerned when politicians start espousing populist rhetoric, as this may provide a signal of forthcoming institutional changes that undermine their business and property rights. entrepreneurs should be especially vigilant of left-wing populism	obj = measures (macroeconomi c uncertainty (i.e., the standard deviation of inflation rates), macropolitical uncertainty (i.e., the standard deviation of relative political extraction, and trade uncertainty (i.e., the standard deviation of tariff rates). Leader tenure also serves as an inverse measure of political change	institutional economics; political science; populism; capitalism; ideology; transaction costs; judgment-based approach	regime uncertainty concerning the future stability of the institutional environment; institutional uncertainty; the variety of populism will influence the magnitude of regime uncertainty; undermining confidence among entrepreneurs that a nation's institutions will continue to support market exchange and protect business and private property rights in the future; several measures of macro-economic uncertainty; uncertainty in exchange; fundamental market uncertainty; unpredictability of the institutional environment; mistrust of the people in charge of the institutions
Berglund, H., Bousfiha, M., & Mansoori, Y. (2020). Opportunities as artifacts and entrepreneurship as design. Academy of Management Review, 45(4), 825-846.	concept ual-theory - ontolog y, verbal desc, types	[*?* TWO TYPES - each can be overcome? knowable or shapable rather than unknowable; no other characteristics*] with a discovery view, uncertainty is epistemic in the sense that it is overcome through the discovery of information about an in principle knowable and independently existing environment; with a creation view, uncertainty is instead ontological in the sense that it is overcome by creating the environment anew	[*consistent in words/ categories as unknown-but-knowable/ controllable by the few?* under-defined otherwise re: states vs probabilities vs options, etc] uncertainties as problems with ready solutions in design, so - SOPs?	By conceptualizing entrepreneurship as artifact-centered design, we provide an alternative to accounts inspired by economic theory, which have proven conceptually problematic and of limited practical use. We conclude by discussing how uncertainty can be defined and managed	We combine Herbert Simon's view of design with the common distinction between reality as discovered or created to develop experimentation and transformation as ideal types of entrepreneurial design. Building on the design tradition's view of artifacts, we describe how opportunities-as-artifacts iteratively develop at the interface between organized individuals and their environments, where more or less concrete instantiations are used to drive the process forward	individu als - entrepre neurs	experimentation = adaptation, uncertainty is epistemic and overcome by information-gathering over time; transformation = negotiation, uncertainty is ontological and overcome by world-making over time	subj = beliefs; social construction; (obj = discovable truth, but not one U?)	design; philosophy of science (epist/ ont ologies); hierarchy; creation vs discovery; Simon; opportunities;	two kinds of envoronmental U = epistemic and ontological; objective vs created worlds - indep vs dep worlds; novelty; surprise; technologies, demand are unpredictable;
Bloom, N. (2014). Fluctuations in uncertainty. Journal of economic Perspectives, 28(2), 153-176.	concept ual - essay	Knight defined uncertainty as peoples' inability to forecast the likelihood of events happening; refer to a single concept of uncertainty, but it will typically be a stand-in for a mixture of risk and uncertainty;	[consistent as being ill-defined, missing risk and uncertainty and proxies - NOT Knightian] an amorphous concept; reflects uncertainty in the minds of consumers, managers, and policymakers about possible futures; also a broad concept, including uncertainty over the path of macro phenomena like GDP growth, micro phenomena like the growth rate of firms, and non economic events like war and climate change;	what are some facts and patterns about economic uncertainty?; why does uncertainty vary during business cycles?; do fluctuations in uncertainty affect behavior?; has higher uncertainty worsened the Great Recession and slowed the recovery?	discussion is based on research on uncertainty from the last five years, reflecting the recent growth of the literature; the increased availability of empirical proxies for uncertainty, such as panels of firm-level outcomes, online news databases, online news databases, and surveys, has facilitated empirical work;	aggregat ed decision -makers - policy-makers, manager s, analysts	financing choices; options creation and use; diversification; price adjustments; forecasting; information search; exploration; delay; stimulus policies; slack;	obj = proxies/ measures used in empirical analyses; subj = forecaster perceptions (implied, reality to managers as well)	real options; economic policy; macro-economics; information TH; recessions; international business;	various - from macro-level to micro-level, given the wide range of definitions of U used here; recessions; xchg rates; forecaster disagreement; news reports; unpredictble industry growth; variances in sales; price changes; bond-yield volatility; wage volatility; bad news; lack of info; exptn (R&D); political shocks; natural disasters; epidemics;

Botelho, T. L. (2018). Here's an opportunity: knowledge sharing among competitors as a response to buy-in uncertainty. Organization Science, 29(6), 1033-1055.	empirical - event study	"*buy-in uncertainty*," or uncertainty about the likelihood that key stakeholders will come to realize the value of a potential opportunity in a timely fashion..This uncertainty parallels a Knightian view of uncertainty, where the expectation of an opportunity's quality is difficult to know ex ante (Knight 1921).	[*NOT consistent w/ KU; measures used do not cover unknowns, unknowability, states, probabilities and so om*] - The measures Firm Age, Sell-Side Coverage, Institutional Ownership Concentration, and Media Attention were used to capture the level of buy-in uncertainty for a given stock. The goal of this approach is to not overemphasize the coefficient of any one measure, but instead to interpret the results collectively... For these measures, besides the institutional ownership concentration variables, buy-in uncertainty decreases as the value of these measures increases	propose that in markets where competitors are a set of key stakeholders, knowledge sharing is a strategic response to high levels of buy-in uncertainty related to a potential opportunity, namely, the likelihood that stakeholders will come to realize the value of a potential opportunity in a timely fashion	knowledge sharing among these competitors is most likely when buy-in uncertainty for a given opportunity is high and that this knowledge sharing does lead to subsequent buy-in.	firms	knowledge sharing among these competitors is most likely when buy-in uncertainty for a given opportunity is high	obj as measured (the level of scrutiny and attention that a focal firm/stock faces from evaluative institutions in the market (e.g., the media, sell-side analysts)	market-based mechanisms to address knowledge gaps (info market efficiency/ effectiveness); Keynesian beauty; coopetition	buy-in U = the likelihood that key stakeholders will come to realize the value of a potential opportunity in a timely fashion; exogenous in other related parties
Brooke, G. T., & Cheung, L. (2021). Uncertainty and general equilibrium: an evaluation of Professor Knight's contributions to economics. Cambridge Journal of Economics, 45(5), 901-918.	conceptual - lit review	U as KU => Knight considers the situation where final demand is not known, and it is here that the distinction between risk and uncertainty is introduced; the future is uncertain, then there is no a priori or historical basis for estimating future demand; distinction between risk and uncertainty may be correct, but the boundary between them is wide, and includes all forms of partial information; there is no valid basis of any kind for classifying instances; the absence of any basis for assigning probabilities to some or all of them; if insurance markets do not function, then the future is uncertain;	[*curiously - CONSISENT and then sporadically NOT consistent*] Knight relaxes the assumption of perfect information required for perfect competition in order to allow for the existence of profits; central thesis in RUP is that profit exists only if the future is uncertain; the role of the entrepreneur is to make decisions in the face of uncertainty and earn profits (positive or negative) as a reward; action according to opinion, of greater or less foundation and value, neither entire ignorance nor complete and perfect information, but partial knowledge; if the future is uncertain there is no basis for entrepreneurial decision making; entrepreneurs have no basis for forming any expectations about the future, and so no basis for bidding for inputs into in production, or for expecting profits under any given production plan*;	Knight made a distinction between risk and uncertainty; the distinction, and the theories of profit and entrepreneurship that followed from it, are widely considered his most important contributions to economic theory; we ask why they have not had more impact on economic theory and whether they are indeed his most important contributions?	the distinction between risk and uncertainty has been of limited use; in making it, Knight overlooked all forms of partial information; Knight's real contribution to economics was promoting the model of perfect competition; the distinction between risk and uncertainty ignores disaggregated, costly-to-acquire and costly-to-process information; the uncertainty theory of profit overlooks theories of oligopoly and monopolistic competition, while the theory of entrepreneurship insists that the entrepreneur who creates the profits must also earn them as income; the distinction does not matter to modern economics because, following Savage (1954), people make decisions on the basis of subjective probabilities-as a result, in economic theory, the terms risk and uncertainty are now used interchangeably; RUP is primarily a theory of the existence of profit and a demonstration of correct scientific method in economics, and not a theory of decision making under risk or uncertainty or of entrepreneurship;	individuals - entrepreneurs	Knight begins by observing that uncertainty is undesirable but notes that the methods of reducing uncertainty all involve costs: scientific research uses resources that must be diverted from other uses; large organisations locate control of the economy in a small number of individuals and so reduce individual freedom for the majority; and slowing economic progress incurs both of the previous costs while also reducing future consumption; he cannot offer a basis for entrepreneurs to expect profits beyond luck*; what is missing is any explanation of how expectations are formed when the future is uncertain;	obj = unknown to all (implied), otherwise insurable; [nothing explicit]	Knight; Clark;	novelty/ uniqueness = there is no valid basis of any kind for classifying instances; insurance markets do not function (outcome v source?); unpredictable demand; dynamic changes in the economy - changes to population, capital stock, technology, improvements in business efficiency and increases in consumer wants;
Brouwer, M. (2000). Entrepreneurship and uncertainty: innovation and competition among the many. Small Business Economics, 15, 149-160.	conceptual - math model	Knightian uncertainty refers to uncertainty about the economy at large and uncertainty about outcomes of individual ventures;	[**NOT consistent - modeled as RISK*;] uncertainty about the time of entry arrival and incumbents' retreat; each venture has an equal ex ante chance of success β and the chance of failure can then be written as (1– β)	analyzes the effects of entry, market structures and uncertainty on the incidence and diffusion of innovation; seeks to investigate whether and how innovation and diffusion is affected by the number of incumbent competitors and by entry; how the introduction of Knightian uncertainty can abate diminishing returns to innovative investment;	insertion of Knightian uncertainty in Schumpeter's model can explain why innovators are numerous and arrive unexpectedly; uncertainty spurs diffusion and improves the utilization of human capital; combining the ideas of Schumpeter and Knight also elucidates several stylized facts of entrepreneurship, such as small entry size; low chances of survival and high growth rates;	individuals - entrepreneurs	negative impact of uncertainty on innovation; positive effects of uncertainty on investment; prompts entrants to set price equal to incumbents' marginal cost; entrants are more motivated to innovate due to larger additional profits; uncertainty will also reduce entrant size; will induce investors to spread their capital thinly over many ventures; uncertainty improves innovative quality, since a large number of start-ups enables manifold experimentation and opens up hitherto hidden potentials of human capital;	obj = math model;	Schumpeter; Knight; innovation; Cournot competition; entry; process innovation;	novelty; business cycles follow an unpredictable pattern and many entrepreneurial ventures fail; unpredictable change; the length of busts and booms cannot be predicted accurately; unpredictable innovation;

Burns, B. L., Barney, J. B., Angus, R. W., & Herrick, H. N. (2016). Enrolling stakeholders under conditions of risk and uncertainty. Strategic Entrepreneurship Journal, 10(1), 97-106.	conceptual - verbal (propositions)	U = decision-makers know neither the possible outcomes nor their probability [KU];	[*CONSISTENT with definition - given it is a conceptual piece - BUT only to point of initial interaction; then NOT consistent with having to make choices w/o the ability to learn*] under conditions of uncertainty, stakeholders can still know some things about the attributes of an entrepreneur; the opportunity in this uncertain setting does not yet exist (?); opportunities are cocreated through the joint actions of entrepreneurs and enrolled stakeholders => only after engaging in these actions does an opportunity emerge with dimensions that can be known or measured probabilistically;	purpose of this article is to examine how the process of enrolling stakeholders varies as a function of the informational setting within which an entrepreneur is operating—risky or uncertain;	entrepreneurs can use information about the nature of the opportunity they are pursuing, information about themselves (i.e., the entrepreneurs' charisma, trustworthiness, and reputation), or both, to enroll stakeholders; given uncertainty, the nature and dimensions of this opportunity are likely to change dramatically as entrepreneurs create it;	individuals - entrepreneurs	the more uncertain a particular opportunity is, the less entrepreneurs can use information about the opportunity and the more they must rely on information about themselves to successfully enroll stakeholders; entrepreneurial actions make the uncertainty change into risk; develop strong—identification or commitment—bonds between stakeholders and some aspect of their entrepreneurial endeavor;	obj = as described theoretically;	stakeholder enrollment; opportunity formation; workplace commitment; author's own related work; effectuation;	an entrepreneurial context = uncertainty about whether or not an opportunity exists, the actions required to form and exploit that opportunity, the entrepreneurial skills required to form and exploit an opportunity, the potential for that opportunity to generate economic profits, and so forth; uncertainty can emerge from risk (?); changes in technology, consumer tastes, or other environmental conditions;
Bylund, P. L., & McCaffrey, M. (2017). A theory of entrepreneurship and institutional uncertainty. Journal of Business Venturing, 32(5), 461-475.	conceptual - arguments and figures	"regime uncertainty" faced by entrepreneurs during the Great Depression and Great Recession; regime uncertainty = entrepreneurs are highly doubtful about the willingness of political institutions to provide ideological and legal support for entrepreneurial action; policy uncertainty?; unknown future values;	[*?* consistent w/ the defn of U as DOUBT, but less so regarding unknowns, given the institutions are real, have points of contact, rules, routines, histories, and so forth* and, seem to be treatable by action, vs KU] institutional uncertainty reflects an additional cost borne by entrepreneurs as a result of their doubts about the future stability of institutions and their future alignment; entrepreneurs act in order to reduce or eliminate the uncertainty as it relates to their own decisions; institutional change can produce distinct kinds of uncertainty that require distinct types of entrepreneurial judgment to overcome.;	using insights from new institutional economics, we develop a model that explains the institutional uncertainty resulting from conflicts between institutions on different "levels" of social activity; further explain how entrepreneurs can both cause and mitigate this uncertainty through market and institutional action; focus on a special case of institutional uncertainty, "regime uncertainty", wherein entrepreneurs are left without reliable means to overcome uncertainty in political institutions;	disaggregating institutions into groups and potential sub-groups allows us to more clearly identify the effects of institutional uncertainty on entrepreneurial action; this is especially true of institutional entrepreneurship, which we conceptualize as a choice entrepreneurs make to reposition their actions either horizontally or vertically in the institutional hierarchy; abiding action is typical entrepreneurial behavior that legitimizes and strengthens the institutional status quo; evasive action sidesteps a specific institutional constraint and represents a horizontal relocation to a position less burdened by the relatively high costs of institutional uncertainty; altering action can be interpreted as a vertical repositioning for the purpose of changing higher-level institutions.; human beings develop institutions is to help eliminate uncertainty;	individuals - entrepreneurs	U changes entrepreneurs' relative costs of bearing uncertainty in their typical abiding activities; when high, entrepreneurs have little choice but to evade institutions, alter them through action at a different institutional level, or exit the market; find different ways to do business at the same institutional level, while in the second they change their level of activity by moving upward in the institutional hierarchy; generate feedback to higher-level institutions that encourage adjustment; usually cope with this uncertainty using a combination of good judgment and institutional entrepreneurship;	subj = beliefs/ perceptions; reality; (tho, can be obj sources)	institutional economics; Williamson; Kirzner; Schumpeter; Knight;	institutional incongruences and contradictions (perceived or real); created when entrepreneurs anticipate misalignments, incongruences, or contradictions between institutions on different levels, and how this affects entrepreneurial behavior; uncertainties of innovative governance, contracting, and firm structures. L2 then implies the political uncertainty associated with rules and policy changes and their enforcement, and L1 the overarching uncertainties regarding social values, cultural norms and behavior, and their trends in the distant future;

Camuffo, A., & Pignataro, A. (2022). Theory-Driven Strategic Management Decisions (No. 17664). CEPR Discussion Papers.	conceptual - math model - ent examples	managerial decision-making under fundamental or "knightian" uncertainty = incorporates the fact that, when decision problems are not defined ("unknown-unknowns") and data are not available; non-ergodic contexts; decisions characterized by unknown states and probabilities;	[inconsistent][use of probability distributions, based on different beliefs in action, assumption, or implicit reasoning; jointly distributed as Dirichlet with parameters; decision-makers have expected values;] .not Knightian, given they learn over time about the 'truth' using experiments;	develops a framework that applies theory-based decision making under uncertainty to strategic management decisions in which executives cannot rely on past data;	[another learn by experiment approach to knowable unknowns] - shows how and why, in the absence of readily available decision problems or past data, executives should develop alternative theories, experiment with them, and choose the most promising and valuable one; model this process as a Bayesian approach, in which executives form, test, and update beliefs about theories; key insight is that executives should experiment with more uncertain beliefs or theories	individuals - decision-makers	decision makers should experiment with more uncertain theories, because testing the "boundary" models of these theories elicit more informative signals that generates larger belief updating; before choosing actions executives need to develop theories to identify the states that define their problems and learn through experiments which theory to choose; ground strategic management decisions on theories and experiments, similar to the structured and disciplined approach used by scientists; the attributes and causal links posed by decision makers (their theories) reduce uncertainty by concentrating probabilities	subj = decision-makers should define decision problems "subjectively"? ; confront uncertainty through the lens of the models they build; the state space is subjectively defined by the specific choice of attributes that decision makers believe are relevant for their problem; obj = an objective reality to discover (e.g., about demand)?	decision TH; Knight; beliefs; Bayesian updating; cognition; strategic management; modeling and theorizing; experimentation;	decision-makers as the ultimate "un-caused cause" of uncertainty generation and reduction; technological and demand unpredictability; novelty; tech development;
Chen, J. S., Elfenbein, D. W., Posen, H. E., & Wang, M. Z. (2022). The problems and promise of entrepreneurial partnerships: Decision-making, overconfidence, and learning in founding teams. Academy of Management Review, 47(3), 489-520.	conceptual - simulation model	U = it is difficult … to assign meaningful probabilities to outcomes … [therefore] individuals will reach different decisions, even if they share the same objectives; [KU - cited]	[*NOT consistent w/ KU; this is RISK - given distributions exist, and rational decisions are made based on their known-ness*] profit variance in both the pre- and post-entry periods is s2; the signal of cumulative profits, Xt, that an agent receives follows a Brownian motion with drift m and variance s2; asymmetric information (biases of main persons are 'unknown' - to others);	How should decision-making be organized in entrepreneurial teams when founders exhibit confidence biases? We highlight the conditions under which partnership voting is an effective means of governing market entry and exit decisions when teams' decision-making is informed by efforts to learn about the merits of uncertain opportunities;	we show that confidence biases may be managed by selectively matching the decision-making structure to entrepreneurs' biases, and that doing so may substantially improve the performance of new ventures; conceptualized entrepreneurship as an unfolding feedback-learning process through which teams discover the viability of their opportunities and make market entry and exit decisions;	individuals - entrepreneurs & stakeholders	learn about opportunities by gathering additional information; lessened through additional feedback (Bayesian updating);	subj = described as different interpretations by person; obj = math-coded in a sim;	organizational economics; team decision-making; cognitive bias; partnerships; authors' previous sim work;	entrepreneurial opportunities; uniqueness; high failure rates; noise in feedback; unpredictable market demand;

Cho, S. H., & Lee, J. (2021). Estimating the uncertainty–R&D investment relationship and its interactions with firm size. Small Business Economics, 57(3), 1243-1267.	empirical - panel data	[*UNDER-DEFINED*] firm-level uncertainty; uncertainty is high when firm size is small. In our data, small firms are more likely to be exposed to uncertainty.. Market/ external U ignored (limitations)	[*?* NOT sure what is being captured here; a lot goes into variance of REVs* NOT nec unknowables; not KU] Firm-level uncertainty is measured by variation in a firm's sales revenue	We hypothesize that the uncertainty effect on R&D investment varies by firm size using South Korean firm-level date. We find a concave relationship between the uncertainty elasticity of R&D investment and firm size using separate models for the two firm size proxies	This paper investigates the uncertainty–research and development (R&D) investment relationship and its interactions with firm size by allowing flexibility in the relationships among uncertainty, R&D investment, and firm size.	firms	uncertainty has a negative impact on R&D investment for large and small firms; to stimulate R&D investment in large firms, government policy should concentrate on alleviating the irreversibility of R&D investment; to stimulate R&D investment for small firms, relax capital market constraints under uncertainty	obj = variance measure [internal U only proxy];	R&D investment; real options TH; innovation	U = variation in a firm's sales revenue [may reflect sources of uncertainty internal to the firm]; unpredictable markets; tech/ innovation unpredictability; coping with temporary demand shocks and cyclical fluctuation; firm size (small = more uncertain) [market fluctuations, such as changes in interest rates, foreign exchange rates, equity prices, and real estate prices = external factors]
Cirillo, B. (2019). External learning strategies and technological search output: Spinout strategy and corporate invention quality. Organization Science, 30(2), 361-382.	empirical - patent data (over time)	U = tech U = procedural and outcome U's with recombinations of unused or unfamiliar components; lack of information [no formal defn]	[*?* given no formal defn; tho, outcome U of tech {vs of patent granting} does NOT appear consistent w/ the measure used] U not measured directly... Unfamiliar Components. Following Fleming (2001), I assessed whether a patent uses unfamiliar components according to the extent to which its inventors recently and frequently recombined the set of components in the patent…Temporal exploration measure (the mean age of the cited patents) as a control.. Technological Distance. Spinouts' knowledge maybe in closer proximity to the parent firm's knowledge than to other firms' knowledge in the parent firm's technological search space.. Industry Proximity, etc..	That CV spinouts benefit their parent firms by reducing uncertainty relative to other strategic formats for external learning in unfamiliar technological areas	the mechanisms underlying knowledge spill-ins and their importance for external learning in uncertain technology environments have not been examined in detail; when firms recombine unfamiliar knowledge components developed by their CV spinouts, their inventions are associated with higher quality than comparable firms' inventions that recombine knowledge from the firm's corporate venture capital portfolio ventures, allies, or employee spinouts	firms (spinouts)	CV spinouts benefit their parent firms by reducing uncertainty relative to other strategic formats for external learning in unfamiliar technological areas.	subj = bounded rationality; obj = unfamiliarity as patents using unfamiliar components + tech distance (also patent-based w/ overlap)	learning; knowledge access; bounded rationality (to knowledge search); routines; proximate search	tech environments = outcome + procedural U; dissimilar learning contexts;
Cong, J., & Zhou, W. (2020). Inflexible repositioning: Commitment in competition and uncertainty. Management Science, 66(9), 4207-4225.	conceptual - theory - math model w/ props	[*UNDER-DEFINED, in reality demand is unlikely to have such characteristics - more risk-variance than ex ante unknown] demand uncertainty = The demand is stochastic so that consumer distribution may disperse or concentrate relative to the two firms' initial positions	[*ok but not U *distribution type known, only two possible states, prob-dependent, p known; RISK vs unknown] A total mass of m> 0 consumers distribute uniformly on [−μ, μ] for μ > 0. Demand is uncertain in that m and μ are both random variables such that with probability ph ∈ [0, 1] : μ _ h and m _ mh & with probability 1 − ph : μ _ l and m _ ml, { where h ≥ l >0 with the interpretation that h means more dispersed consumer tastes... it helps to characterize the demand uncertainty in terms of some mean and variance rather than the raw parameters	In real life, however, the most common environment in which a business operates is both uncertain and competitive. In that case, should a company commit or not commit? Does commitment become more or less valuable as uncertainty increases? Does a company's commitment always hurt its competitors? More broadly, what is the relationship between commitment value and option value when both are present?	We study the value of commitment in a business environment that is both competitive and uncertain, in which two firms face stochastic demands and compete in positioning and repositioning. If the future demand tends to disperse or the demand uncertainty is sufficiently large, one firm chooses rigidity (i.e., commits not to change its positions), and the other chooses flexibility	firms - modeled	If the future demand tends to disperse or the demand uncertainty is sufficiently large, one firm chooses rigidity (i.e., commits not to change its positions), and the other chooses flexibility (i.e., to reposition freely).	obj = math modeled - demand is stochastic so that consumer distribution may disperse or concentrate relative to the two firms' initial positions; random variables; mean & variance (known)	game theory; commitment; technology choice; flexibility; rigidity; commitment; positioning; option value; competition; Hotelling; sequencing	most common environment in which a business operates is both uncertain and competitive; disruptive technology; new products; changes in demand;

Cong, L. W., & Howell, S. T. (2021). Policy uncertainty and innovation: evidence from initial public offering interventions in China. Management Science, 67(11), 7238-7261.	empirical - panel	[UNDER-DEFINED in characteristics of the U - e.g., distrn] a policy uncertainty = unpredictable start of effect w/ bounded end; the suspensions were not scheduled and were not anticipated multiple months in advance; max length 16mo	[**UNUSUAL - experienced as shock** can't tell whether firms considered it prior, simply look at effects ex post; no decision analysis here] as indefinite delay to IPO; measured as a [0,1 - dichotomous] treatment experience	This paper studies the impact on innovation of a government policy that created uncertainty by suspending IPO activity indefinitely. Specifically, the policy temporarily prevented certain firms that had already been approved to go public from accessing public markets through IPOs.	We find that IPO suspension-induced delay reduces innovation with economically significant magnitudes. This effect endures for years after listing, whereas effects on other corporate outcomes do not outlast the delay period. The evidence is most consistent with heightened uncertainty disrupting the corporate innovation process.	firms	managers with experience of suspension-induced delays innovate less, consistent with the channel of uncertainty reducing tolerance for failure or interest in experimentation in the long run; suspension-induced listing delay significantly reduces firm patenting activity and quality; diversifying access to capital (away from public markets where U exists); (after the fact); treatment prior not considered (altho history of event exists)	obj = a treatment of whether the shock happened or not (not about the belief it would)	IPO; capital constraints; policy uncertainty; real options; corporate innovation	govt policy U = lose access to public markets for an indefinite period of time; suspensions were not scheduled and were not anticipated multiple months in advance;
De Groot, K., & Thurik, R. (2018). Disentangling risk and uncertainty: When risk-taking measures are not about risk. Frontiers in psychology, 9, 2194.	Conceptual - meta-analysis - commentary	uncertainty, is characterised by both an unknown outcome and an unknown probability distribution; applies to all situations in which one knows that there is a chance of winning and losing but has no information on the exact distribution of these chances;	[somewhat consistent] scenarios have unclear outcome distributions (e.g., going camping; drinking heavily; investing in a new venture), but are NOT novel; probability distribution of balloon explosions is unknown to the participant, but again are NOT novel; somewhat Ellsbergian ambiguous (bounded outcomes) at best	commentary discusses both the theoretical and empirical basis of the distinction between uncertainty and risk from the viewpoint of several scientific disciplines and reports how many studies wrongfully employ the DOSPERT (Domain Specific Risk-Taking) scale and BART (Balloon Analogue Risk Task) as risk-taking measures	we call for proper distinguishing between (tasks measuring) decision-making under uncertainty and decision-making under risk in psychology, and related fields; we believe this is vital as research has shown that people's attitudes, behaviour, and brain activity differ between both concepts; in contrast to laypersons, scientists cannot afford to confound the concepts of risk and uncertainty; only **7.1 per cent of articles** correctly adhered to the U/R distinction in relation to the DOSPERT scale and BART [**(analogy to the present lit review!); *] we believe that most researchers understand the conceptual distinction between uncertainty and risk, but do not explicitly report on this in their articles [WHY?? the result of common practices within the field; distinctions are not only scarce but are also not consistently referred to in the literature]; whether a decision is treated as a choice under uncertainty or under risk can have real consequences	individuals - decision-makers	experiment [BART] or guess [] based on historic/ analogical beliefs - individuals are less sensitive to likelihood information in the case of uncertainty compared to risk; use safe heuristics; behavioural economic literature shows aversion towards uncertain compared to risky choices; the cortisol response to stress impacts decision-making under risk, but not under uncertainty; decision-making under risk depends more on executive functioning than does decision-making under uncertainty; risk and uncertainty are differentially coded in the brain;	subj = chances are subjective;	Knight; Ellsberg; psychology; neurobiology	lack of distribution information (of possible outcomes) in a hypothetical case or lab experiment
Deng, X., Gao, B., & Li, G. (2019). The effects of dynamic work environments on entrepreneurs' humble leader behaviors: Based on uncertainty reduction theory. Frontiers in psychology, 10, 2732.	conceptual	demand uncertainty; [abstracts from any uncertainty concerning the development of the product]; must make a decision w/o knowing the level of demand; [also, separates out moral hazard - e.g., info asymmetries][ignores network effects, etc..]; probabilities unknown	[*CONSISTENT - there is no explicit delineation of the probability distribution or definition of the underlying randomness*] take ñ as the potential demand of the entrepreneur's good; its randomness expresses the demand uncertainty;	the objective of this paper is to show that crowdfunding innovation has an important efficiency effect that persists despite the presence of moral hazard and private cost inform;	by directly addressing consumers, the contract can elicit their demand and, thereby, obtain information about whether aggregate demand is large enough to cover the project's investment costs; hence, by conditioning the investment decision on this information, crowdfunding has the potential to yield more efficient investment decisions;	individuals - entrepreneurs & crowd funders	crowdfunding [as a tool for both price discrimination and for reducing demand uncertainty (market testing)]; the all-or-nothing crowdfunding scheme respects ex post participation constraints and implements the first-best in dominant strategies; *this is learning/ experimentation - based on feedback from the 'source' of the uncertainty;	obj = math model (*tho unspecified, given individuals making decisions, could be subjective perceptions of U)	economics; decision-making; moral hazard; information asymmetry; crowdfunding; contracts;	unpredictable demand/ consumer preferences; information asymmetries; unknown valuations;

Dew, N., Velamuri, S. R., & Venkataraman, S. (2004). Dispersed knowledge and an entrepreneurial theory of the firm. Journal of business venturing, 19(5), 659-679.	conceptual - model (box and arrow)	cross-sectional U = info asymmetry [*NOT U*] = when all the knowledge pertaining to a transaction is available in the system at one moment in time, but its unequal distribution creates uncertainty ; longitudinal U = no agent in the system can possess accurate knowledge of the future owing to the fact that much knowledge relevant to the prediction of the future has not yet been created by any economic agent; KU (cited); the knowledge relevant to future predictions is not simply unknown, but unknowable;	[NOT consistent with KU - in terms of info asymm, equivalence, specific failure of two parties to reach agreement] economic agents having heterogeneous expectations; practical differences between Akerlofian and Knightian uncertainty are differences in degree rather than differences in kind [!?]; uncertain situations are ones that exhibit failure of intersubjective agreement between the relevant parties; U has a degree (based on novelty) vs a dichotomous is or is not known;	specific question we discuss in this article is when and why an entrepreneurial opportunity will be taken to market through an existing firm, and when and why a new firm will be chosen as a vehicle for taking a new idea to market; firm is created when an entrepreneur recognizes an opportunity in an environment of genuine uncertainty and is unable to sell this opportunity in the market	dispersion of knowledge over people and places and over time, combined with heterogeneous expectations and the nexus of an individual and opportunity, explains the emergence of new firms;	individuals - entrepreneurs	entrepreneur as sole bearer of uncertainty; intersubjective agreement is low both within firms and outside firms (KU/?) - one individual or a very small group of them identifies an opportunity while working in a firm and independently pursues it, using a bootstrapping approach; [but [NO explanation given ON WHAT BASIS the opportunity is seen/ the U is reduced [!*]	subj = different individuals will classify the outcomes differently and will assign different probabilities to them;	dispersed knowledge; entrepreneurial theory; theory of the firm; Coase; TCE; RBV/ factor markets;	the dispersion of knowledge over people and places and over time leads to uncertainty; novel knowledge defies prediction; the range of outcomes from a basic research program;
Dold, M. F., & Rizzo, M. J. (2021). Frank Knight and the cognitive diversity of entrepreneurship. Journal of Institutional Economics, 17(6), 925-942.	conceptual - venn diagrams	under conditions of true uncertainty, however, the classification of phenomena and the derivative mental models will be inadequate or incomplete; dealing with contingencies which cannot be exactly foreseen; there are no blue-print solutions to problems of uncertainty; [no explicit definition of U/ KU {!}]	[*given no ONE formal definition, NOT consistent; further quotes the two inconsistent sides of Knight - where it is untreatable {and must be borne} and where it is treatable*]; speaks to different uncertainties and their delegation w/i the firm (with the U doing that, and the spread of partial information), with cognitive diversity providing better decisions when luck is the only determinant of outcomes under KU theoretically; so, a mixing of real and theoretical;	we summarize the 'philosophical vision' of Knight's framework and illustrate his rationale behind the distribution of entrepreneurship; focus on the institutional implications of the psychology of uncertainty and entrepreneurship in the third part of RUP;	a discussion of potential institutional implications by referring to the danger of monocultures, the additional value created by cognitively diverse teams, and the effectiveness of venture capitalists; the value of an interchange of ideas will be greater as uncertainty and distributed knowledge are greater; want to emphasize that 'entrepreneurial judgment' in the Knightian framework really means a series of judgments;	individuals - entrepreneurs (in teams)	judgment has its limitations and that discussion and contestation are important elements of decision-making under uncertainty; implement a sufficient cognitive diversity among her proxy decision-makers using her judgment of judgment; fundamental methods of dealing with uncertainty, based respectively upon reduction by grouping and upon selection of men to 'bear' it, 'consolidation,' and 'specialization,' respectively. To these two methods we must add two others which are so obvious as hardly to call for discussion: (3) control of the future, and (4) increased power of prediction; discovery;	subj = perceptions; individual; reality; (but, obj = unknown to all, if no solution to all)	cognitive diversity; Knight; judgment;	unpredictability about supply and demand conditions, both present and future, opp costs; technological and price changes; breakthrough technology to produce discontinuous products and services; partial information;
Dong, J. Q. (2021). Technological choices under uncertainty: Does organizational aspiration matter?. Strategic Management Journal, 42(5), 898-916.	conceptual - theory - math + sim study	[?RISK not U/ UNDER-DEFINED SHIFTS] technological uncertainty = the volatility of the commercial value of a firm's technology; market uncertainty = the shifts in customer preference for a firm's products or services based on its technology	[*?* RISK not U => DISTRNs KNOWN? for shocks*] new technology resulting from search Sit is uncertain following a standard normal distribution, which is consistent with the reality where the majority of technological development efforts have moderate rewards while only a few cases represent breakthrough technologies or big failures; current tech deterioration rate at X percent; Market performance is partly resulting from unpredictable shifts in customer preferences Uit following a standard normal distribution. The initial market uncertainty is randomly drawn from a standard normal distribution	there is a need to extend BTOF and to better understand the performance and risk implications of different organizational aspirations for technological choices over time	A simulation study to systematically investigate the performance and risk of technological choices with different organizational aspirations, and explore their contingencies on technological and market uncertainty. The simulation results provide novel insights into the indispensable role of goal setting to ascertain organizational performance	firms - simulated agents	adjust aspiration levels or search for new factors (technology); mixed aspiration can only outperform social aspiration when firms use an ambitious strategy of compiling reference group under high market uncertainty; make technological choices properly by comparing performance feedback with organizational aspiration	obj = simulated, math captured; uncertain following a standard normal distribution; random draws;	behavioral TH; strategy; aspiration; satisficing; technology choice;	technological uncertainty as the volatility of the commercial value of a firm's technology, and market uncertainty as the shifts in customer preference for a firm's products or services based on its technology; turbulence;

Doshi, H., Kumar, P., & Yerramilli, V. (2018). Uncertainty, capital investment, and risk management. Management Science, 64(12), 5769-5786.	empirical - panel	output price uncertainty = UNDER-DEFINED, implied that has options-base, but no definition explicitly given on known-ness (essentially, and observed volatility); - other forms of uncertainty (i.e., other than output price uncertainty), such as economic policy uncertainty (, option-implied equity volatility (and stock market volatility or VIX;	[*?* likely consistent; RISK/ variance rather than actual U*] Price Uncertainty and 6-monthPriceUncertainty denote themodel-freerisk-neutralvolatilityat365-daymaturityand 180-daymaturity, respectively, estimated using options on crude oil futures; Our key independent variable of interest is Price Uncertainty, which serves as a forward-looking measure of oil price volatility at the one-year horizon. We compute this as the option-implied volatility, using the method proposed by Bakshi et al. (2003), estimated from options on crude oil futures with maturity of approximately one year	Yet there is scarce empirical evidence regarding the causative effects of uncertainty on corporate policies and the potentially mitigating role of hedging. Does risk management moderate the effect of uncertainty on capital investment, and how does risk management itself vary with uncertainty? Does uncertainty exacerbate financial frictions and affect firms' ability to raise new financing? Are the effects of uncertainty heterogeneous across firms, and, if so, what are the important drivers of this heterogeneity?	We use forward-looking and exogenous measures of output price uncertainty to examine the effect of price uncertainty on firm-level capital investment, risk management, and debt issuance. The effects of uncertainty vary significantly by firm size. When faced with high price uncertainty, large firms increase their hedging intensity but do not lower capital investment or debt issuance. In contrast, small firms do not adjust their hedging intensity but significantly lower capital expenditure and debt issuance even after controlling for investment demand	firms [upstream oil and gas (O&G) sector]	faced with high price uncertainty, large firms increase their hedging intensity but do not lower capital investment or debt issuance; while small firms do not adjust their hedging intensity but significantly lower capital expenditure and debt issuance even after controlling for investment demand; high price uncertainty has significant dampening effects on capital investment of small firms	obj = compute this as the option-implied volatility, estimated from options on crude oil futures with maturity of approximately one year	capital investment; risk management; hedging;	forward-looking and exogenous measures of output price uncertainty; affected by a host of macroeconomic factors (e.g., stock market volatility; credit spread; economic policy uncertainty…)
Dushnitsky, G., & Sarkar, S. (2020). Here comes the sun: the impact of incidental contextual factors on entrepreneurial resource acquisition. Academy of Management Journal, (ja).	empirical - archival + experimental	*intense uncertainty* because (a) there is little or no information on multiple facets of a startup's operation, and (b) the entrepreneurs have yet to identify, let alone mitigate, the various business risks	[*consistent with language; INDIRECT only; age/ stage as lack of info*] Seed stage startups have no sales and face uncertainty on multiple fronts, including the viability of the technology, the ability to attain product–market fit, and the feasibility of the business model; the *younger* a startup, the greater the level of uncertainty associated with it	Drawing on affect-as-information theory, we conjecture that, in the face of intense uncertainty, sunnier days may affect investors' mood and result in a greater likelihood of investment.. We find that graduating on a sunnier day increases the likelihood of investment. This effect is stronger under intense uncertainty, where (a) startups are nascent, or (b) founders have limited human capital	This paper focuses on investment decisions in nascent, seed-stage startups, where information is scarce and uncertainty is intense	individuals - seed-stage investors	in the face of intense uncertainty, sunnier days may affect investors' mood and result in a greater likelihood of investment; affect is a salient information heuristic in the face of uncertainty	subj = lab experiment (but same pitch) ; obj = the younger a startup, the greater the level of uncertainty	affect-as-information theory;	information is scarce; startups are nascent, or founders have limited human capital; the viability of the technology, the ability to attain product–market fit, andthe feasibility of the business model
Ehrig, T., & Schmidt, J. (2022). Theory-based learning and experimentation: How strategists can systematically generate knowledge at the edge between the known and the unknown. Strategic Management Journal.	conceptual - theory - logic, boxes	[*somewhat under-defined, U as unknowns, some of which are unknowable, some of which are not*, not explicit about states or probabilities or options*] Knowledge about the future is incomplete and many contingencies are unforeseen; experimentation can reduce the uncertainty… Under uncertainty, the strategist cannot be sure that reaching the conjecture is possible at all, and thus it makes sense to first of all ponder about the question what would be necessary to reach it... due to the nature of uncertainty (incompleteness of knowledge), the strategist cannot know if his beliefs about necessary and sufficient conditions and relations among beliefs are correct, and they are therefore subject to revision.. some relevant beliefs cannot be evaluated based on observations or evidence from an experiment... the critical contingencies that will affect outcomes are not yet fully known	[*similarly under-defined/ under-specified as to characteristics or uncertainty vs of what a 'theory' is about the future*; NOT KU as discussed, given learnable] verbal - see definitions - unknowns in future, some more knowable through experiments on theory parts; relationship statements, beliefs about outcomes (consumer behaviors) as examples of possible future states [not full array, not probability]	We develop a framework that helps strategists to learn and understand what it takes to reach ambitious goals when there is substantial uncertainty. We ask strategists to formulate their assumptions as a theory. How can theories be useful for guiding experimentation and decision-making toward an envisioned future? In particular, how can theories be improved before large or even irreversible investments are made on their basis?	We present a framework for theory-based learning and experimentation under uncertainty. Strategists' assumptions about how an envisioned future can be reached are likely incomplete and possibly wrong, for instance, if critical contingencies have been overlooked. We explain how strategists can learn from thinking about and testing necessary conditions for an envisioned future to materialize	individuals - strategists	learning over time - framework for theory-based learning and experimentation; learn from thinking about and testing necessary conditions for an envisioned future to materialize; logically linking assumptions to consequences; also learn from arguments formulated as counter-theories even if objections are rejected (e.g., by identifying hidden premises).	subj = personal theories; personal beliefs; mistakes possible;	strategy; experimentation; learning; contingency; theorizing/ model-building;	knowledge about the future is incomplete and many contingencies are unforeseen; cannot be sure that reaching theconjecture is possible at all; cannot know if his beliefs about necessary and sufficient conditions and relations among beliefs are correct; some relevant beliefs cannot be evaluated based on observations or evidence from an experiment; example has tech and demand unpredictability

Engel, Y., Kaandorp, M., & Elfring, T. (2017). Toward a dynamic process model of entrepreneurial networking under uncertainty. Journal of Business Venturing, 32(1), 35-51.	concept ual - theory - dynamic framew ork	uncertainty about a course of action is discerned "if, at the time a decision is being made, decision makers cannot collect the information needed to anticipate either the possible outcomes associated with a decision nor the probability of those outcomes".. ultimately concerned with the power of temporality in drawing a veil over the future, thereby concealing preferences as well as outcomes (KU)	[*?* surprise is consistent but reactable to and affectable is NOT consistent with KU] U as given&perceived + surprise => knowable along way, reactable, affectable.. no ultimate decision [U as inconvenience?][U not measured but hypothesized as some general context of unpredictability but known once acted upon?]… observation-based frantic search at a point in time for info to reduce U	theorize about how entrepreneurs act when desired ties cannot be identified in advance, networking outcomes cannot be predicted, and ongoing social interactions fuel the emergence of new objectives; more detail about how entrepreneurs generally act under uncertainty. How do entrepreneurs engage in networking under uncertainty?	consider the implications of incorporating the notion of uncertainty into investigations of how entrepreneurs engage in networking; that entrepreneurial agency is agency under uncertainty. In other words, to the extent that networking processes are entrepreneurial they are bound to involve unpredictability, goal ambiguity, and an interactive environment that keeps changing with every action; draws on effectuation	individu als - entrepre neurs	a dynamic networking process, highlights distinctive elements such as altruism, pre-commitment, serendipity, and co-creation; effectuation; begin w/ people already know; use available means	subj = perceived inability to predict; personal objectives	networking; tie formation; creation; action; effectuation	networking processes bound to involve unpredictability, goal ambiguity, and an interactive environment that keeps changing with every action; people's free will
Faulkner, P., Feduzi, A., & Runde, J. (2017). Unknowns, Black Swans and the risk/uncertainty distinction. Cambridge Journal of Economics, 41(5), 1279-1302.	concept ual - lit review	U = not reducible to numerically definite probabilities; an unknown; known unknowns as those 'gaps we know exist', while unknown unknowns are those 'gaps we don't know exist'; an unknown is defined as any feature of the world that an individual lacks knowledge of;	[*CONSISTENT*] typology of hypothetical values and imaginability; put forward an exhaustive categorization of the different kinds of hypothetical values that might be associated with any unknown, and a means of describing what is contained in any individual's subjective space of possibilities; (1)Uncertainty concerning the existence of unknowns, whereby a person lacks knowledge about some feature of the world; (2)Uncertainty concerning the existence of unknown unknowns, where a person is unaware of some gap in knowledge; (3)Uncertainty concerning whether or not the membership of the SSP associated with an unknown is 'correct'; (4)Uncertainty concerning which of the hypothetical values in the SSP is the true one; etc...	explores uncertainties of the latter kind, starting with and building on Donald Rumsfeld's famous observations about known unknowns and unknown unknowns; various connections are developed, first with Nassim Taleb's Black Swan, and then with Lawson's Keynes inspired interpretation of uncertainty; provide philosophical foundations for a conception of uncertainty not reducible to numerically definite probabilities;	Keynes does not define uncertainty in A Treatise on Probability, and one of the aims of Lawson's 1985 paper is to provide an interpretation of uncertainty consistent with the framework sketched above; events that lie outside the 'realm of regular expectations' or the 'tunnel of possibilities'; U can then arise in one of two ways: (1) where the relevant probability relation is unknown due to an individual's inability to argue from given evidence to the degree of rational belief it justifies in some proposition, and (2) where there exists no method for determining a numerical measure of the probability relation, namely where probabilities are numerically immeasurable or indeterminate;	individu als - decision -makers	absence of an explicit treatment of unimagined possibilities; (in dynamic context, perhaps learning can work);	subj = beliefs; bounded rationality;	Taleb; Lawson; Knight; decision TH; bounded rationality;	ignorance; surprise; financial crises, industrial accidents, technological shifts and political developments that are unpredictable; unimagined stuff;
Feduzi, A., Faulkner, P., Runde, J., Cabantous, L., & Loch, C. (2020). Heuristic methods for updating small world representations in strategic situations of Knightian uncertainty. Academy of Management Review, (ja).	concept ual - theory - proposit ions, figure	Knightian uncertainty - including uncertainties about the number and nature of possible acts, states and consequences, as well as about the probabilities of states.. the impossibility of determining both the possible outcomes of a decision and their associated probabilities, extending the concept to include the uncertainty stemming from possible omissions from the state space	[*INCONSISTENT* confusing the unknowable with the knowable over time/ updated] small world representations/ hypotheses/ scenarios [where all is known] imagined as way to deal with KU, then updated through exploration/ discovery - with disconfirmation or counterfactual reasoning used to guide hypothesis testing	The question of how SWRs should be updated during the implementation phase of strategic decisions has however received considerably less attention, perhaps because adaptive responses to emerging information are often seen as extempore and ad hoc rather than the result of systematic analysis; is nonetheless a pressing one in situations of Knightian uncertainty, where the scope for constructing adequate SWRs ab initio is often highly limited, and where decision-makers relying on heuristics to guide their actions often find it difficult to adapt their cognitive representations in a timely way	Recent studies on the construction and use of "small world representations" in strategic decision-making under Knightian uncertainty say little about how such representations should be updated over the implementation phase. This paper draws on the psychology of reasoning to take a step towards answering this question	individu als - DMKrs	over time, updating beliefs; using two well-known heuristic methods of inquiry—disconfirmation and counterfactual reasoning—might inform procedures for updating; under U, the procedure based on counterfactual reasoning is likely to be more effective; imagine scenarios; test hypotheses (to update scenarios)	subj = Wason's test, in reality, updating personal beliefs; (obj = in theory as Knightian U)	Knight; small world representations [Savage]; heuristics; psychology of reasoning; cognition	uncertainties about the number and nature of possible acts, states and consequences, as well as about the probabilities of states; unpredictability of future; unforeseen consequences; scenario spaces will often be profoundly ambiguous and non-definitive

Fink, M., & Harms, R. (2012). Contextualizing the relationship between self-commitment and performance: Environmental and behavioural uncertainty in (cross-border) alliances of SMEs. Entrepreneurship & regional development, 24(3-4), 161-179.	empirical - quant/ intl	environmental uncertainty [results from changes in the economic conditions faced by an organization that are outside its control and hard to anticipate]; and behavioural uncertainty [the potential inherent in a situation for difficulty anticipating and understanding actions];	[consistent, but NOT directly measured, only assumed/ argued; categories only] behavioural uncertainty is higher in international alliances than in national alliances; environmental uncertainty is higher in alliances with transition economy partners	cooperation based on self-commitment of the partners is relevant for successful alliances in the context of uncertainty; however, the performance impact of self-commitment can be contingent on the type of uncertainty;	purpose of this study is to extend the research of Krishnan, Martin, and Noorderhaven (2006) by comparing the impact of environmental and behavioural uncertainty on the relationship between trust based on self-commitment and performance in the context of (inter)national alliances between firms from market economies and/or transition economies	firms	self-commitment to cooperation can be valuable under uncertainty; alliances with partners from the same country (national alliance) show a lower degree of behavioural uncertainty; alliances in which the focal partner is from a market economy exhibit less environmental uncertainty than in alliances with the focal partner from a transition economy; in settings of behavioural uncertainty, the alliance can be managed by establishing a relation between self-committed actors	subj = perceptions about partners (re: behavioral uncertainty); obj = identifiable categories of uncertainty levels	alliance; behavioural uncertainty; environmental uncertainty; international entrepreneurship; performance; self-commitment	environmental = transition economic conditions (unpredictable macro-econ, unstable institutions, poorly-developed infrastructure, volatile politics/ legal regimes, govtl interventions); behavioral = differenes in cultures, beliefs, ideologies, mental models, heterogeneity... distrust
Fischer, E., & Reuber, A. R. (2014). Online entrepreneurial communication: Mitigating uncertainty and increasing differentiation via Twitter. Journal of Business Venturing, 29(4), 565-583.	empirical - tweets	stakeholder uncertainty regarding the quality of the firm, its management and its products or services; NO definition explicit (e.g., nothing about unknowns)	[? NOT consistent; just assumed] ***U simply implied (!?!) by age (<15 yrs old), B2B, growth mode, using Twitter; uncertainty reduction measured by external proportion of tweets about 'quality'	a gap in the current literature on entrepreneurial communications; do not, as yet, know how growth-oriented entrepreneurial firms can use new media channels such as Twitter to reduce uncertainty; what kinds of communicative approaches enacted by entrepreneurial firms using Twitter attract audience responses that affirm their quality?	this research stops well short of identifying communicative approaches on new social media that might be effective at reducing uncertainty about quality; social media communications seem likely to be effective in mitigating uncertainty and enhancing differentiation only if firms are adept at balancing multiple dimensions in their communicative streams;	firms as communicatrs; individuals - consumers/ stakeholders as perceiving U	some narratives and symbolic actions produced by entrepreneurial firms can help to reduce audience uncertainty about their quality; links between specific types of communicative streams and audience responses that reflect reduced uncertainty; a multi-dimensional communicative stream is more effective than either a uni-dimensional or a sparse stream; cues in a communicative stream signaling that a company's management is adept in this regard should help to mitigate both firm and management quality-related uncertainty;	subj = perceived U by consumers; reality;	social media; communications; differentiation; firm growth; narratives; symbolic actions; legitimacy;	emergence phase of an industry; sources of uncertainty identified by Shepherd and Shanley (1998): namely the firm, its management and its product or service offerings;
Fisher, G., Neubert, E., & Burnell, D. (2021). Resourcefulness narratives: Transforming actions into stories to mobilize support. Journal of Business Venturing, 36(4), 106122.	conceptual - box and arrows model; typology	U = cannot use systematic or rational calculations to evaluate whether a venture is worthy of support; the data for doing such calculations do not exist; [KU]; analytical decision approaches are not possible or useful;	[*CONSISTENT regarding the inability to apply analytics to resolve; NOT consistent in that narratives will/ should work in such circumstance*; HISTORY is needed to provide a narrative - implying some things are KNOWN] speaks to signals and info asymmetries (not being U); resourcefulness narrative as a discursive, temporal account of PAST or ongoing entrepreneurial actions, whereby an entrepreneur is presented as using, assembling, or deploying resources in creative ways in order to overcome an impediment;	theorize that a particular type of narrative – a resourcefulness narrative – will significantly impact an entrepreneur's ability to mobilize support from resource providers;	argue that a resourcefulness narrative generates positive emotional and cognitive reactions from external resource providers such that they are inclined to support a venture; these effects are contingent on the general level of resource scarcity or munificence in a venture's environment, the level of uncertainty underpinning the venture, the entrepreneur's experience, and the recency of the actions described within the narrative;	individuals - entrepreneurs & resource holders	by acting resourcefully and transforming that action into a narrative, entrepreneurs can resourcefully mobilize support; decisions to support a new venture are based largely on intuition, lending greater weight to positive emotions and behavioral signals; resource providers depend on behavioral signals to make support decisions; [(learning over time);]	subj = perceptions; reality;	resourcefulness; narratives; resource mobilization; emotion; cognition;	new ventures; novelty; level of newness associated with the activities; pursuing a novel technology, market, or business model;

Fisher, G., Stevenson, R., Neubert, E., Burnell, D., & Kuratko, D. F. (2020). Entrepreneurial hustle: Navigating uncertainty and enrolling venture stakeholders through urgent and unorthodox action. Journal of Management Studies, 57(5), 1002-1036.	empirical - interviews	Under conditions of uncertainty – where the probabilities of alternative outcomes are impossible to quantify (Knight, 1921) and the future is unknowable (Shackle, 1972, 1979)– taking action may be one of the only means for an entrepreneur to move forward; shifts the entrepreneurial context from one defined by uncertainty to one defined by risk, where the probabilities associated with alternative futures can be estimated [unknown but knowable*]	[*NOT consistent, given novelty does not necessarily imply KU; no measure of unknownness, probabilities, states and so on*] Because each entrepreneur invited onto the podcast is recognized for having created something significantly novel and new, it is inevitable that each of the interviewees confronted high levels of uncertainty as they sought to bring their creations to market. [??? - U assumed].. To mitigate uncertainty, entrepreneurs can be open to learning and exploration	examining the type of action that allows entrepreneurs to operate under conditions of uncertainty and enroll stakeholders under such conditions is critical to advancing entrepreneurial action theory and entrepreneurial leadership. entrepreneurial hustle. From this analysis, we theorized that such actions were central to navigating uncertainty and other important entrepreneurial activities including creating opportunities, resourcing, learning, establishing legitimacy, and making connections	We analysed 48 interviews with entrepreneurs to inductively identify an action-oriented construct we labelled as entrepreneurial hustle – an entrepreneur's urgent, unorthodox actions that are intended to be useful in addressing immediate challenges and opportunities under conditions of uncertainty	individuals - entrepreneurs	hustle = urgent, unorthodox actions that are intended to be useful in addressing immediate challenges and opportunities under conditions of uncertainty; action = learning, converts U to risk	subj = interviews (3rd party - NPR); no actual assessment of this (U) = assumed as novelty of pitch	stakeholder TH; entrepreneurial action; creation school; effectuation; enactment; social construction; exploration	environmental unknowns (in opportunities, resources, legitimacy, networks); unpredictable future; novelty; nothing yet exists
Foss, N. J., Klein, P. G., & Bjørnskov, C. (2019). The context of entrepreneurial judgment: organizations, markets, and institutions. Journal of Management Studies, 56(6), 1197-1213.	conceptual	a context of deep uncertainty and resource heterogeneity, it is difficult or impossible for entrepreneurs to communicate their judgments to funders and other resource providers; Frank Knight's fundamental insight that uncertainty differs from risk (Knight, 1921); uncertainty (or, if one prefers, risk that is uninsurable); under uncertainty, entrepreneurs do not know all relevant attributes of the resources that they deploy to production; given uncertainty, acquiring, combining, deploying, etc. resources to production all depend on judgment	[*NOT consistent with the ex ante unknowability of KU, given it speaks to learning over time; consistent in language even though judgment is promoted as something that can work when addressing KU*] U not measured; under uncertainty, entrepreneurs must experiment to figure out how resources, in various combinations, can best be used to generate profits by satisfying consumer wants; many things that can be uncertain (institutions, factors, means, ends)	Focusing on the emerging judgment-based approach to entrepreneurship, we argue that economics can say much about how the organizational, market, and institutional context shapes entrepreneurial judgment. We describe entrepreneurs as individuals who deploy scarce, heterogeneous resources to service customer preferences at a profit. Because of uncertainty, this process is essentially experimental	Under uncertainty, entrepreneurs must experiment to figure out how resources, in various combinations, can best be used to generate profits by satisfying consumer wants; Packard et al. (2017) note that entrepreneurs face a double-sided uncertainty problem. First, there is ***uncertainty about ends***; Second, for given ends, there is ***uncertainty about means***… If there are high levels of ***uncertainty in factor markets***, it may make sense to choose desired products and services first, then choose among a limited set of factors. If product markets are complex and uncertain, it may be better to start by identifying feasible factor combinations, then look for potential products	individual entrepreneurs	experimental (entrepreneurs will seek to design the internal organization of the firm so that it facilitates internal experimentation); their version of judgment (as experimentation); but cannot communicate it(?!)	subj = entrepreneurs start with some subjective attributes	entrepreneurial judgment (authors' own TH); institutions; organizational structure;	exogenous; resource char (ends and means, factor mrkts); demand; some from institutions
Fraser, S., & Greene, F. J. (2006). The effects of experience on entrepreneurial optimism and uncertainty. Economica, 73(290), 169-192.	empirical test of model	uncertain about their true talent; Knightian [a future event is uncertain if the likelihood of its occurrence is unknown]; the distribution of talent is initially unknown to the entrepreneur, reflecting a situation of true uncertainty; the entrepreneur's initial talent beliefs may have little grounding in reality	[questionable in TH model; no in estimate- given no info in model about range of possible talent or its distrbn, just about beliefs and shocks - which, also unclear are NIID known to entrepreneur] [a knowable known unknown] talent beliefs are represented by a prior density given by a Normal distribution that is specific to, and its parameters are known by, the individual, but where the talent level is unknown and mixed with shocks [NIID, 0] observed together, where that variance is observed, talent doesn't change(?!); measured as positive variance empirically (not as an unknowable factor);	the empirical analysis supports the main propositions of the model: principally, entrepreneurs are found to be more optimistic than employees, and both optimism and uncertainty diminish with experience;	model is applied to British data on self-employment and optimism for the period 1984–99; a Bayesian learning model necessitates a heteroscedastic probit estimator	individuals - entrepreneurs	learning over time - uncertainty diminish with experience; entrepreneurs continually revise their beliefs with new information gathered during entrepreneurial activity	subj = personal beliefs over talent in model/ reality; SEU; obj = there is a true value and the noise distribution is known/ knowable// estimated empirically, objectively;	Knight; optimism; occupational choice; (entrepreneurial) learning;	year dummies, inflation, regional unemployment rates, real interest rates and real GDP growth are included to capture possible macroeconomic sources of uncertainty; optimism; heterogeneity; size of investment; injecting into the firm's production and/or cost functions firm-specific random variables, reflecting the entrepreneur's unobserved efficiency

Frese, T., Geiger, I., & Dost, F. (2020). An empirical investigation of determinants of effectual and causal decision logics in online and high-tech start-up firms. Small Business Economics, 54(3), 641-664.	empiric al - 2 studies	perceived 'state' U = it is a type of Knight's (1964) uncertainty that refers to a future whose events are unknown and unpredictable	[*Ok, subjective* but not KU 'type'; consistent if perceived, but NOT if KU] Perceived uncertainty {survey items} = It was not clear what developments and trends should be given special attention; We could hardly assess how the general conditions would develop for our company; We could hardly assess how our business opportunities would develop <= main quant study; for qual study, interpret interview language (did no know...)	What are relevant antecedents to effectuation and causation logics, and how do they relate to the latter concepts? ..entrepreneurial expertise in the face of uncertainty as the original, and the only, combined driver of effectuation logics and behavior	validates various effectuation logics and uncovers the following four antecedents of effectuation and causation: founders' perceived uncertainty, entrepreneurial experience, management experience, and investor influence	individu als - entrepre neurs	experimentation [rather than flexibility, affordable loss, pre-commitments]; entrepreneurial experience; more in early stages	subj = perceived uncertainty in the view of the decisionmakers , the entrepreneurs, should take precedence over more objective assessments of uncertainty; interviews & survey	effectuation; Milliken; entrepreneurial action;	future events are unpredictable; DMKr ignorance; unpredictable future developments and trends, and how they may become business relevant
Frølund, C. W. (2021). Institutions, uncertainty, and entrepreneurial judgment. Journal of Institutional Economics, 17(6), 913-923.	concept ual - box and arrow	KU (cited) = immeasurable probabilities; options that cannot be estimated mathematically or statistically; option or outcome sets open (Packard);	[*QUESTIONABLE - consistent language, but given inelasticity of most governments, and given historical knowledge of the institutions and possible players, it is hard to argue that options or outcomes cannot be imagined, and probabilities estimated*; as well, the pace of the change is often slow enough to respond to w/o extraordinary effort] institutional uncertainty is the result of perceived contradictions or incongruences between institutional levels, also referred to as institutional misalignment; introduces uncertainty for the entrepreneur who is unsure of how to interpret the institutional environment; further uncertainty is the fact that geographically separate institutions across cities, states, or countries may have different rules or norms ...such contradictions drive institutional change; institutional uncertainty generally opens the option set, the outcome set, or both;	the main contribution of the paper lies in the development of a model offering a coherent description of the way institutions affect uncertainty and the entrepreneurial process;	builds upon recent efforts to integrate the concepts of uncertainty and institutions within the entrepreneurial context;	individu als - entrepre neurs	judgment (consisting of intuition, understanding, and gut feeling); institutions provide some certainty; abide, evade, alter the institution, or give up when they provide uncertainty; the decision-maker must populate both the option and the outcome sets thru judgment; learning [(belief updating over time);]	subj = beliefs; interpretations; (but obj = in TH, correct or incorrect decisions)	institutions; judgment; Knight;	unpredictable institutions (and their policy changes); technological progress; differences in social norms, changes; lack of trust; uncertainty regarding the implementation and enforcement of rules and policy changes; regime uncertainty, which entails a mistrust of the people in charge of the institutions;
Furr, N. R., & Eisenhardt, K. M. (2021). Strategy and uncertainty: Resource-based view, strategy-creation view, and the hybrid between them. Journal of Management, 47(7), 1915-1935.	concept ual - theory - verbal view	[*as unpredictable future; states; environment*] U = unpredictable, often uninterpretable market, change often rapidly occurs. Executives have limited foresight and time; the loss of predictability such that the future is unpredictably different from the past, and information about the future is incomplete, unknown, or unavailable (; ambiguous demand	[*by market 'type' vs defined unpredictability* apparently knowable and shapable, so NOT unknowable*] high uncertainty markets such as nascent and disrupted ones where ventures often operate without a clear industry structure; strategy in high uncertainty markets is more about learning, cognition, and shaping than owning, controlling, and leveraging resources (e.g., green energy; air taxis?)	propose uncertainty as a critical boundary condition for RBV, and delineate a strategy creation (SC) view for high uncertainty markets	in high uncertainty markets like nascent or disrupted ones, RBV seems less germane. Resources may not yet exist or their value (and rarity) may be indeterminate (or changing). Here, we contribute the Strategy Creation (SC) view—joining strategizing by doing, thinking, and shaping. It offers a strategic logic that fits highly uncertain markets	individu als - executiv es	joining strategizing by doing, thinking, and shaping; creating strategy by doing and thinking; choosing to shape versus adapt; beginning to build scaffolding of resources for scaling; learning, cognition, and shaping versus owning, controlling, and leveraging resources; experimentation; bricolage; problem-solving; learning; visions; analogies; imagine, frame, and structure a new market order that is favorable to the focal firm	obj = theoretical; if by industry conditions/ stage, more objective as well; (unstated subj as real executives)	RBV; authors' own strategy creation view; technology; ecosystems; industry evolution; dynamic capabilities; Knight	resources may not yet exist or their value (and rarity) may be indeterminate (or changing); uninterpretable market, change often rapidly occurs;.executives have limited foresight and time; the loss of predictability such that the future is unpredictably different from the past, and information about the future is incomplete, unknown, or unavailable; nascent and disrupted markets where ventures often operate without a clear industry structure; incomplete or fleeting market structures; unclear or contested product definitions; ambiguous demand; lack of a dominant design; information is incomplete, unpredictable, or even unknowable.

Galasso, V. (2022). The cost of political uncertainty: Evidence from Catalonia. Journal of Economic Behavior & Organization, 201, 250-259.	empirical - survey	political U = unanticipated events and/ or with outcomes ex ante unknown	[*sometimes consistent - when a surprise event; less so with known events with a known range of outcomes and bases for subjective beliefs (e.g., over negotiations between known parties)] significant CARs provide some evidence of actual surprise in info/ fin markets	an event approach methodology, we estimate negative stock market reactions to the approval of the Catalan Statute and to the 2017 referendum for (mostly tradable) Catalan firms; we provide a quantitative assessment of the economic effects of political uncertainty by considering stock market reactions to crucial events for national and regional firms;	the political uncertainty created by demands for more autonomy or independence using the Catalan-Spanish negotiation for the Catalan Statute and the unilateral quest for independence;	firms - CAR; individuals - preferences	entrepreneurs tend to prefer the status quo and that the political uncertainty associated with more autonomy and independence may be detrimental to the business environment; traded firms have higher CARs for events providing greater political certainty	subj = survey; perceptions; reality; obj = events (known dates of decisions);	autonomy; political independence; joint administrative responsibility; event approach;	nationalist demands for more autonomy or independence create uncertainty; negotiated agreements over shared legal, administrative and fiscal responsibilities between central and regional authorities are associated with political uncertainty; unilateral moves towards full independence create deep political uncertainty; uncertainty emerges regarding which organizational bodies, at regional and/or national level, will be in charge of monitoring and enforcing rules; uncertainty may stem from these bodies trying to favor central or regional players; related to whether the joint Catalan-Spanish responsibility over crucial infrastructures, such as ports, and a perspective double tax collection would lead to more bureaucracy, higher taxes or to favoring Catalan or Spanish players
Gans, J. S., Stern, S., & Wu, J. (2019). Foundations of entrepreneurial strategy. Strategic Management Journal, 40(5), 736-756.	conceptual - formal model	(Uncertainty)—The parameters of the probability distribution governing the value of an idea are not known by the entrepreneur [KU]	[*NOT consistent; the math involved all assumes that probabilities are known - or believed - by the entrepreneur; also, violated by experimentation over time w/ Bayesian updating to 'know' the distribution] we assume that the value of the idea(vj) is either low(vl), medium(vm) or high(vh) with prior probabilities pl, pm, and ph respectively.. AND pl, ph > 0. (where at pl => loss occurs)… so, ok ex ante BUT learning takes place to then reduce it prior to full commitment	The objectives of this paper are to develop a general framework for the entrepreneurial choice process, identify conditions under which this process involves a gap between optimization and choice, and consider the implications of that gap for the foundations of entrepreneurial strategy. The central contribution of the analysis is to provide insight into the subtle role that uncertainty plays in the entrepreneurial choice process, and how its interplay with learning can result in an endogenous rule to search until faced with equally viable yet distinct alternatives	The interplay between uncertainty and learning has the consequence that commitment-free analysis yields multiple, equally viable alternatives from which one must be chosen. This endogenous gap between optimization and choice is a central paradox confronting	individuals - entrepreneurs	learning; proaction; search w/ stopping rule; continue search until they reach at least two alternatives that are ex ante equivalent in expected value before making a choice; experimentation	obj = probability distribution in a simulation; subj = in reality	Bayes; constrained maximization; opportunity cost of experimentation; action vs planning; real options; search TH;	venturing into new domains and as such, must choose under conditions of high uncertainty with only noisy learning available; The parameters of the probability distribution governing the value of an idea are not known by the entrepreneur

Gänser-Stickler, G. M., Schulz, M., & Schwens, C. (2022). Sitting on the fence-Untangling the role of uncertainty in entrepreneurship and paid employment for hybrid entry. Journal of Business Venturing, 37(2), 106176.	empirical - cross-sectional	[*unusual] uncertainty in entrepreneurship, which we *define as the level of unpredictability of an individual's future earnings* in entrepreneurship (+ to employment); pertains to the individual level;.the upside potential of uncertainty provides an incentive to discover and exploit new investment opportunities.. use of real options logic*	[*NOT consistent w/ unpredictabty given measuring known volatility at industr level*] we drew on data from the SIPP to align this established measure of industry volatility more closely to the individual level; we determined the impact of past industry volatility on future earnings uncertainty in paid employment by using a sample of full-time employees to regress the industry volatility over the past twelve months on the individuals' earnings volatility (in terms of the standard deviation of earnings) in the subsequent twelve months; calculated these regressions separately for 22 major occupational groups .. based on his or her current occupation and the state-level volatility of GDP over the past twelve months in the industry in which he or she was employed + in entrepreneurship, we relied on information about an individual's current occupation and state of residence; used a sample of self-employees to regress occupation fixed effects interacted with state fixed effects on the twelve-months earnings volatility to generate predictions of uncertainty and matched them	Prior research agrees that uncertainty in entrepreneurship shapes individuals' decision between hybrid and full-time entry, but largely neglects the role of uncertainty in paid employment. By theorizing that hybrid entrepreneurship is a portfolio of real options in entrepreneurship and paid employment, we argue that both uncertainty in entrepreneurship and paid employment as well as their interplay determine individuals' decisions regarding their mode of entry into entrepreneurship	A main advantage of hybrid entry over full-time entry is that hybrid entry allows individuals to test the 'entrepreneurial waters' while still having the security of a paid job. Entrepreneurship is generally acknowledged as being associated with a high degree of uncertainty, so hybrid entry allows individuals to deal with this uncertainty by taking the first steps in entrepreneurship while maintaining paid employment and its associated benefits and security	individuals - entrepreneurs	hybrid entry into entrepreneurship to reduce its uncertainty; entry to entrepreneurship to reduce employment uncertainty	obj = measures used (volatilities at higher levels); subj = in reality/ logic	real options; portfolios (of options)	unpredictability of an individual's future earnings in entrepreneurship, and opportunities; industry volatility w/ individuals' earnings volatility; state-level volatility of GDP; negative economic developments that can erase their investments of time and money; business failure; potential lay-offs instead of wage cuts; risk of unemployment
Garrett, R., Mattingly, S., Hornsby, J., & Aghaey, A. (2020). Impact of relatedness, uncertainty and slack on corporate entrepreneurship decisions. Management Decision.	empirical - survey/ experiment	[*RISK not U; probability of states?*] ICV uncertainty = as "essentially experiments" where little is known regarding appropriate strategies or how best to achieve venture goals; in this research is discussed as the probability of expected outcomes; exists when conditions in an organization's environment are less predictable; future outcomes are not readily knowable; perceived uncertainty	[*under-defined; dichotomy; perception* measure mixes state and probability, so not very consistent*] verbal scenarios - The potential opportunity's outcomes are fairly [un]certain {low/ high}	The purpose of this study is to evaluate the effect of opportunity relatedness and uncertainty on the decision of a corporate entrepreneur to pursue a venturing opportunity	Results show that product relatedness, market relatedness, perceived certainty about expected outcomes and slack resources all have a positive effect on the willingness of a corporate entrepreneur to pursue a new venture idea. Moreover, slack was found to diminish the positive effect of product relatedness on the likelihood to pursue a venturing opportunity	individuals - corporate entrepreneurs	less willingness to pursue a new venture idea (option to abandon) [+ more willingness with perceived product and market relatedness, and with slack]	[subj = survey; perceptions; reality], obj = scenarios w/ probability of expected outcomes, was portrayed as either high or low	corporate entrepreneurship; internal corporate ventures; entrepreneurial decision-making; relatedness; cognition; slack; risk	little is known regarding appropriate strategies or how best to achieve venture goals; the probability of expected outcomes; when conditions in an organization's environment are less predictable; future outcomes are not readily knowable; novelty;
Gartner, W., & Liao, J. (2012). The effects of perceptions of risk, environmental uncertainty, and growth aspirations on new venture creation success. Small Business Economics, 39, 703-712.	empirical - survey PSED	environmental U = [Milliken]an individual's perceived inability to predict (an organization's environment) accurately because of a 'lack… of information' or 'an inability to discriminate between relevant and irrelevant data';	[**NOT consistent given wording of actual measure - that does not ask about predictability, or lack of information or ability to discriminate**] an 11-item measure from the PSED mailing survey (Matthews & Human 2004); items are related to nascent entrepreneurs' perceptions of their ability to understand or to predict the state of various environmental conditions due to lack of information; broken down into three interpretable factors: financial uncertainty, competitive uncertainty and operational uncertainty; chose financial uncertainty as a key uncertainty measure; *actual PSED wording asks respondents to self-define and score on the term uncertainty and 5 levels from very low to very high* - that does NOT speak directly (or in any way explicitly) to understanding or prediction	explores the strategic and non-strategic risk-taking propensity perceptions of nascent entrepreneurs as it relates to the subsequent likelihood of venture formation success, considering the moderating influences of perceptions of environmental uncertainty and venture growth aspirations; assume that individuals who perceived high levels of uncertainty would perceive higher levels of risk as well; set out to test whether nascent entrepreneurs with a high risk-taking propensity are more likely to perceive high levels of uncertainty during the venture creation process,	an entrepreneur's risk-taking propensity has no relationship to the likelihood of successfully starting a business; perceptions of environmental uncertainty were positively related to non-strategic risk-taking propensity, yet none of these variables (strategic and non-strategic risk-taking propensity, environmental uncertainty and growth aspirations) had a significant effect on venture creation success	individuals - entrepreneurs	N/A	subj = survey; perceived; reality;	risk-taking propensity; nascent entrepreneur; PSED; start-up; Knight;	a 'lack… of information' or 'an inability to discriminate between relevant and irrelevant data' ; demand unpredictability; questionable abilities;

Ghosal, V., & Ye, Y. (2015). Uncertainty and the employment dynamics of small and large businesses. Small Business Economics, 44, 529-558.	empirical - SBA dara	*NO formal definition provided*	[**NOT consistent, as no formal definition given; this is measured as variance; so, it is RISK**] alternative measures of uncertainty are constructed based on the survey of professional forecasters, and regression-based forecasting models for GDP growth, inflation, S&P500 stock price index, and fuel prices; in the actual estimation of the effects of uncertainty, we will use data on these variables only over the period 1988–2011; variance of the forecast error (the unpredictable component) measures uncertainty;	examine the impact of uncertainty on employment dynamics;	results indicate that greater uncertainty has a negative impact on growth of employment, and the effects are primarily felt by the relatively smaller businesses; to truly understand the effects of uncertainty on employment dynamics, we need to focus on the relatively smaller and entrepreneurial businesses; alternative channels via which uncertainty can affect firms' decisions related to capital investment outlays, entry, exit, production, R&D expenditures and choice of technology;	firms - employment	uncertainty and sunk costs imply an option value of waiting and are likely to depress investment and entry; while the optimal capital stock decreases with input cost uncertainty, it increases with technical uncertainty; lowers employment, especially in smaller businesses;	obj = public measures; theoretically speaking to individuals making decisions (subj implied?)	employment; small businesses; real options; financing constraints; info-asymmetry; risk aversion;	underlying factors such as demand, prices, input costs, cash flow, project returns, technological factors, and regulatory and economic policy changes;
Giménez Roche, G. A., & Calcei, D. (2021). The role of demand routines in entrepreneurial judgment. Small Business Economics, 56(1), 209-235.	conceptual - theory - model (box & arrows)	U = future market conditions cannot be inferred from present ones; open-endedness manifests as uncertainty about alternative actions and possible outcomes, thus resulting in divergent assumptions of what should be done and what could happen; fundamental uncertainty is not just a matter of quantity of information (i.e., extensiveness and complexity), but also of its quality (i.e., emergence).. Entrepreneurs face uncertainty because information is either dispersed or missing, but not because it is being continuously generated	[*? Many types discussed; no single definition; *somehow can be eliminated? so, NOT KU*] fundamental, that is, "the lack of knowledge that results from non-predetermined structural change (Dequech 2011, p. 631). The main problem with fundamental uncertainty is that creative reflexivity makes information incompleteness persistent through time; *can be created*; but routines eliminate it??? .we present demand routines as the response to the uncertainty problem. as demand routines become generally disseminated and enforced throughout the market, they eliminate uncertainty by bringing regularity and stability to market evaluations and hence resulting in price convergences. The extensiveness and complexity of structural information in the market and the scarcity of time for optimal decision-making imply structural uncertainty that bounds agent rationality, while resulting in price divergences. Creativity is one response to this problem, as agents create missing information	Routines reduce uncertainty when agents choose to adopt standardized behavior over ad hoc creative action.. Exposure to uncertainty makes it hard to tell good judgment from pure luck, and poses the problem of entrepreneurial competence in identifying, evaluating, and exploiting profit opportunities under uncertainty; our central contribution is to provide an explanation on how entrepreneurs introduce innovative products	One of the main problems in fully integrating uncertainty in entrepreneurship process theory is how to distinguish entrepreneurial competence from pure luck. Uncertainty is assessed from its structural nature to its endogenous origins in creatively reflexive market interactions; we argue that recursive market interactions are a source of both uncertainty and stability in market processes: uncertainty because of their open-endedness and stability because market agents routinize part of their interactions as a response to that uncertainty	entrepreneurs (individuals/ firms)	entrepreneurial competence = consolidating and triggering routine emergence OVER TIME; recursive market interactions; idiosyncratic judgment resonates with emergent demand routines serving as reference points to identify potentially specific and fitting artifacts to those routines; more generally enforced routines tend to eliminate fundamental uncertainty; cohesive and generative entrepreneurship; create missing information; !we present demand routines as the response to the uncertainty problem	obj & subj = has both structural and cognitive origins	entrepreneurial judgment; creation school; routines; bounded rationality	market U = price divergences arise because market processes of production and exchange are open-ended, that is, information is not just dispersed, but is continuously and idiosyncratically generated by market agents; future market conditions cannot be inferred from present ones; divergent assumptions of what should be done and what could happen; a matter of quantity of information (i.e., extensiveness and complexity), but also of its quality(i.e., emergence); extensiveness and complexity of structural information in the market and the scarcity of time for optimal decision-making
Gomes, L. A. D. V., Brasil, V. C., De Paula, R. A. S. R., Facin, A. L. F., Gomes, F. C. D. V., & Salerno, M. S. (2019). Proposing a multilevel approach for the management of uncertainties in exploratory projects. Project Management Journal, 50(5), 554-570.	empirical - multi-case study	uncertainties over long timeframes at different levels (e.g., project, portfolio, organization, and network); uncertainty would characterize events not feasible to have probabilities associated with the event outcomes (Knight); beyond the lack of probabilities, in some cases, the recognition of what the variables influencing management are is not even possible (unknown unknowns); least granular (primative) to most granular (elementary) Us;	[**likely NOT consistent with KU as defined; NO explicit explanation of measures, just subjective case-writers's interpretations of interviews, under-detailed on translation, and no example quotes**] three new categories of uncertainties: primitive uncertainties (related to how far the exploration is from the core—the exploration tolerance), structural uncertainties (related to the exploration breadth), and elementary uncertainties (related to the exploration depth);	there is a need for more empirical ground and theoretical development of a systemic approach to the management of uncertainties… we identified new categories of uncertainties (primitive, structural, and elementary) and aspects related to managing these uncertainties; How do firms manage uncertainties in exploratory projects?	exploratory projects can be defined as projects in which neither means nor goals can be defined at the beginning where organizations might face uncertainties over long timeframes; collective uncertainties impose distinct managerial actions in comparison to individual uncertainties, since they imply managing a phenomenon in the network, outside the boundaries of the firm; literature lacks offering a multilevel integrated perspective, or from one level to the others—for instance, framing uncertainties in project portfolios originating from project, organization, or network levels; uncertainty aggregation, moving from more aggregated uncertainty to less aggregated uncertainty;	firms & projects	employ the trial-and-error learning approach; using a systematic process of proposing and testing assumptions; adopt "organizational ambidexterity,"; managers deal with uncertainty blindness by generating (or making sense) of intermediary artifacts; create new ecosystems; protected space for experimentation; learning; knowledge transfer mechanisms; rapid prototyping; flexibility; uncertainty tree;	subj = interviews at case sites; perceptions; reality; BUT obj = model (categories);	exploratory projects; multilevel approach; innovation management; Knight:	unknown situation (e.g., new technology, new market); lack of knowledge regarding the scope or boundaries of the problem (what we do not know or what we should know), principles or functions (what the functions are that define how this technology works), and roles (network); lack of data and well-structured project planning; unpredictability of factors and people;

Graddy-Reed, A. (2021). Decisions of firm risk and the role of organizational identity. Small Business Economics, 57(1), 1-21.	empirical - survey data	U in organizational identity [UNDER-DEFINED] - at risk of lacking a clear identity within their hybrid structure (Organizational identity comprises the core, enduring attributes that distinguish the organization from its peers)	[*?NOT U per se, {term used once in text of paper} but confusion/ ambiguity of terms internal in survey*] U implied as misalignment of structure with identity statements - vector of terms is used to note if a firm self-identifies as entrepreneurial, hybrid, or as a social enterprise (vs structure as for-profit, non-profit, or hybrid)	But it is unknown how these firms compare in practice to both nonprofits and for-profits in their risk-taking behavior, an important predictor of future innovation. This paper addresses this deficit by examining how organizational identity impacts a firm's decision to take risks across firm structures	hybrid firms face uncertainty in their organizational identity, which may detract from their propensity to innovate. Further, there is little empirical work on the actual differences of risk-taking outside of for-profit firms. This paper assesses how the organizational identity of a firm impacts their decisions of risk	firms	for-profit, hybrid, and nonprofit firms are more likely to take risks and introduce new products and services when their organization has a culture toward entrepreneurial and investment behavior; but, nonprofit firms are hampered by a hybrid identity when it comes to risk-taking	obj-subj = measure (y/n), but surveyed;	social enterprises; risk-taking; identity TH; innovation	business risk = having failed, incomplete, or abandoned projects ; social risk = trying but failing to implement a series of social practices related to their employees, their local community, or the environment; (due to usual set of external/ internal drivers - listed in Table 7, from support to regs to community)
Griffin, M. A., & Grote, G. (2020). When is more uncertainty better? A model of uncertainty regulation and effectiveness. Academy of Management Review, 45(4), 745-765.	conceptual - theory - dyn model of U regln of wrkrs	most general sense, we define uncertainty as any departure from absolute determinism , pointing to unpredictability as the core of uncertainty; individual uncertainty is represented as a lack of information or ambiguous information in relation to a task they wish to accomplish) - how handle a general state of "not knowing for sure"; exogenous = objective/ true U; endogenous = epistemological & discoverable & influenceable by indvdl*	[*consistent with language {no measure}, NOT KU] unknown but knowable? @indivdl => can reduce or expand?! [**] -- U as related to work tasks** - ***increase uncertainty through opening behaviors***. .. enlarge her task by exploring not only new customer segments but also new advertising techniques that the company has never done before; vs. closing behaviors (Rosing, Frese, & Bausch, 2011: 966) involve known routines and the application of existing knowledge that narrows the range of possible outcomes.	we expand current conceptualizations of uncertainty by introducing a model of uncertainty regulation where individuals employ opening and closing behaviors to achieve alignment between preferred and experienced levels of uncertainty and with exogenous requirements for effectiveness. We derive propositions for uncertainty regulation and work performance that extend existing concepts of adaptation in uncertain environments to include deliberate uncertainty creation	move beyond "uncertainty management", with its focus on uncertainty reduction, toward "uncertainty regulation", which includes a positive role for uncertainty creation. We argue that individuals not only seek to reduce uncertainty, but at times actively create uncertainty that is functional and adaptive; effectiveness of work performance results from an alignment between exogenous uncertainty and an individual's uncertainty regulation toward a preferred level of endogenous uncertainty.	individuals - working in firms	regulation and adaptation towards a preferred level of U; choosing between exploring new opportunities through opening behaviors that increase uncertainty and exploiting predictable outcomes and rewards through closing behaviors that reduce uncertainty; and performing effectively through proficiency, adaptivity, proactivity, or expansive agency	obj = when exogenous (given); subj = when endogenous, influencable, sensemade	Knight; psychological self-regulation; theories of learning; contingency TH; DCV;	individual can create it as well; unpredictability/ lack of info; work task-focused; can be exogenous (environment) -shocks, free will of others,
Hårsman, B., & Mattsson, L. G. (2021). Analyzing the returns to entrepreneurship by a modified Lazear model. Small Business Economics, 57(4), 1875-1892.	conceptual-theory - math model w/ emp calibration	income U = [UNDER-DEFINED] = implied as unknown/ varied income? (risk or ambiguity??)	[*EV known? linear adjustment to utility for income U? - simplification for math modeling*] Instead of assuming that the entrepreneurial income is certain, we assume that it is uncertain with expected value of $\lambda \cdot \min\{x1, x2\}$ for an individual with observed skill strengths of x1 and x2; a positive parameter λ representing the market value of entrepreneurial talent.. the *s* parameter reflects the behavior of a person who first adjusts his expected income because of perceived nonmonetary benefits and then adjusts it because of income uncertainty (utility * s)	This paper analyzes the returns to entrepreneurship by applying a utility-based version of Lazear's (2002, 2004, 2005) occupational choice model. The modified model allows income uncertainty and nonpecuniary benefits associated with entrepreneurship to influence the occupational choice... Lazear's model has also been criticized for excluding the uncertainties and risks characterizing entrepreneurship.. Aim of our paper is to provide a theoretical framework that can be used to analyze how occupational choices are affected by skill profiles, incomes, and the combined influence of nonpecuniary benefits and income uncertainty	A modified version of Lazear's model for occupational choice is formulated. It includes a utility adjustment factor that captures the combined effect of nonpecuniary benefits and uncertainty associated with entrepreneurship	individuals - entrepreneurs	choose to avoid w/ regular employment (guaranteed wages) when too high	obj = modeled in math/ estimated in data [expected value w/ distrbn in math]; (subj = in reality)	Lazear's model of occupational choice;	income U = unpredictable (less predictable) future earnings from self-employment/ (due to usual set of Us?)

Hashai, N., & Zander, I. (2018). The evolution of vertical boundaries in new high technology ventures. Strategic Entrepreneurship Journal, 12(3), 287-315.	empirical - (survey?)	the uncertainty of *technological and commercial* outcomes of new high technology ventures, which makes it difficult to create universal agreement about future developments and the chances of ultimate venture success.. in some cases, differences of opinion about future developments between new venture founders and external stakeholders may be so fundamental that little can be done to reach collective agreement and action.. creation of new technology, whether carried out by individuals or within larger teams, involves a relatively large proportion of knowledge that is difficult to codify;.it is also by definition associated with high degrees of uncertainty; (cites Knight, but not that defn); unknownness (of venture in the marketplace, or new product)	[? .given no formal definition and no direct measure; CONSISTENT in terms of novelty as unknownness by some (more like info asymm for investors); no argument made this is beyond risk, though; NOT KU, given learning/ staged investment] .no direct measure; indirect proxy by venture stage (e.g., seed, R&D..)	We argue that interrelated processes of knowledge codification and uncertainty reduction lead to the contraction of vertical firm boundaries of new high technology ventures over time.	High levels of uncertainty come with significant contracting costs, as they increase the level of detail, number of contingencies, and range of safeguards that need to be considered and worked into long-term contracts; establishing technological trajectories reduces perceived uncertainty and the number of contingencies that must be considered in writing long-term contracts.. a greater degree of knowledge exploration prevents new ventures from stabilizing technological trajectories and, thus, delays the reduction of uncertainty levels	individual managers	experiment and outsourcing; = uncertainty reduction (learning; experience in like projects)	subj = perceived U; survey; reality; (BUT obj = context of high-tech ventures)	TCE re: outsourcing different functions (R&D vs mfg vs sales)	technology and commercial outcomes (of high tech); contracting issues
Heavey, C., & Simsek, Z. (2013). Top management compositional effects on corporate entrepreneurship: The moderating role of perceived technological uncertainty. Journal of Product Innovation Management, 30(5), 837-855.	empirical - survey (CEOs/ TMT)	perceived technological uncertainty among top managers creates an information environment that is largely unanalyzable, one in which it is difficult to assign probabilities to events, and one in which the efficacy of formal market analysis and forecasting tools in guiding CE decisions and pursuits is severely limited; reflect top managers' perceived inability to establish cause–effect relationships or accurately predict the action implications of technological environment	[*NOT consistent - pace and breakthroughs are not necessarily unpredictable, unanalyzable, hard to forecast or non-causal*] perceived technological uncertainty—the team's perception regarding the "speed of change and unpredictability of technology in the firm's principal industry"; relied on a four-item measure of technological uncertainty (Atuahene-Gima & Li, 2004); ask about rapid change, and tech breakthroughs;	perceived uncertainty within a team unleashes sociopolitical turbulence and dysfunctional decision-making processes; we envision a potential "shackling" role of perceived technological uncertainty in shaping the relationship between top team human/social capital and CE;	A second implication is the need to consider the alignment between team composition and the nature and level of the team's perceived uncertainty.	firms	the beneficial effects of top management size and diversity are mitigated under the condition of perceived technological uncertainty, but the beneficial influence of top managements' social network on CE is likely to be pronounced; results show smaller TMT size (and less diversity) is better (for CE) under high U [no effect for network];	subj = perceived U; survey; reality;	corporate entrepreneurship; TMT; human capital; social capital; high-tech; upper echelons;	various sources and types of perceived uncertainty within a top team including technological, market, political, competition, suppliers; speed of change and unpredictability of technology;

Heavey, C., Simsek, Z., Roche, F., & Kelly, A. (2009). Decision comprehensiveness and corporate entrepreneurship: The moderating role of managerial uncertainty preferences and environmental dynamism. Journal of Management Studies, 46(8), 1289-1314.	empirical - survey (Ireland)	ambiguity is defined 'as uncertainty about the outcome probabilities themselves'; uncertainty wherein it is probable for decision-makers to estimate the probabilities associated with a set of possible outcomes, even though they do not know which outcomes will occur;	[**NOT measured directly; NOT consistent; simply implied by dynamism = frequent and major changes + innovation] assessed risk-taking propensity using a three-item seven-point scale from previous research (Covin and Slevin, 1986); assessed environmental dynamism using Miller and Friesen's (1983) six-item scale;	demonstrate the effects of decision-makers' willingness to bear uncertainty on the consequences of engaging in comprehensive decision-making	corporate entrepreneurship (CE), defined as the sum of a company's innovation, renewal, and venturing efforts; explaining how comprehensive processes help decision-makers to overcome ignorance and doubt that surround the organization's pursuit of CE;	individuals - SME CEOs	comprehensiveness (procedural rationality or extent of analysis) - systematically consider information from the external environment in making and integrating strategic decisions; in figure = risk-taking propensity + proactiveness; knowledge;	subj = survey; reality; individual risk-taking propensities; [obj = dynamism?]	comprehensiveness; SMEs; corporate entrepreneurship; entrepreneurial action; perceived uncertainty;	due to a lack of timely awareness of what opportunities to pursue, as well as a sense of doubt surrounding the feasibility and desirability of those opportunities; created by ignorance and doubt; dynamism; engage in innovation, venturing, and renewal;
Hmieleski, K. M., & Baron, R. A. (2008). Regulatory focus and new venture performance: A study of entrepreneurial opportunity exploitation under conditions of risk versus uncertainty. Strategic Entrepreneurship Journal, 2(4), 285-299.	empirical - national sample survey	U = unable to effectively gather information about potential decisions regarding opportunity exploitation and the probability of achieving certain outcomes [KU]; ambiguity; as suggested by Knight (1921), a state of uncertainty occurs when the probabilities of decision outcomes cannot be estimated, because the necessary information is unknowable in the present;	[*NOT consistent to KU - no actual measure of information availability or unclear paths; consistent with one measure of dynamism as RISK*] the industry-level rate of unpredicted change was measured as the standard errors of four regression slopes following past work - dependent variables were industry revenues, number of industry establishments, number of industry employees, and research and development intensity; an index of the standard errors of the regression slopes divided by their respective means was used as the indicator of unpredicted change for each of the four variables;	the current study focuses on the question of whether there are certain cognitive mechanisms that are more or less effective at exploiting entrepreneurial opportunities under the conditions of risk versus uncertainty;	a promotion focus will be the most effective self-regulatory mode for entrepreneurs leading their firms within dynamic industry environments, which are characterized by uncertainty; these effects are found to be fully mediated by deviation from firms' original business concepts; learning and adapting to change are what separates successful from less successful entrepreneurs; those who self-regulate through a promotion focus are primarily concerned with advancement, growth, and accomplishment; hence, they are primarily motivated to seek gains and new achievements;	individuals - lead entrepreneurs	in dynamic environments, entrepreneurs' promotion focus is positively associated with venture performance (i.e., lagged measures of revenue and employment growth), while entrepreneurs' prevention focus is negatively related to performance in such environments; low cognitive fit (a mismatch between entrepreneurs' mode of self-regulation and the decision-making context in which they operate) is more damaging in dynamic environments; continuously alter strategy in an effort to fully capitalize on the potential gains inherent in dynamic environments; flexibility, rather than persistence or calculated analyses, may be the crucial overall approach to manage uncertainty;	obj = objective predictability in a context; (speaks to perceptions as subj, though)	cognition; entrepreneurial action; individual differences; opportunity recognition;	unpredictable changes in the markets and industries; dynamism; the speed of technological evolution of the industry; shifts in markets, competition; unknowable future; lack of information;
Hmieleski, K. M., Carr, J. C., & Baron, R. A. (2015). Integrating discovery and creation perspectives of entrepreneurial action: The relative roles of founding CEO human capital, social capital, and psychological capital in contexts of risk versus uncertainty. Strategic Entrepreneurship Journal, 9(4), 289-312.	empirical - national sample survey	U = dynamic (fast changing and unpredictable); we assume that there is an objective degree of predictability that exists in industry environments (ranging from risk to uncertainty) and that the degree of objective predictability carries important implications for whether a discovery or creation lens is most appropriate for guiding entrepreneurial action; dynamic industries involve 'uncertainty'; information is not readily available for making calculated decisions about the probability that exploiting specific opportunities will lead to successful firm outcomes [KU]; path for converting ideas into successful products and services is unclear;	[*NOT consistent to KU - no actual measure of information availability or unclear paths; consistent with one measure of dynamism as RISK*] consider the decision-making context to range along a continuum from risk to uncertainty; industry-level rate of unpredicted change was measured as the standard errors of three regression slopes based on research - dependent variables were the number of employees, amount of revenue, and number of firms for each industry, measured at the three-digit NAICS level; high levels of environmental dynamism represent dynamic industry conditions that are characteristic of uncertainty	examines the relationships of founding CEOs' intangible resources (human, social, and psychological capital) with the performance of their firms in environmental contexts of discovery (stable industry conditions that are characterized by risk) versus creation (dynamic industry conditions that are characterized by uncertainty); which intangible resources of founding CEOs are most critical to the development and growth of firms operating in industry environments characterized by risk (a discovery context) versus uncertainty (a creation context)?	entrepreneurial experience (an aspect of human capital) to be positively related to performance in discovery contexts, whereas educational attainment, strong ties, and psychological capital (a composite index of optimism, self-efficacy, resilience, and hope) were positively related to performance in creation contexts	individuals - entrepreneurs (CEOs)	educational attainment, strong ties, and psychological capital (a composite index of optimism, self-efficacy, resilience, and hope) were positively related to performance in uncertain contexts; inductive decision-making; human resource practices entail the recruitment of employees who can fill a wide range of roles; corporate strategy is emergent and continually being updated, funding for growth comes from informal sources; marketing practices are under continual revision as the firm's products/ services shift and evolve, competitive advantage is sustained through tacit learning and innovation; engaging directly with the environment, rather than seeking information from others, is the most effective way of sensemaking in conditions of uncertainty; 'strong ties (i.e., family members and close friends)	obj = objective predictability in a context;	contingency theory; individual differences; leadership; upper echelons; social capital; decision-making; cognition;	dynamic, fast changing, unpredictable contexts; shocks; unpredictability; lack information;

Holm, H. J., Opper, S., & Nee, V. (2013). Entrepreneurs under uncertainty: An economic experiment in China. Management Science, 59(7), 1671-1687.	empirical - survey/ experiment	define ambiguity, as did Ellsberg (1961), as situations where economic actors have information about conceivable outcomes, but not about their probabilities; standard risk situations, however, do not represent typical scenarios in entrepreneurial decision making; four types of uncertainty rather than just one behavioral trait - ambiguity = as ranges are known but distributions are not, given the 'other' party is not known (or its behaviors);	[yes, consistent measure of AMBIGUITY - Ellsbergian; that said, NOT FULLY for the rival and trustee exercises, one could form 'reasonable' subjective beliefs of 'other human parties', given the wording of the experiment**] ambiguity aversion was elicited by letting outcomes for option A be certain and the probabilities for the outcomes in option B be fully or partially unknown, denoted as the A1 and A2 tasks, respectively; using controlled incentivized tasks (instead of psychometric survey measures) to elicit behavioral differences between entrepreneurs and nonentrepreneurs;	reports findings from the first large-scale experiment investigating whether entrepreneurs differ from other people in their willingness to expose themselves to various forms of uncertainty;	findings suggest that in economic decisions, entrepreneurs are more willing to accept strategic uncertainty related to multilateral competition and trust; however, entrepreneurs do not differ from ordinary people when it comes to nonstrategic forms of uncertainty, such as risk and ambiguity;	individuals - ENTRs and non	education; willingness/ preference to compete (testosterone/ overconfidence); willingness to be exposed to social risks; rely on ongoing personal ties in upstream and downstream transactions with their suppliers and distributors; networks provide a ready conduit of fine-grained information on reputation and trustworthiness, trust in relational contracting may be a self-reinforcing feature of entrepreneurial activity;	subj = survey; imagined distributions; ALSO, obj = in possible payoffs/ ranges for each exercise are explicit;	risk; ambiguity (Ellsberg); trust; lotteries; competition; aversions; Knight; strategic decisions; economics; behavior and behavioral decision making; decision analysis; microeconomic behavior;	unknown behaviors of rivals and partners; risky outcomes; situations which are far too unique, generally speaking, for any sort of statistical tabulation to have any value for guidance;
Hoskisson, R. E., Chirico, F., Zyung, J., & Gambeta, E. (2017). Managerial risk taking: A multitheoretical review and future research agenda. Journal of Management, 43(1), 137-169.	conceptual-review - theory	[RISK not U*] focus on managerial risk taking (i.e., top managers' strategic choices associated with uncertain outcomes)	[*voluntary; outcome sets known; some w/ known variance and means; not unknowables*] (e.g., R&D spending, diversification, acquisitions and divestitures, competitive actions)	agency theory assumes that top managers should be compensated or monitored to achieve better outcomes. We review the theory and research on agency theory and managerial risk taking along with theories that challenge this basic assumption about risk taking	Managerial risk taking is a central component of strategic management research; managerial strategy would be of little value if it did not address the risk associated with such uncertainty; we have attempted to create a model to guide future research and to help identify and examine possible gaps in the literature and the competing predictions and moderators that have been and might be applied differently across perspectives	individuals - managers	manipulation of risk-taking of TMT through compensation schemes; effects of past performance/ aspirations; social comparisons; + acts like diversification; [*review of the lit* (sunk costs; competitive intensity)]	subj = mainly perceived (behavioral THs), reality;	agency theory; behavioral theory of the firm; top management teams/upper echelon; prospect theory; psychology	uncertainty surrounding organizations; strategic choices associated with uncertain outcomes; strategic choice with uncertain consequences (e.g., R&D spending, diversification, acquisitions and divestitures, competitive actions);
Huang, L. (2018). The role of investor gut feel in managing complexity and extreme risk. Academy of Management Journal, 61(5), 1821-1847.	empirical - interviews & in situ observtns	Genuine uncertainty occurs when the possible outcomes cannot be known in advance, let alone their probabilities [follows Knight]; rewards are uncertain for investments (type I and II error uncertainties); products and markets do not yet exist	[*NOT consistent w/ KU; this is RISK, and imperfect info flow among investors {friction/ asymmetries}*] Entrepreneurial investment decisions deal with situations that are unique, generally speaking, because statistical calculations can be made (and hence risk is salient), but these tabulations vary in the extent to which investors see them as clearly objective, measurable, or even applicable (hence, uncertainty is salient as well). Therefore, to remain true to the accounts of investors in this study, I follow their use of the term "risk" to describe the active management and quantification of factors that may, in fact, not be objectively tabulated to a point where statistical estimations could entirely eliminate risk, and would be considered genuine uncertainty	I delineate how investors are guided by a predisposed stance on risk and uncertainty, which dictates the approach investors take toward managing the complexity of an investment opportunity—and how they cognitively and emotionally reframe investment risk into a compelling narrative that transcends avoidance behavior and leads investors to invest	Given the inherent uncertainty surrounding a decision to invest in these ventures, prior research has found that experienced investors rely heavily on their investor gut feel—that is, dynamic expertise-based emotion-cognitions specific to the entrepreneurship context. In this paper, I inductively find that rather than being based on rapid, nonconscious impulse, as much of prior literature would suggest, what investors call their "gut feel" is an elaborate "intuiting process."	individuals - investors (angels)	intuiting process; investors' initial stance on investment risk guided the way they managed the complex decision factors—and how this process, in turn, ultimately allowed them to substantiate their investment decision (a checklist approach, or a syncopated approach) - business viability data vs perceptions of the entrepreneur	subj = interviews; vary by investor;	system 1/2 thinking; heuristics; intuition; decision-making; gut feeling (author's own); economic vs behavioral (data)	potential products and markets that often do not yet exist; situations that are unique, generally speaking, because statistical calculations can be made (and hence risk is salient), but these tabulations vary in the extent to which investors see them

Huang, L., & Pearce, J. L. (2015). Managing the unknowable: The effectiveness of early-stage investor gut feel in entrepreneurial investment decisions. Administrative Science Quarterly, 60(4), 634-670.	empirical - inductive theory - w/ field experiment(s)	extreme uncertainty' = as unknowable; face the types of "unknown unknowns"; may represent more than unforeseeable events; differs from uncertainty as known unknowns	[? arguable whether consistent, given the bounded outcomes from an early stage investment and the list of known unknowns existing; that said, likely to be surprises] what angel investors face with new, very early-stage ventures; decide on investments in ideas for markets that often do not yet exist, and they propose new products and services without knowing whether they will work;	using an inductive theory-development study, a field experiment, and a longitudinal field test, examine early-stage entrepreneurial investment decision making under conditions of extreme uncertainty; why do angel investors use the criteria they say they use, and how effective are their investment criteria in predicting which investments will result in successful firms?	rely on a combination of expertise-based intuition and formal analysis in which intuition trumps analysis, contrary to reports in other investment contexts; found that their reported emphasis on assessments of the entrepreneur accurately predicts extraordinarily profitable venture success; "gut feel" to describe their dynamic emotion-cognitions in which they blend analysis and intuition in ways that do not impair intuitive processes and that effectively predict; [no 'hit rate' data on their model; no success reports on predicting home runs in last experiment]	individuals - angel investors	base decisions on market and financial data, also rely on other less-explicit social factors such as high-status affiliations, familiarity with other members of syndicates, the quality of the entrepreneur, and the quality of an entrepreneur's storytelling; use small stakes; diversified portfolio;	subj = perceptions (of entrepreneur); [obj = unknown unknowns, even known unknowns]	investor decision making; angel investors; entrepreneurial finance; investment criteria; perceptions; cognition; gut feel / affect;	uncertainty about the services, products, and markets themselves; about unpredictability of entrepreneur and team; disruptive technologies; unknown supply chain;
Jansson, J. (2011). Emerging (internet) industry and agglomeration: Internet entrepreneurs coping with uncertainty. Entrepreneurship & Regional Development, 23(7-8), 499-521.	empirical - qualitative and quantitative	argue for uncertainty (Knightian uncertainty) as an explanatory concept; cannot be exploited by optimizing because the set of alternatives in introducing new things is unknown, precluding mechanical calculations between all possible alternatives; uncertainty is non-knowable and refers to situations where risks cannot be expressed in terms of mathematical probabilities, such as the outcomes of sport events, elections or investments	[questionable consistency - simply assumed that internet-based firms in Sweden at that time {2000-2005 = past US internet bust} onfronted unknowable unknowns][did they? could they learn from US experience? were these knowable known unknowns?] emerging industries lack established structures and institutional frameworks and standardized or settled procedures and processes; no industry has had the same pace in the circulation of ideas or the same momentum in the product life cycle as the internet industry; lack of legitimacy is a crucial uncertainty;	argues that agglomerations or local urban milieus play a crucial role to actors (internet entrepreneurs) coping with uncertainty; agglomerations or urban milieus compose a necessary infrastructure for (1) negotiating industrial legitimacy, and thus establishing structures and procedures in the emerging industry; (2) discovering market opportunities and (3) informal relations necessary in making flexible labour markets efficient; this article has tried to contribute to the understanding of how uncertainties of an emerging industry may explain, at least partly, why certain industries tend to agglomerate to specific cities or regions; dense agglomeration of internet firms, entrepreneurs and labour in Stockholm	agglomerations, i.e. spatial concentrations of firms (and labour) in similar or related activities, and the urban space with its diversified supply and demand, form a rich network of contacts and possibilities that may help in reducing uncertainty; entrepreneurs and other people working in the internet industry were supported by being among others doing similar things and maybe, this was especially true with entrepreneurs in the new and emerging industries which, as in the case of the internet industry, made themselves appear as revolutionary and distrusting old traditions and ways of doing things;	individuals - entrepreneurs	agglomerations or local urban milieus play a crucial role to actors (internet entrepreneurs) coping with uncertainty; needed to be innovative, flexible, creative, ideas-driven and continuously changing in order to deal with, for example new technology, emerging markets and new ways of organizing labour; internet entrepreneurs utilized project work and temporary organizations; becoming an insider demands close personal relations with other insiders of the industry - creating new markets and accessing new customers should be considered as a social and relational process; helped by peer-to-peer negotiation, arm's length proximity and face-to-face contacts between the actors involved	subj = real decision-makers; survey; subjective opinions; subjective markets; (some obj reality in categorizing internet industries as uncertain - as independent in the assessment)	economic geography; emerging industries; internet industry; agglomeration; Knight;	three levels of uncertainty: (1) the newness of the technology introduced to the public and the emerging markets; (2) the process of developing new markets and approaching new customers and (3) the renegotiating of pre-existing structures and flexible ways of organizing work and labour; activities being judged by subjective and unpredictable markets where the value of a product is estimated by, for example, aesthetic appraisals; 'the fickleness of consumer tastes; labour market uncertainty was due to (1) the number of employees needed to meet customer demand; and (2) labour force requirements and qualifications needed to meet the demands from the fluctuating and unpredictable markets
Jiang, Y., & Tornikoski, E. T. (2019). Perceived uncertainty and behavioral logic: Temporality and unanticipated consequences in the new venture creation process. Journal of Business Venturing, 34(1), 23-40.	empirical - field study (4 China); 4 phase process model	uncertainty due to the novelty of the market or technology; Milliken (1987) identifies three types of perceived uncertainty: state, effect, and response uncertainty. State uncertainty refers to perceived market and technological uncertainties, and relates to perceptions of the environment as unpredictable. Effect uncertainty is defined as, "an inability to predict what the nature of the impact of a future state of the environment or environmental change will be to the organization" Response uncertainty is an entrepreneur's inability to predict the likely consequences of a response choice	[? coded from interviews - NOT on face consistent -> confusion vs unpredictability] we used established criteria to understand the perceived uncertainty, differentiating state, effect, and response (Mckelvie et al., 2011). We looked at how founding teams described the change in a particular component of the environment (state uncertainty), how environmental changes will impact the new venture (effect uncertainty), and the new venture's ability to sustain, innovate, and/or lead (response uncertainty). In addition, we coded whether or not the founding team perceived uncertainty	map out how the three types of perceived uncertainties and two behavioral logics evolve and develop in a new venture creation context	show that entrepreneurs perceive different types of uncertainty when unanticipated consequences occur, and the sequences in which entrepreneurs develop perceived uncertainty establish the conditions for effectuation. Next phase shows that when entrepreneurs perceive state, effect and response uncertainty, they actively combine causation and effectuation	founder teams	four phases in which perception and behavioral logics develop and evolve; actively combine causation and effectuation when see U; identify their optimal early-stage collaborators; when each is used matters	subj = perceived U	effectuation; Milliken U types; control TH	due to the novelty of the market or technology; very act of choosing a particular course of action that generates the unanticipated consequences they subsequently face

Kapoor, R., & Klueter, T. (2021). Unbundling and managing uncertainty surrounding emerging technologies. Strategy Science, 6(1), 62-74.	conceptual - theory - figures, tables	[*over-defined* esp w/ Packard; not refer to options, states, probabilities though!*] uncertainty surrounding the emergence of a new technology = a general lack of knowledge regarding that technology's value creation; significant uncertainty regarding when and how they will achieve mainstream adoption and if and when they can be successfully commercialized; Koopmans (1957) referred to such uncertainty as primary uncertainty, and Packard et al. (2017) referred to it as absolute uncertainty; many unknown unknowns	[*ok w/ components and 'lack of information .. on how, when, whats'; again, not U characteristics but U areas* depicts all as manageable?? so no unknowables - inconsistent w/ absolute U cite*] unbundle the overall uncertainty surrounding an emerging technology into discrete **sources** that underlie a technology's value creation = the focal technology itself; the market applications it can serve; the users adopting the technology; the ecosystem of activities that support the technology's commercialization; and the business model... we further consider interactions between them	How can firms evaluate the uncertainty surrounding an emerging technology? To address this question, we offer a structured approach that unbundles the uncertainty surrounding emerging technologies, incorporating both supply- and demand-side factors. These include the focal technology itself, the potential market applications, the users adopting the technology, the ecosystem of activities that support the technology's value creation, and the business model with which the technology is being commercialized	a structured approach of evaluating uncertainty can help firms and managers in terms of the cognitive processes and the managerial practices and provide microfoundations for dynamic managerial capabilities	firms	an explicit consideration of the different sources of uncertainty that may underlie the technology's emergence, through such unbundling, we can identify "what" sources of uncertainty are actually relevant + how they interact; superior capabilities with respect to sensing and seizing are of fundamental importance; scenario-planning; discovery-driven planning; real options; unbundling helps cognitive processes as well	subj = perceptions (indiv cognitive issues); reality; subjective probability assessments	dynamic capabilities; emerging technologies; tech adoption; bounded rationality; real options; experimentation (DDP);	emerging tech; whether and when that potential may be realized; a general lack of knowledge regarding that technology`s value creation; entails unknowns with the focal technology itself, the market applications it can serve, the users adopting the technology, the ecosystem of activities that support the technology's commercialization, and the business model (+ the interactions = pooled, sequential, and reciprocal); when and how they will achieve mainstream adoption and if and when they can be successfully commercialized; many unknown unknowns
Katila, R., Piezunka, H., Reineke, P., & Eisenhardt, K. M. (2021). Big fish vs. big pond? Entrepreneurs, established firms, and antecedents of tie formation. Academy of Management Journal, (ja).	empirical - panel	[UNDER-DEFINED, U used for each party (different)*] Competition induced resource uncertainty = related to U in competitive environments; value of each developer's game idea was highly uncertain	[*??* measures overlap rather than any uncertainty about environment; NOT consistent; NOT U] We measured competition-induced resource uncertainty by the anticipated count of PS2 games that are likely to overlap with games of the focal developer in a year. To compute overlap, we compared the population developers' games with each of the focal developer's games using genre categories	entrepreneurs face a trade-off: they can be a big fish in a small pond, getting more attention and development help from a smaller firm with less market access, or a small fish in a big pond, getting less attention and help from a larger firm with more market access. Our study investigates what goes into choosing between these options.	we develop and test a framework that identifies the key decision variables and focuses on two moderators —resource need evolution and resource uncertainty related to competition—that explain whether a big fish (more development help) or a big pond (more market access) drives tie formation	individuals - entrepreneurs	standing out from the crowd through personalized development help mitigates uncertainty in competitive environments because it helps the entrepreneur to differentiate their products => the more heavily development help (big fish) is weighted over market access (big pond) in tie formation; traditional ways to reduce uncertainty (e.g., repeat ties) become less important and new ways (e.g., the personalized mentoring of new entrepreneurs) more important	obj = measure of game overlap from existing sources; [+subj = interview risk comments, about unexpected cancellations]	ties; partnerships; resource dependence TH;	resource uncertainty related to competition; uncertain access to partner resources after the relationship has formed; actual resource commitments are yet to be known; dynamism; potential value of each developer's game idea was highly uncertain; cognitive constraints; high-uncertainty products; forecasting which product will become a breakthrough success is largely impossible; dynamically changing resource needs of organizations and resource uncertainties of environments in this choice
Kaul, A., Ganco, M., & Raffiee, J. (2021). WHEN SUBJECTIVE JUDGMENTS LEAD TO SPINOUTS: EMPLOYEE ENTREPRENEURSHIP UNDER UNCERTAINTY, FIRM-SPECIFICITY, AND APPROPRIABILITY. Academy of Management Review, (ja).	conceptual - theory - math model (w/ flowchart)	[INCONSISTENT, UNDER-DEFINED] high uncertainty – situations where the potential uses and value associated with an inventive idea are ex-ante unknown.. in the presence of such uncertainty, differences in valuations are irreconcilable… the greater the extent of uncertainty, i.e., the more of the value assessed by the employee that is purely their subjective judgment, the more likely it is that others (either the employee's current employer or other rival firms) will disagree with the employee's valuation of the idea	[*NOT CONSISTENT, info asymmetry, NOTHING UNKNOWN**] While the employee believes the commercialization of their idea will generate cash flows equal to V, this belief may not be shared by all, so assume that only a fraction 1 — mu of this value can be convincingly demonstrated either analytically or statistically ex-ante, where mu [0,1] is thus a parameter reflecting the uncertainty associated with the employee's idea	we develop a formal model of commercialization choice that maps idea characteristics to commercialization outcomes—spinouts, internal commercialization, market mobility, or abandonment—while also predicting how these relationships will be moderated by the cost of startups, the value of the idea, and the institutional context, as well as how value will be created and appropriated within each mode	We advance a theoretical framework of how entrepreneurial ideas of employees are commercialized as a function of their uncertainty, firm-specificity, and appropriability. We argue that as uncertainty increases, the choice of commercialization mode will increasingly be driven by differences in subjective judgments of the idea's value, with firms having an advantage in assessing the true value of their employee's ideas relative to market because of their firm-specific nature.	individuals - employees/ entrepreneurs	choice of commercialization mode, including none; multi-stage model; [no reconciliation of which beliefs are correct (no learning truth) -> **no U**, just differences of opinion, worked out thru offers from different parties]	subj = value of ideas subjective, irreconcilable;	spinouts; firm-specificity; commercialization; appropriability; options	situations where the potential uses and value associated with an inventive idea are ex-ante unknown; range of potential uses of the invention may be unknown, as may the range of potential values from each use; mostly asymmetric info in the model

Klein, P. G. (2020). Uncertainty and entrepreneurial judgment during a health crisis. Strategic Entrepreneurship Journal, 14(4), 563-565.	conceptual - (reflective)	under *uncertainty*, I cannot imagine even the set of possible outcomes, let alone the probabilities, so I must rely on intuition, gut feeling, or understanding to anticipate the uncertain future.	[*NOT CONSISTENT in that many of the examples are not KU {they are imaginable}, and that the suggested treatments cannot affect KU in TH] lists many types of U, some of which are not KU; descriptive of reality and so mixes TH with practice; falls back on experiment (as judgment)	How should entrepreneurs think, plan, and act in times of crisis? How do they handle unanticipated changes? To answer, it helps to think about how entrepreneurs deal with uncertainty more generally	[acts as advert for author's previous work]; consider the many sources of uncertainty entrepreneurs have dealt with in recent months. There is ***policy uncertainty***: Can my business remain open, and under what conditions? What are the rules for social distancing, mask-wearing, and cleaning for my workers, suppliers, and customers? There is ***demand uncertainty***: Given the rapid economic contraction and surging unemployment, will customers be willing and able to buy, and under what circumstances? How should I alter my products and services, and should I introduce new ones to take advantage of current market conditions? I am uncertain about long-term economic prospects, actions, and reactions of my rivals and partners; systemic changes in customer preferences; social and cultural norms for doing business; and much more	individual entrepreneurs	intuition, gut feeling, or understanding to anticipate the uncertain future; heuristics, intuition, gut instinct, empathy, processes of experimentation and learning that allow entrepreneurs to “test”; judgment (intuition, gut feeling, or understanding to anticipate the uncertain future)	subj = attributes that are subjectively perceived and unknowable ex ante	entrepreneurial judgment (authors' own TH)	given (context is Covid) [govt; disease; economy; society]
Klingebiel, R., & Joseph, J. (2016). Entry timing and innovation strategy in feature phones. Strategic Management Journal, 37(6), 1002-1020.	empirical - qualitative and quantitative	uncertainty is irreducible ex ante; unpredictable market reaction; incomplete info about consumer preferences/ tech developments	[*somewhat consistent in this context = early entry is 'more' uncertain' and irreducible; same with new features; BUT, no evidence any of it is unknowable at time of decision - as in not being estimable based on history - i.e., risk*] entry timing a qual proxy for uncertainty; uncertainty just cannot be entirely resolved at an early stage; [premium uncertainty as variance/ delta to average revenues of phone w/o new feature], proportion of feature firsts (?)	inductive study examines how firms make decisions about the timing of innovations, focusing on the mobile handset industry during the feature-phone era;	through analyses of qualitative and quantitative data, we illuminate how firms deliberately self-select into moving early or late; how they align their timing preference with other dimensions of innovation strategy, notably portfolio breadth and selectiveness; and how performance depends on such alignment rather than timing per se	firms	apply broader, less selective innovation portfolios; aim for big hits to compensate for a higher failure rate, launch a broader set of features and exert little selective pressure on the development portfolio; invest in learning from the resolution of uncertainty; the flexibility needed for investments;	subj = interviews; perceptions; reality;	innovation strategy; entry timing; strategic management; hybrid induction; mixed methods; timing of innovation;	early mover; new technology or feature introductions; lack of information; high failure rates; unpredictable integration of tech; threat of competitive preemption;
Korsgaard, S., Berglund, H., Thrane, C., & Blenker, P. (2016). A tale of two Kirzners: Time, uncertainty, and the “nature” of opportunities. Entrepreneurship Theory and Practice, 40(4), 867-889.	conceptual - lit rev of Kirzner	no U in alertness setting; U in the dynamic setting, where there is a passage of time; opportunities for inter-temporal coordination are not predetermined; future markets do not yet exist; uncertainty is seen as present in all entrepreneurial ventures that require production or more generally unfolds over time; *NO real definition*	[NO definition to be consistent with; no measurement given][otherwise, description consistent by design - describing what it is in terms of how it was used by IK][] uncertainty for Kirzner Mark II is more than a mental construct; it is a factual characteristic of the activity and process;	This paper discusses the influence of Israel Kirzner on the field of entrepreneurship research;	Kirzner's latter work, with its emphasis on time, uncertainty, and creative action in pursuit of imagined opportunities, complements the discovery view;	individuals - entrepreneurs	in alertness setting, the entrepreneur only performs the discovery function, leaving her with no uncertainty; in dynamic setting, since the future markets do not yet exist, entrepreneurial opportunities must be either speculative, as when the entrepreneur makes a passive bet on the future, or creative, as when the entrepreneur actively tries to shape or create the future in favorable ways; entrepreneur will need to bear uncertainty as well as make decisions and take actions in the face of uncertainty; the entrepreneur’s main priority is to learn as efficiently as possible	obj = in alertness setting; subj = socially constructed in dynamic setting BUT still face obj uncertainty regardless of perceptions;	Kirzner; discovery view; creation view; Knight; Austrian economics; bricolage; effectuation; heuristics; entrepreneurial judgment and action;	real world of production and (consequently) of multi-period decision making and radical uncertainty; do face actual uncertainty caused by the futurity of the markets; demand, business models, regulations, technology, etc., are less stable;

Koudstaal, M., Sloof, R., & Van Praag, M. (2016). Risk, uncertainty, and entrepreneurship: Evidence from a lab-in-the-field experiment. Management Science, 62(10), 2897-2915.	empirical - online survey	ambiguity (Ellsbergian) = not only is the outcome uncertain, but also the probability of the realization of that outcome and, as a consequence, the expected payoff; unknown probabilities;	[*consistent with AMBIGUITY*, also unknowns in the loss aversion measure] three incentivized experimental measures of uncertainty (risk aversion, loss aversion, and ambiguity aversion); loss aversion = option A consists of a 50% probability of receiving E6 and a 50% probability of losing an amount between E1 and E10, when selecting the safe option B, participants receive E0; ambiguity (bets with an urn A with 50 red balls and 50 black balls, and an urn B with an unknown distribution of red and black balls)	to better understand whether entrepreneurs have distinct attitudes toward risk and uncertainty; try to understand in what related aspects entrepreneurs and managers are different - considering both loss aversion, allowing an asymmetric effect of losses and gains on peoples' utility, and ambiguity aversion;	theory predicts that entrepreneurs have distinct attitudes toward risk and uncertainty, but empirical evidence is mixed; we perform a large "lab-in-the-field" experiment comparing entrepreneurs to managers (a suitable comparison group) and employees (n = 21288); results indicate that entrepreneurs perceive themselves as less risk averse than managers and employees, in line with common wisdom; entrepreneurs are only found to be unique in their lower degree of loss aversion, and not in their risk or ambiguity aversion;	individuals - ENTrs + control groups	be less loss averse (i.e., more entrepreneur-like) [*anti-effectuative*] when potential gains exist;	subj = survey; reality; AND obj = measured;	risk aversion; loss aversion; ambiguity aversion; lab-in-the field experiment; Knight; Ellsberg;	lack of information about probability distributions involved;
Kuechle, G., Boulu-Reshef, B., & Carr, S. D. (2016). Prediction- and control-based strategies in entrepreneurship: The role of information. Strategic Entrepreneurship Journal, 10(1), 43-64.	empirical - experimental (survey online)	U = a lack of knowledge about the outcome of some future event; can be dealt with only through the exercise of judgment and the formation of beliefs [Knight]; the missing information is unavailable because the future is yet to be created; there is no procedure that can reduce the doubts about the possible courses of actions, the possible states of the world, and the nature of their outcomes;	[*CONSISTENT, yes - follows Ellsberg urn setup; quite small range of bounds of possible outcomes, though*] we model an uncertain scenario as a bet on an urn of unknown composition; to account for the fact that sampling and control can lead to both favorable and unfavorable outcomes, we allow subjects to (hypothetically) sample and insert one of the six possible combinations of red and green marbles into the urn;	we study the conditions under which prediction- and control-based strategies lead subjects to accept bets in ambiguous environments - individuals who use control methods to mitigate uncertainty are more likely to accept the bet after a favorable outcome compared to those who use predictive methods; to investigate the impact of prediction- and control-based strategies on the decision to undertake uncertain prospects and the extent to which this relationship is affected by the nature of the information received by the individual;	prediction- and control-based strategies are the two main hypotheses of how entrepreneurs deal with uncertainty in theories of entrepreneurship - prediction-based strategies focus on estimating unknowns via sampling methods, whereas control-based strategies focus on shaping unknowns via proactive behavior;	individuals - decision-makers (NOT entrepreneurs, but MTURK workers)	Bayesian updating with new information (implied initial beliefs - with no legitimate basis); when the decision maker receives favorable information, control-based strategies are more likely to lead to the acceptance of an uncertain prospect than prediction-based strategies (and vice versa); conceive modes of action to get information; predicting the environment or controlling it; obtaining the commitment of stakeholders who provide resources in exchange for coparticipation; estimation of likelihoods, and forecasted values for any relevant parameters;	obj = explicit bets/ odds with bounds (Ellsberg urns);	effectuation; experimental economics; bets; cognition; Knight; Ellsberian ambiguity; Bayesian updating;	unknowns, such as consumer demand, competitors' strategies, and the support of potential stakeholders; lack of information;
Lampert, C. M., Kim, M., & Polidoro Jr, F. (2020). Branching and anchoring: complementary asset configurations in conditions of Knightian uncertainty. Academy of Management Review, 45(4), 847-868.	conceptual - theory - propositions; typology	"Knightian uncertainty," in which neither outcomes nor probabilities are knowable;. Knightian uncertainty" is "unknown unknowns" or, simply put, "everything you did not even know you did not know" (Pisano, 2006: 8)..	[*INCONSISTENT? can roughly measure U to assess location (altho immeasurable) and can address it with branching/ flexibility altho U unpredictable?? just a relative guess?] ..in such situations, the firm cannot take the value chain as a given and must, instead, account for uncertainty about new assets and new asset configurations	purpose of this paper is to advance a complementary assets theory that accounts for conditions of Knightian uncertainty, thus aligning theory with the contemporary realities surrounding innovating firms; without accounting for Knightian uncertainty, firms may unknowingly direct complementary assets in ways that favor current value appropriation at the expense of future value creation	intemporal trade-off arises because the efficiencies in the utilization of specialized assets that existing literature postulates to ensure a firm with the lion's share of profits from its innovation can result in a loss of flexibility that the firm needs in order to sustain value creation in the long run in the face of Knightian uncertainty	firms	a firm can balance this trade-off by adopting complementary asset configurations with unilaterally specialized assets; branching and anchoring (e.g., firms that cospecialize their upstream and their downstream assets across the value chain will achieve high value appropriation of the resulting diminishing value)	obj = implicit; dealing w/ theory and generalization; mentions of 'true' U; nothing about perceptions	complementary assets; firm value chain; cospecialization;	exogenous - many quotes of Knight (1921) - unpredictable tech/ innovation, resource values, appropriability, demand
Lanivich, S. E. (2015). The RICH entrepreneur: Using conservation of resources theory in contexts of uncertainty. Entrepreneurship Theory and Practice, 39(4), 863-894.	empirical - construct test	U = almost anything could be a potentially valuable resource; often unknowable, circumstances; the range of opportunities, and the consequences for exploring new things, often are not only uncertain, but altogether unknown; resource need ambiguity	[NOT measured (directly)] the RICH and entrepreneurial self-efficacy are designed to measure cognitive properties that attenuate uncertainty	an explanation regarding how entrepreneurs cope with potential and actual resource loss (of time, energy, and other resources); the behavior of acquiring, protecting, and developing resources is a coping mechanism for potential and actual resource loss; explain why some individuals are able to cope with resource uncertainty, while others fail	entrepreneurs often take on uncertainty throughout their entire process of venture creation, putting them in many situations prone to resource loss (e.g., searching for markets or opportunities, risking equity, raising capital, managing uncharted markets); uncertainty can also create unique additional draw on resources, which an entrepreneur must endure, including accounting for the multiple possible outcomes of their uncertain situations	individuals - entrepreneurs	the RICH is shown to have predictive properties regarding the assessment of entrepreneurship outcomes; cooperation among cofounders can exploit diversity of skills and decrease risks of uncertainty;	subj = perceptions; survey; reality;	heuristics; conservation of resource theory; resource-induced coping heuristic; RBV	(endogenous) the dynamic and uncertain environment that the process of entrepreneurship can create; many entrepreneurial situations are characterized by ambiguity, uncertainty, and potential for resource loss; highly volatile;

Leiblein, M. J., Chen, J. S., & Posen, H. E. (2021). Uncertain Learning Curves: Implications for First Mover Advantage and Knowledge Spillovers. Academy of Management Review, (ja).	conceptual - theory - math model; sim	Prospective uncertainty - uncertainty about future production cost. It results because firms may have limited knowledge about the extent to which production in the current period will lead to learning that reduces production costs in future periods + Contemporaneous uncertainty - uncertainty about current production cost. It results because firms may have limited knowledge about how much they have learned previously due to factors including data imprecision, limitations of organizational information processing, and noisy feedback	[*?* RISK not UNCERTAINTY, given DISTRBTNS KNOWN*] We use the term "uncertainty" for consistency with prior literature based on Black and Scholes (1973) and, in particular, work on real options upon which we build (e.g., Dixit & Pindyck, 1994). In this extensive literature, the term "uncertainty" is used in place of the term "risk," even though the assumption is that the distribution is known; where φ is a stochastic process representing prospective uncertainty in the learning rate; the $-\sigma p/2 + \sigma pvp$ term represents the level of uncertainty in this knowledge gain; contemporaneous uncertainty is σc, and vp and ϵc are realizations from independent unit normal distributions; the contemporaneous uncertainty term, $\sigma c \epsilon c$, indicates that the firm may be uncertain about precisely how much it has learned in the prior period	While prior strategy research often assumes that learning curves are deterministic and known ex ante to firms, a substantial body of evidence suggests that learning curves are inherently uncertain. If there is uncertainty in the learning curve, then the taken-for-granted wisdom regarding the strategic implications of learning curves may over or under-emphasize the value of early entry. We consider two forms of uncertainty — prospective (future costs) and contemporaneous (current costs). We demonstrate computationally that while prospective uncertainty in the learning curve enhances the benefits of early entry, contemporaneous uncertainty reduces these benefits	Recognizing learning curve uncertainty highlights a novel form of spillovers that don't affect expected cost, but rather affect uncertainty about cost. Our core insight is that when learning curve uncertainty is large relative to the expected learning rate, it is uncertainty, rather than expectations about this rate, that determines the extent of early mover advantage	firms	will learn the rate of learning over time once action taken anyways; we show that the value associated with early entry is contingent upon both the magnitude and form of uncertainty; prospective uncertainty increases, while contemporaneous uncertainty decreases, the benefits of early learning; learn from spillovers;	obj = 'risk', for options, stochastic process; + subj = in reality and in model as subjective belief about cost, firm-specific sources; perceptions	learning curves; first-mover advantage; options TH; absorptive capacity; spillovers; IO	two forms of uncertainty — prospective (future costs) and contemporaneous (current costs) [over learning curves]; the result of a complex iterative process that requires defining an innumerable number of micro problems, determining which are worth addressing, intuiting possible solutions, choosing solutions, and implementing these solutions; factors including data imprecision, limitations of organizational information processing, and noisy feedback
Leyden, D. P. (2016). Public-sector entrepreneurship and the creation of a sustainable innovative economy. Small business economics, 46, 553-564.	conceptual - box and arrows model	when possible future profits, by the nature of uncertainty, cannot be rationally calculated; Knightian U - cited; when the complete list of outcomes and/or the probabilities of those outcomes are not known... is inherently unmeasurable, uninsurable and therefore not able to be dealt with by markets;	[*?* NO measure provided; descriptions of things that can be uncertain, but not regarding their lack of information about states or probabilities or unknowns - * NOT explicitly consistent]*	identifying the acts of direct public-sector entrepreneurship that can foster a more effective public sector environment that reduces the uncertainty that the public-sector entrepreneur and the public are otherwise subject to, thereby encouraging and supporting public-sector entrepreneurial action	paper develops an NSE-based theoretical model of the entrepreneurial environment that integrates into a functional whole the various subsets of that environment that others have studied and explores the role that NSE-guided public policy can play in improving the entrepreneurial environment for both private-sector and public-sector entrepreneurs; entrepreneurial action occurs in an uncertain environment and therefore cannot be sustained through centralized direction and explicit planning	individuals - entrepreneurs	use laws to reduce transactional uncertainties; use policies to reduce the restrictions, costs, and uncertainty associated with entrepreneurial action; use regulations to reduce the uncertainty associated with gaining access to resources; policies that allow for the creation of a "white space" for experimenting to reduce the uncertainty that innovative efforts will be honestly considered;	subj = perceptions; reality; personal;	innovation; policy; sustainability; National Systems of Entrepreneurship (NSE); Burt; Granovetter;	novelty/ innovation; unpredictable actors - consumers, rivals, suppliers, investors, evaluators; incalculable profits;
Liesch, P. W., Welch, L. S., & Buckley, P. J. (2011). Risk and uncertainty in internationalisation and international entrepreneurship studies: Review and conceptual development. Management International Review, 51, 851-873.	conceptual - review	[**too many definitions - inconsistent - but expected, given this is a lit review] risk and uncertainty, primarily as a composite; in the strategic management and entrepreneurship literatures, that "risk and uncertainty are treated as if they were synonyms"; although the term uncertainty is not always consistently applied: uncertainty sometimes referring to decision situations where there is an unknowable future and sometimes to situations where this future is knowable, but not calculable; information on all possible outcomes is just not available, and not all possible outcomes are knowable; there currently does not exist information that will help them discover the future; Knightian uncertainty;	[**NOT measured - given a lit review** but 'consistent' in the acknowledgment that the term is not consistently defined or measured in that lit] however, managers and entrepreneurs are rarely called upon by researchers to identify whether it is risk or uncertainty they are dealing with, and to define the meanings they ascribe when they use these terms; uncertainty and its management, are usually treated as dynamic variables in internationalisation research;	we review how risk and uncertainty in the international expansion of the firm are treated in the internationalisation and international entrepreneurship literatures; introduce the dynamic concepts of uncertainty acclimatisation;	show that, despite the prevailing perspective in the literature, more uncertainties might be revealed and risk might increase with international experience, thereby inhibiting internationalisation; uncertainty and its management, are usually treated as dynamic variables in internationalisation research; the action of entrepreneurs could be a reflection of ignorance rather than a ready recognition and acceptance of uncertainty and risk; no reason to expect that international experience, emerging information and the outcomes of cross-cultural marketing endeavours will necessarily lower perceived uncertainty; there is no simple connection between information received, perceptions of the uncertainties revealed and assessments of risk, and	firms & individuals (given this is a lit review)	through operation mode decisions; growing competence and confidence in using a given mode; opt for low commitment foreign operation modes; extensive market research; market spreading strategy; enlisting government support; market experimentation techniques; and the payment of incentives, gifts and bribes, in a general sense seeking to "… arrange a negotiated environment"; networks and relationships, particularly trusting ones; uncertainty acclimatisation refers to the adaptations and responses, psychological and material, that individual entrepreneurs and firms make to the evolving perceived uncertainties; learning;	subj [perceptions] and obj [measured realities, like risk]... (given this is a lit review);	risk; coevolution; internationalisation; international entrepreneurship; Knight; managerial judgment;	complexity and heterogeneity; the start of international operations; doubtfulness and apprehension that ensue from the sense of the unknown;

		non-ergodic worlds; U = refers to the entrepreneur's confidence in his estimates or expectations;			decisions regarding international operations; often produce indeterminate paths of internationalisation characterised by nonlinearities in the relationships among interacting variables;					
Loch, C. H., Solt, M. E., & Bailey, E. M. (2008). Diagnosing unforeseeable uncertainty in a new venture. Journal of product innovation management, 25(1), 28-46.	empiric al - case study	unknown unknowns; unforeseen, unpredictable factors; before the effects of unforeseen influences are revealed; important parameters and possible outcomes are not known; some things out there are not on the horizon at all; the presence of unforeseeable uncertainty means an entire set of influences is unidentified;	[*consistent in the prelim description of a general model, BUT, it is INCOMPLETE in how it is operationalized as 'given paramenters' with 'what values' and their observability*, NOT consistent in arguing the contradiction that unk unks can be identified ex ante, even in simplified problems - NO explanation for that] team is unaware of the unk unks, or unforeseen dimensions, from n+1 to N and therefore is not aware of additional actions that would be available if the team knew of the additional influence dimensions.; the team proceeds under implicit and possibly wrong default assumptions as if they were set to fixed values; will differ from true values that the project will later encounter => the unforeseen dimensions are taken as parameters, as given, without being recognized as such; be able to recognize at the outset whether unknown unknowns are present (or possible), although unknown unknowns cannot be identified initially by definition; they emerge over time (!?)'	How can unforeseeable influence factors in a new venture be diagnosed at the outset? Make explicit that the lack of knowledge is so severe, and ask what part of the venture is in danger of being affected [but, how is that even known early on?]	Based on this case study, a process is outlined for systematically identifying the vulnerability to unforeseeable uncertainty;	new ventures	suggests dividing the overall problem of structuring the venture into subproblems for which the management team can identify knowledge gaps; with learning and experimentation; a structured, process-like approach can be used to identify subproblems, to determine their uncertainty profiles, and to update the uncertainty profiles; existing models from project management can help a new venture respond to unknown unknowns (e.g., hedging, buffers, or contingency plans) [(?!)]; selectionism parallel experimentation); project redefinitions;	subj = case study interviews; perceived Us; reality; obj = modeled formally in a functional form;	innovation; new ventures; project management; decision theory; info gap theory; discovery driven planning; risk management;	unpredictability of new tech or a new market; unforeseen influences; complexity; cannot forecast demand; unpredictable management team capabilities, resource costs, competitor moves, market demographics, emergence of other technologies, technological difficulty, regulatory changes; industry readiness; product functionality;
Maghzi, A., Lin, N., Pfarrer, M., Gudergan, S. P., & Wilden, R. (2023). Creating opportunities: Heuristic reasoning in proactive dynamic capability deployment. Academy of Management Review, (ja).	concept ual - theory - process model	According to Knight (1921), uncertainty involves a situation in which sufficient prior information is not available, and hence both the odds of a specific outcome and the probability distribution of possible outcomes are unknown... We acknowledge that various definitions and perspectives of uncertainty exist. In this paper, we adopt Knight's (1921) concept of uncertainty and theorize based on this definition… However, we argue that individuals do not clearly differentiate between complexity and uncertainty and thus tend to perceive complex and uncertain situations similarly. ..."uncertainty," which is characterized by a lack of sufficient information	[*NOT consistent w/ KU; use of treatments for untreatable]... in uncertain environments with poor probability estimations or limited information about alternatives, individuals and firms rely on simple heuristic reasoning in an adaptive way; WHAT = the value of an idea is unknown (vs options, vs drivers of that value)… + what past knowledge is applicable + key criteria that affect the idea's acceptance + of proactive DC deployment (whatever that is) + environment + the DMkrs own reliance on past info + the outcome of a decision +what might become the industry standard + value of new opportunity + unclear paths ...BUT somehow, the simplicity of a heuristic + relevant past K compensates for U (p17)? ...	Drawing on the opportunity creation perspective in entrepreneurship, we argue that proactive DC deployment is characterized by uncertainty, which makes deductive reasoning less effective and thus requires the use of heuristic reasoning… First, how does ecologically rational heuristic reasoning facilitate proactive DC deployment when the decision context is uncertain? Second, why is ecologically rational heuristic reasoning effective for proactive DC deployment?	[overciting/ over-mentioning editors and their school; too many objects of U (see two boxes to left); speaks to incomplete info but not really any specifics on its form (as options, probabilities, payoffs, range, states of nature); solves U with unexplained ability to know what past K is applicable plus the use of a heuristic w/o explaining how the unknowns become known or providing a way to select which heuristic to which decision; process model is just another experiment + learn model => implies a knowable unknown so not really uncertain; conflates selection of idea with opportunity and with heuristic (and past K); ignores explicit conditions for when heuristic works best][see G's source material], and its relative costs]	individu als - decision -makers	[learning over time] - heuristic reasoning; emphasizes the need for functional matches between cognition and the environment; how iterative learning during proactive DC deployment promotes the balance between bias and variance (i.e., the main error components) in decision making and hence increases the confidence; simplicity (s focus on fewer pieces of information) and adaptability (selective in their search for and attention to information and to only focus on information that is seemingly most relevant); the iterative process of variation and selection	subj = perceived ideas, realities, information;	heuristics; dynamic capabilities; creation school; evolutionary logic; ecologically rational heuristic reasoning; Knight;	characterized by a lack of sufficient information preventing the estimation of possible outcomes; problems are ill-defined; exogenous change; both the odds of a specific outcome and the probability distribution of possible outcomes are unknown;

Mahieu, J., Melillo, F., Reichstein, T., & Thompson, P. (2021). Shooting stars? Uncertainty in hiring entrepreneurs. Strategic Entrepreneurship Journal, 15(4), 526-567.	empirical - matched sample	[*unknown value, but knowable through signals; probationary period? *UNDER-DEFINED as to characteristics vs 'what'*] a worker's future productivity under uncertainty (Spence, 1973) = employers are unable to discover the true ability of each worker prior to employment; they rely on information gathered from signals that have proven to be effective in predicting workers' productivity	[*?* NO DIRECT MEASUREMENT - treatment model where ENTl spell (experience) is it, assumed of greater U + other parts of signal = length, fast exit, etc..] proxy of ENT spell not really U, vs noise; info asymmetry;	However, for individuals contemplating founding a company to experiment with ideas, knowing whether their future salary will be jeopardized upon returning to the wage sector is valuable… This paper advances a theory to explain why entrepreneurs are penalized. In developing this theory, we were motivated by recent intriguing insights from labor economics on the role of uncertainty in hiring	This article advances a theory to explain why a spell of entrepreneurship affects the future wages of entrepreneurs returning to the wage sector. We propose that entrepreneurship holds a low rather than a negative information value, increasing the uncertainty around a job applicant's future productivity. Employers respond to this uncertainty by discounting the offered wage.	individuals - entrepreneurs	employers respond to this uncertainty (of candidates returning to wage work from entrepreneurial work) by discounting the offered wage; wage penalty is more pronounced for those (a) who were in the upper tail of the wage distribution before the entrepreneurial spell, (b) who exited it quickly, and (c) who are hired by small employers;; use probationary contracts (as employer); delay exit, or don't quit wage job, as entrepreneur, especially is fast fail possible	obj = noise from signal (first time entrepreneurs mid-career)	labor economics; information asymmetries; signal noise; option value	uncertainty around a job applicant's future productivity = signal noise; signals of ability derived from an entrepreneurial experience may not only be noisier compared with those in the wage sector but also costlier to obtain; evaluating the contribution of the entrepreneur to the performance of his/her venture remains difficult for employers + exogenous (industry or macroeconomic) shocks
Mahnke, V., Venzin, M., & Zahra, S. A. (2007). Governing entrepreneurial opportunity recognition in MNEs: Aligning interests and cognition under uncertainty. Journal of Management Studies, 44(7), 1278-1298.	conceptual - deduction, verbal	U = possible outcomes and their probabilities of occurring are not known beforehand;	[*NOT consistent* definition of U is KU; descriptions of three Us are not - some have limited options and outcomes and known precedents, some are merely info asymmetries] communicative U = relates to audience, message, timing, medium questions- internal to the MNE; behavioral U = arises when the actions of intrapreneurs do not fully reveal their true intent [asymmetric information]; value U = when there are several proposals that should be evaluated for selection;	identify sources of entrepreneurial uncertainty in an MNE's opportunity recognition process; identify various strategies to reduce it; discuss contingencies; how are multi-level decisions in MNE's entrepreneurial process of opportunity recognition and selection governed?	an incentive-alignment paper, where internal entrepreneurs need the right environment to pursue opportunities (given internal uncertainties)	firms - strategies; individuals - decisions/ actions	several mechanisms = delegation of authority to local experts with expert knowledge reduces communicative U; providing self-enforceable high-powered incentives reduces behavioral and value uncertainties; contingent career promise and deferred payment structure reduces behavioral and value uncertainties; clan control reduces behavioral and value uncertainties;	subj = perceived Us affecting behaviors; obj = from firm's perspective these issues exist indep of any one mind;	economics; MNEs; behavioral; cognition; authority; rules; incentives; HRM; judgment; opportunity; agency TH; Knight;	internal political processes; complexity; dispersed knowledge, culture, geographic markets and regional resource endowments; individuals have different goals, motives, political agendas; the remoteness of resulting innovation from local market needs, groupthink, and the lack of incentives for local subsidiaries to share their knowledge and ideas for new business development; the ambiguity of the opportunity review and assessment processes; lack of clarity; fears of misappropriation;
Matthews, C. H., & Scott, S. G. (1995). Uncertainty and planning in small and entrepreneurial firms: an empirical assessment. Journal of Small Business Management, 33(4), 34.	empirical - survey	multiple definitions of uncertainty have been offered in the literature, including lack of knowledge for decision-making; Milliken's state U is environmental U = the inability to understand or to predict the state of the environment due to a lack of information or a lack of understanding of the interrelationships among environmental elements;	[**questionable - measuring certainty as confidence rather than unpredictability or non-understanding, of inter-relationships** so, NO, not directly consistent] 5-point Likert scale from very low to very high for questions of - "certainty refers to the amount of information needed to make a decision with confidence and the information available...please circle the level of certainty you have with regard to the following..."; considered four different sources of U (input/output, financial markets, governmental, competitor)	the influence that the perception of environmental uncertainty has on the strategic and operational planning of small firms remains largely unexplored; this study seeks to address this issue… results suggest that entrepreneurial firms engage in more sophisticated planning than small firms overall;	perceived environmental uncertainty mediates between the objective environment and a firm's strategic response; it is the perceived environment which elicits strategic action by managers; in both entrepreneurial firms and small business ventures, sophistication of strategic and operational planning declined with increasing environmental uncertainty; for the entrepreneur, reduced sophistication of planning might be a highly adaptive response to a turbulent environment;	firms (tho individuals were surveyed)	as perception of environmental uncertainty increases, strategic and operational planning decrease; strategic planning may be "directed at achieving a modification of the current state" rather than directed at achieving some desired future state; decreasing sophistication of strategic and operational planning; [BUT, for entrepreneurial firms, less decreases]	subj = perceived U; reality; survey; ALSO, obj = obj environment exists;	strategic planning; operational planning; Milliken; small firms; entrepreneurship;	the complexity and interconnectedness of the environment (customers, suppliers, distributors, competitors, government, public attitudes, technology, and financial markets) make analyzing the global environment difficult; unpredictable change; lack of information; lack of understanding;
McGrath, R. G. (1999). Falling forward: Real options reasoning and entrepreneurial failure. Academy of Management review, 24(1), 13-30.	conceptual - propositions argued	U = a priori irreducible uncertainty; one manifestation of uncertainty is highly variable—or RISKy—returns; U = potential variance; [defines uncertainty as RISK]	[*NOT U, just RISK - consistent in speaking to risk/ variance, though, and explicit*] characterizing entrepreneurial initiatives not as variations, random mutations, or bold new adventures but as real options, whose value is fundamentally influenced by uncertainty (risk); potential variance of expected returns is akin to volatility;	use real options reasoning to develop a more balanced perspective on the role of entrepreneurial failure in wealth creation, which emphasizes managing uncertainty by pursuing high-variance outcomes but investing only if conditions are favorable; offer propositions that suggest how gains from entrepreneurship may be maximized and losses mitigated;	the value of a real option depends to some extent upon subjective judgments regarding what is likely to happen in an uncertain future, real options reasoning suggests a point of intersection between economic forces and psychological ones;	individuals - entrepreneurs	rents can be earned by those who take out real options on opportunities that are not obvious to others and that, therefore, are undervalued; learning thru experiments (that sometimes fail) reduce uncertainty over time; early containment of fixed costs and avoidance of irreversible investments thru real options; learn thru failure analysis;	obj = risk/ variance (of option); rational dec-mkg (given model); distrbn known; (noting that subj occurs in real world)	real options;	high-variance outcomes; technological progress; volatility of underlying assets; dynamics

McKelvie, A., Haynie, J. M., & Gustavsson, V. (2011). Unpacking the uncertainty construct: Implications for entrepreneurial action. Journal of business venturing, 26(3), 273-292.	empirical - decisions	state uncertainty represents the inability to predict how the components of the environment are changing; effect uncertainty describes the inability to predict how changes in the environment will influence the firm; response uncertainty describes a lack of insight into response options given a changing environment and/or the inability to predict the likely consequences of a response choice; a conceptual distinction between types of uncertainty as a function of the nature of the information shortage represented by each type;	[consistent w/ Milliken definitions, but inconsistent as 'not' subjective (and w/o explanation or responsibility for it)] operationalize uncertainty as a multi-dimensional construct composed of state, effect, and response types of uncertainty; we design a decision experiment that offers insights into how different types and manifestations of uncertainty promote or impede an entrepreneur's willingness to exploit an opportunity; risk implies that the probabilities of future outcomes are knowable, whereas uncertainty implies that they are unknowable (Knight); operationalized as predictability and rate of change for the three; each of our decision scenarios was characterized by seven decision attributes — operationalized at two levels (either high or low); U (high) = unpredictability, unforeseeable, fluctuate high, no insights.	however robust and generalizable findings that explain the conditions in which uncertainty may impede [or promote] entrepreneurial action remain elusive; expertise moderates the relationship between uncertainty and action only in the case of effect uncertainty; apply Milliken's conceptualization of uncertainty toward investigating how a multi-dimensional view of uncertainty might extend our understanding of the relationship between uncertainty and an individual's willingness to engage in entrepreneurial action	focus on the primary decision-maker's willingness to exploit a given opportunity in the face of varying combinations and manifestations of uncertainty and find that the type of uncertainty experienced influences the willingness to engage in entrepreneurial action differently; find that differences in how each type of uncertainty is manifested in the environment, the scale of exploitation (i.e. large vs. small), and the entrepreneur's expertise serve to moderate the relationship between uncertainty and action in counter-intuitive ways; a case can be made that we actually understand very little about how and under what conditions uncertainty may influence important outcomes in entreprneurship	individuals - entrepreneurs/ decision-makers	can overcome the challenges of decision-making in the face of uncertainty because of their “expert knowledge'; uncertainty related to customer demand, decision-makers choose to experiment with small-scale launch, possibly to learn more about customer preferences; but, avoid small-scale experimentation if they feel that the viability of the underlying technology appears to be threatened	subj = perceptions of U; reality; as it is experienced by the individual; survey; BUT obj = given info in objective scenarios;	entrepreneurial action; opportunity exploitation; conjoint analysis; Milliken; cognition;	dynamism and turbulence constitute external factors that contribute to uncertainty; entrepreneurial environment can be characterized in terms of dynamism, munificence, and complexity; customer, competitors, technological volatility, and change;
McMullen, J. S., & Shepherd, D. A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. Academy of Management review, 31(1), 132-152.	conceptual - theory - logic model, boxes & arrows	the future is unknowable; three types of uncertainty: state, effect, and response (Milliken's); state uncertainty = when administrators perceive the environment to be unpredictable; effect uncertainty = “an inability to predict what the nature of the impact of a future state of the environment or environmental change will be to the organization”; response uncertainty = “a lack of knowledge of response options and/or an inability to predict the likely consequences of a response choice";	[inconsistent][? - does not necessarily follow, given doubt <> unpredictability of response but feelings of what that could mean, negatively] uncertainty in the context of action is a sense of doubt that blocks or delays action; define uncertainty more in terms of what it does than what it is; [? quantified vs categorized as a lack] uncertainty perceived by a prospective actor forms a continuum, with complete ignorance on one end; [in Fig3 - no] radical uncertainty = ignorance [inattention] vs action-specific uncertainty?	establishing the need to consider knowledge and motivation concomitantly when examining entrepreneurial action, we proposed a two-stage conceptual model of entrepreneurial action, built on these two constructs; considering the amount of uncertainty perceived and the willingness to bear uncertainty concomitantly; exposes limitations of existing theories of entrepreneurial action	[questionable whether - “uncertainty” can be viewed as a sense of “doubt” that is inextricable from the beliefs that produce action, given uncertainty can be viewed as objective]; [the two stages - delineating third-person from first-person - is artificial, and critiquing other theories for ignoring one or the other seems trivial (given most often the attention stage is implied in being in the evaluation stage); square-peg-round-holes the state and effect as prior to the response types of uncertainty (that are themselves poorly-constructed types - being more about 'what' than 'how')]	individuals - entrepreneurs	be perceptive/ experienced in many technologies to 'have attention'; through learning efforts and/or the encouragement of others, one may be able to overcome doubt and act; learning over time (w/ action)	subj = perceptions; uncertainty is subjective; personal beliefs; tautological attention	authors' own entrepreneurial action; Knight; Kirzner; Schumpeter; Milliken; Casson;	novelty; environmental change; technological change; discrepancies in supply and demand; unpredictable future costs;

Miller, K. D. (1992). A framework for integrated risk management in international business. Journal of international business studies, 23, 311-331.	conceptual - list of Us	this paper adopts the convention of using the label "risk" to refer exclusively to unpredictability in corporate outcome variables; variance; volatility; deviations; "uncertainty" as used in strategic management and organization; theory refers to the unpredictability of environmental or organizational variables that impact corporate performance or the inadequacy of information about these variables; U increases R;	[consistent given no actual measures][U not measured, directly, just described] unpredictability mentioned but not precise, given can be risk (distribution known) or have legitimate bases for subjective beliefs (experience) or… {no mention of Knight or distributions}	s paper develops a frame-work for categorizing the uncertainties faced by firms operating internationally and outlines both financial and strategic corporate risk management responses; major strength of the integrated risk management perspective is that it facilitates explicit recognition of trade-offs between exposures to various uncertainties; trade-offs can also occur across the three levels of analysis identified earlier-general environment, industry, and firm-specific uncertainties; ideally, a firm could, as part of the strategic planning process, develop a comprehensive uncertainty profile encompassing each of the uncertainty dimension;	shortcoming in much of the existing risk and uncertainty literature is the emphasis on particular uncertainties rather than a multi-dimensional treatment of uncertainty; paper develops an alternative to the suboptimal approach of treating uncertainties in isolation from one another - this alternative-the integrated risk management perspective-takes a general management view giving explicit consideration to numerous uncertainties	individuals - managers at intl firms	financial risk management practices (purchasing insurance and buying and selling financial instruments) and changes in firm strategy (avoidance, control, cooperation, imitation, flexibility) are two approaches to managing exposure to environmental uncertainties; Avoidance (Divestment Delay new market entry Low uncertainty niches) Control (Political activities Gain market power Exchange of threats Vertical integration Horizontal mergers and acquisitions) Cooperation (Long-term contractual agreements with suppliers or buyers Voluntary restraint of competition Alliances or joint ventures Franchising agreements Licensing and subcontracting arrangements Participation in consortia Interlocking directorates Interfirm personnel flows) Imitation (Imitation of product and process technologies Follow other firms in moving into new markets) Flexibility (Diversification [Product diversification Geographic diversification] Operational flexibility [Flexible input sourcing Flexible work force size Flexible work force skills Flexible plants and equipment Multinational production])	subj = perceive uncertainties; heterogenous; reality	IB; risk management; strategic management; Milliken	can arise from exogenous shocks, unforeseeable behavioral choices, or combinations of the two; uncertain (1) general environmental, (2) industry, and (3) firm-specific variables; political instability, government policy instability, macroeconomic uncertainties, social uncertainties, and natural uncertainties [list in Tables]; input market uncertainty, product market uncertainty, and competitive uncertainties; firm-specific uncertainties are operating, liability, research and development, credit, and behavioral uncertainties
Miozzo, M., & DiVito, L. (2020). Productive opportunities, uncertainty, and science-based firm emergence. Small Business Economics, 54(2), 539-560.	empirical - longitudinal single case study	Define uncertainty as a situation where the totality of possible outcomes is unknown and the probabilities associated with those that are known are not measurable.. For Knight, uncertainty can be reduced by decreasing these types of situations through grouping (consolidation) or by selecting people who can bear the uncertainty (specialization) (such as science-based entrepreneurs) PLUS many other types cited... when both their science (and technology) is uncertain and the market for its products or services often does not exist yet	[?? unlikely consistent* NOT w/ KU] BioCure therefore started with an initial set of scientific and technological knowledge, and possible productive opportunities.. aim of the venture was to develop and out-license candidates for novel stem-cell therapeutic drugs in the targeted areas.. context of U based on 'assessments from partners' and 'problem-solving competence' (= feasibility; obstacles) [??] - from interviews 'see' U from info incompleteness and gaps in competence; 'proof' of U [?] in requests from partners for more 'more data' and 'proof of concept' and from distrust in form of requests for various assessments (technical, legal, reputational..)	We address explicitly how the firm and its potential partners perceive uncertainty and single out the different mechanisms used by the firm to address uncertainty—envisioning, pooling, and staging—to secure resources from external partners and exploit the identified productive opportunities in a timely manner; how and why do entrepreneurial science-based firms emerge through identifying and pursuing their productive opportunities when both their science (and technology) is uncertain and the market for its products or services often does not exist yet?	our understanding of how new science-based firms—research spin-offs from university departments or industrial firms—emerge is still underdeveloped	firms	envisioning, pooling, and staging—to secure resources from external partners and exploit the identified productive opportunities in a timely manner	subj = case study interviews; perceived Us	Penrose; evolutionary economics; strategy; Keynes;	changes in scientific or technological knowledge; economic (endogenous) unpredictability; animal spirits; stems from a variety of sources, including entering a new market, acquiring another firm, turnover in top management, and technical uncertainty, which concerns the likelihood of technical success and the costs associated with that success. Market uncertainty is shared across a set of firms and includes competitive uncertainty (created when the competitive actions of a rival influence a firm), demand uncertainty (which comes from the general level of demand for an industry's products), and input cost uncertainty. technical uncertainty and performance standard uncertainty; conflicting interpretations

Montauti, M., & Wezel, F. C. (2016). Charting the territory: Recombination as a source of uncertainty for potential entrants. Organization Science, 27(4), 954-971.	empirical - data	market-specific uncertainty = difficulty in identifying a clear reference group of prospective rivals and also in understanding a competitive environment; shared across organizations, not controllable, and independent of what occurs at the organizational level; assume either a high extent or a diverse mode of recombination helps to evoke market uncertainty in the eyes of potential entrants [*lack of a formal definition* in terms of unknowns]	[**w/o a formal definition, NO consistency; consistent with assumption that proxies might work; no direct measure of difficulty of understanding the competitive environment**] extent of recombination captures the degree to which, in a given year, incumbent record labels recombine in their releases the elements of a focal style's offering with those of products in other styles; mode of recombination captures how much the incumbent record labels experiment with different combinations rather than reproducing them;	propose that the more a category appears altered via incumbents' acts of recombination, the more potential entrants are exposed to market-specific uncertainty and become reluctant to invest/ enter in that category; contend that high extent or diverse mode of recombination leads to a reduced number of investments in the focal category, because potential entrants become more likely to face market uncertainty;	expect that the degree to which categories appear altered and ambiguous, affects the investment decisions of potential entrants; uncertainty increases the strength of status signals so expect the negative effects of recombination—in terms of its extent and mode—on market entries to be attenuated at increasing values of category status;	firms (labels) - entrants & individuals - artists	reduction in investment; experimentation dominates over reproduction; category status alleviates the uncertainty faced by potential entrants by reviving the distinctiveness of that part of the market;	obj = shared across firms; ALSO subj = eyes of potential entrants;	recombination; market uncertainty; ambiguity; entrepreneurship; music industry; cognition;	a category appears altered via incumbents' acts of recombination; volatile consumer preferences; unpredictable rival behaviors; increasing levels of extent and mode of recombination confront potential entrants with market uncertainty; nn increasing loss of distinction of that category lowers the potential entrants' chances to collect meaningful information; lack of reproduction typical of a category whose mode of recombination is diverse suggests a volatile demand;
Nair, S., Gaim, M., & Dimov, D. (2022). Toward the emergence of entrepreneurial opportunities: organizing early-phase new venture creation support systems. Academy of Management Review, 47(1), 162-183.	conceptual-theory - props and flow figures	[NOT formally defined] given the uncertainty under which new ventures and opportunities inextricably emerge; from serendipitous and purposeful intersubjective interactions between heterogeneous actors; in uncertain environments with few antecedents	[*questionable consistency - U as age*] The early phase of new venturing is uncertain (Alvarez & Barney, 2005; Townsend et al., 2018) and nonlinear, where changing one part of the configuration generates unpredictable outcomes.	By viewing venturing efforts and opportunities as emergent and drawing on the literature on complexity and organizational space, we propose openness, self-selection, visibility, and connectivity as the defining characteristics for organizing support systems…we expand the theoretical scope of support systems to include organizing that is more attuned to the uncertain and nonlinear nature of new venture creation that they support	The origins and development of new ventures can be traced to many incidents—some designed, others coincidental. Our paper advocates creating the potential for more coincidental actions and interactions, paradoxically within an organized mode, to feed existing support systems	individuals - entrepreneurs + incubators	organizing support systems for the early phases of new venture creation; s creating the potential for more coincidental actions and interactions, paradoxically within an organized mode, to feed existing support systems; added connectivity, visibility, trust, reducing associative barriers, openness, reducing power asymmetries	subj = individual perceptions;	entrepreneurial action; creation school; opportunity; temporal issues; complex adaptive systems; support systems research	non-linearity; amorphous yet purposeful interactions; changing one part of the configuration generates unpredictable outcomes; complexity;
Nikolaev, B. N., Boudreaux, C. J., & Palich, L. (2018). Cross-country determinants of early-stage necessity and opportunity-motivated entrepreneurship: accounting for model uncertainty. Journal of Small Business Management, 56, 243-280.	empirical - 14 sources	model uncertainty—that is, the use of a wide variety of explanatory variables has produced inconsistent empirical findings).. according to Pinello (1999) sampling uncertainty accounts for only 11 percent of the total variance in estimates while the remaining 89 percent is due to model specification (i.e., the choice of control variables in a model). model uncertainty leads to the problem of asymmetric information between researchers and readers .	[*ONLY one aspect of model mis-spec measured*] while accounting for model uncertainty. To do this, we used a methodology proposed by Young and Holsteen (2015) and reported the robustness of the estimated coefficients to the choice of control variables from five different categories; our goal was to assess whether the significance of the estimated coefficients depends on the set of control variables included in the model or if the results are consistent regardless of the assumptions made about the model.. We focus on the weight of the evidence from thousands of estimations as opposed to a single or a few select estimates	What if the research findings of the countless cross-country studies of the drivers of entrepreneurship have led to conclusions that might be misleading as several recent studies suggest?	Model uncertainty is one of the most pervasive challenges in the social sciences. Cross-country studies in entrepreneurship have largely ignored this issue; we identify robust cross-country determinants of entrepreneurship. To do this, we examine 44 variables as possible determinants of early-stage opportunity-motivated entrepreneurship (OME) and necessity- motivated entrepreneurship (NME)	studies (of individuals as entrepreneurs)	identify robust cross-country determinants of entrepreneurship; allow future studies to perform robustness analyses that can make empirical findings more compelling and less prone to non-robust, trivial, and false-positive results; apply control variables from: (1) economic factors, (2) formal institutions, (3) cultural values, (4) legal origins, and (5) geographical conditions	obj = statistical analysis over controls (model) variants and results	statistical; empirical methods; modeling; determinants of entrepreneurship	model U = a wide variety of explanatory variables has produced inconsistent empirical findings; 89 percent of total variance is due to model specification (i.e., the choice of control variables in a model); adding or dropping control variables is a common practice in empirical research; U about data
O'Brien, J. P., Folta, T. B., & Johnson, D. R. (2003). A real options perspective on entrepreneurial entry in the face of uncertainty. Managerial and Decision Economics, 24(8), 515-533.	empirical - surveys	[*NOT formally defined*] uncertainty associated with the estimate of future cash flows; we implicitly assumed uncertainty to be exogenous and irresolvable; unpredictable returns;	[**given lack of formal definition, NOT consistent; implied that variance is predictable - based on historic data - while U is about unpredictability** this is RISK, not U] since we cannot feasibly ascertain the total uncertainty associated with every individual new venture, we focus on the central role that the exogenous uncertainty in the entrepreneur's target industry plays in deterring investment = represented by the randomness, or volatility, in the external environment => the volatility of each industry's gross product (tbe square root of tbe annual conditional variances);	develop and test theory regarding whether entrepreneurs contemplating starting a new venture account for the value of the option to defer the entry decision;	we find that high uncertainty in the target industry dissuades entry, and that the irreversibility of the entry decision moderates this relationship; firm characteristics and entrepreneurial attributes bear upon investment irreversibility, find evidence that these factors moderate the effect of uncertainty on entrepreneurial entry; very little empirical research that has considered how variations in the level of uncertainty will impact the entry decision;	individuals - entrepreneurs	delay entry; high uncertainty generally dissuades investment; defer; analogous to holding a call option; wait for more information/ certainty; uncertainty will have a stronger negative effect on entry as the irreversibility of the investments required to enter an industry increases, and on entry into geographic regions that are less concentrated with other similar firms, and for individuals that have less formal education;	subj = variations in level of U; survey; reality; BUT can only measure (?) objective U = as variance;	real options; Dixit; entry choice; timing; sunk costs;	the risks that they bear by initiating a venture whose future returns are unpredictable; n due to forces exogenous to the entrepreneur's control (e.g., changing demand and supply characteristics, technological changes, legislation, etc.);

Ott, T. E., & Eisenhardt, K. M. (2020). Decision weaving: Forming novel, complex strategy in entrepreneurial settings. Strategic Management Journal, 41(12), 2275-2314.	empirical - multi-case study	market U = NO formal definition*; implied by setting = ventures (i.e., privately owned, professionally funded young firms); selected ventures addressing nascent two-sided markets with a geographic component (like Airbnb) + early-stage ventures (i.e., Seed or Series A) + founded in about 2012 (+ nascent markets)	[**given NO definition, NO consistency to speak of - no quote w/ term unknown, uncertainty, lack of information, un/predict, {one quote of strategy 'Nothing's figured out with 100% certainty' vs about context/ market, one quote about not knowing which features customers would want, a few quotes about not knowing anything about painting or their customer - but that is voluntary ignorance, not U}]	we address a core dilemma at the heart of strategy formation in entrepreneurial settings by asking: How do entrepreneurs form novel yet complex strategy in nascent markets?; primary contribution is the theoretical framework of decision weaving: a problem-solving process comprised of inter-related behaviors that enable formation of a novel, complex strategy:	we conduct a rare "deep dive" into the strategy formation processes of six ventures using multi-case theory building; use archival data and four waves of field data to track closely strategy formation at three venture-pairs—from founding until the strategy became clear (or the venture failed); each venture began with a promising opportunity, but only some effectively formed a strategy, survived, and grew;	ventures	use sequential focus (not parallel) to learn about successive focal strategic domains; pause at learning plateaus to consolidate that knowledge about a focal domain; use stepping stones to make progress in background domains without losing focus; a few simple rules highlighting flexibility; learning and flexibility (trial-and-error, experimentation, bricolage); taking action and learning; combine activities for fit;	subj = interviews; reality;	managerial cognition; micro-foundations; strategic decision making; strategy formation;	nascent markets are characterized by incomplete or fleeting market structures, unclear or contested product definitions, ambiguous demand, and lack of a dominant logic or legitimated category; a "high velocity" (i.e., uncertain, ambiguous, and fast-paced) landscape;
Ozcan, P. (2018). Growing with the market: How changing conditions during market growth affect formation and evolution of interfirm ties. Strategic Management Journal, 39(2), 295-328.	empirical - case study	uncertainty, which is defined as the unpredictability of the environment (,	[*measures as quotes from interviews across time - perceived U by players as industry matured; NONE mention the unpredictability of the definition used -> NOT consistent*] [RE: tech & market - e.g., There was a high degree of technological uncertainty due to primitive purchasing and gaming interfaces... A further decrease to market uncertainty came once carriers began advertising campaigns. [uses quotes of firms and customers]	This study explores the complex dynamics of how changing levels of uncertainty and competition during market growth affect the formation and evolution of interfirm ties during the transition of the U.S. wireless gaming market from nascent to growth stage.	the findings show that changing levels of uncertainty and competition in growth stage markets can have different consequences for firms due to heterogeneity in their ties and power relative to partners	firms	alliance portfolio management goes beyond a firm's capability of managing individual alliances; remain flexible	subj = interview questions about (perceived) U; some cite 3rd-party assessment of Us	interfirm ties; industry life cycle; network/ portfolio management (strength of ties); options; ambidexterity	U = exogenous environmental change; due to customers, suppliers, technology
Ozmel, U., Reuer, J. J., & Wu, C. W. (2017). Interorganizational imitation and acquisitions of high-tech ventures. Strategic Management Journal, 38(13), 2647-2665.	empirical analysis (over time) M&A activity - hazard model	[no formal definition about U vs what is at risk]...focusing on *technology-related uncertainty*.. we first introduce *exogenous technological uncertainty* within the focal tech venture's industry subfield as a critical dimension of technological uncertainty. This uncertainty reflects the uncertainty in the technological landscape of the focal venture's subfield that is unaffected by the venture's own actions (.	[this is RISK, not U; and, given no formal defn, questionable consistency] ..follow prior research and measure Exogenous Technological Uncertainty in a venture's subfield by calculating the **monthly standard deviation of the returns** for each biotech industry subfield index composed of publicly traded biotech firms(e.g., Folta,1998; Vassolo, Anand, & Folta,2004).	research has yet to attend to the dimensions of uncertainty that might be especially relevant for tech ventures and hence might particularly affect the extent of imitation within a subfield regarding the acquisitions of tech ventures	Our findings are in accord with the suggestion that uncertainty in the technology domain is an important boundary condition in moderating the extent of imitation in technology acquisitions… imitation can be one way to deal with decision-making under uncertainty when making acquisition decisions in high-tech environments (!) potential acquirers of a technology venture might face substantial uncertainty regarding the quality of the venture's resources and its prospects when they are assessing the venture as an acquisition target **[NOT seemingly considered here** - somehow accounted for in tech distance b/w acquiror and target [past studies used expert valuation dispersion?]	firms	imitation can be one way to deal with decision-making under uncertainty when making acquisition decisions in high-tech environments; observation and learning (from cues)	obj (given measure of exog tech U is monthly standard deviation in returns)	imitation [homophily]; legitimacy, TCE; other competitive learning (no theories cited in theory section); interorganizational imitation; mergers and acquisitions; technology acquisitions	exogenous technological change in landscape outside firm's control + transaction-specific re: resource differences b/w firms
Packard, M. D., & Clark, B. B. (2020). On the mitigability of uncertainty and the choice between predictive and nonpredictive strategy. Academy of Management Review, 45(4), 766-786.	conceptual - formal model - dichotomy w/ consqncs	Has distinguished uncertainty derived from ignorance of knowable information (i.e., "epistemic uncertainty") from that derived from inherently stochastic events (i.e., "aleatory uncertainty")	[*consistent but problematic*, NOT KU] uncertainty is, for us, "epistemic" if it results from ignorance of knowledge that is knowable in principle. This includes those uncertainties for which the information or computational capacity needed to mitigate them may not yet be available; the possibility of causal indeterminacy and the aleatory uncertainty that would result - "a factual uncertainty," ontologically real where, in a Newtonian sense, at least one underlying causal factor is utterly unknowable, even in principle (see Dequech, 2004).. aleatory uncertainty is characterized by its immitigability	Managers face a critical issue in deciding when to employ a predictive planning approach versus a more adaptive and flexible strategic approach; we take on this issue, distinguishing mitigable ignorance of pertinent but knowable information (i.e., "epistemic uncertainty") from immitigable indeterminacy (i.e., "aleatory uncertainty").	When should managers and entrepreneurs forecast and plan, and when should they adopt a more dynamic, adaptive strategy? ..roots of this issue are not only in what and how much is uncertain, but also in the nature of that uncertainty and the extent to which it is, or may be, mitigable... what information is unknowable? This is a philosophic question	individuals - managers, entrepreneurs	"epistemic" if it results from ignorance of knowledge that is knowable in principle -> prediction should, in fact, become possible if and once we have determined and can precisely measure all relevant factors; aleatory -> use non-predictive approach (effectuation) + adaptation; aleatory (immitigability) still treated with effectuation [!?]	subj = epistemic; perceived U; (debates obj = in theorizing, real U)	uncertainty mitigation; coping/ capitalizing; Knight; effectuation; rational choice TH	Epistemic uncertainty originates from ignorance of knowable information; causal ignorance and ambiguity; equivocality, probabilistic risk; m "a competence gap in problem-solving," or a computational incapacity; complexity, dynamism, and stochasticity; aleatory = causal indeterminacy; free will; unknowability of qualia; quantum "indeterminism,"

Packard, M. D., Clark, B. B., & Klein, P. G. (2017). Uncertainty types and transitions in the entrepreneurial process. Organization Science, 28(5), 840-856.	conceptual - typology	[perceived U] = the foundation of Knightian uncertainty— the reasons why probabilities do not exist for certain decisions—can be understood in terms of the nature of these option and outcome sets. Specifically, *uncertainties exist only when one or both sets are perceived as open*... risk & ambiguity (both closed); absolute U (both open), environmental (outcomes open, options closed), creative (vice versa) ... provides prescriptions to make the unknown known	[*consistent in language {no measure provided, as conceptual}; NOT consistent in that KU is considered treatable, e.g., by judgment] Environmental U embodies the complexity and dynamism of nonacting factors (Downey et al. 1975), as well as the collective effect of all actors on the environment. The culmination of these is an uncertain environment, in that the outcomes of any chosen course of action cannot be fully predicted because of unknown changes to the environment over time and potential ignorance of the effects of specific actions. Creative U results, then, from the fungibility of the set of options and the ignorance of possibly superior alternatives (given goal, find best choice). Absolute U = entrepreneur applies judgment not only to what consumer needs can be better met, but also to what solutions could better meet them.	The result is a novel framework for better understanding uncertainty and its implications for entrepreneurial behavior over time	we revisit the nature of entrepreneurial decision making under uncertainty. We begin with a novel typology of uncertainty that defines and delineates different types of uncertain contexts. We then examine the nature of decision making within these distinct contexts, highlighting differences in how entrepreneurs make decisions within different types of uncertainty; novel classification scheme for different types of perceived uncertainty.. [use of effectuation (!)]	individuals - entrepreneurs	defer; wait to gain info/ experience; judgment; imagination; intuition; scenarios; learning/ adapting (various options or outcomes are imagined and considered, revisions to the other set may become expedient until a more refined consideration set is achieved)	subj = perceived Us (a novel classification scheme for different types of perceived uncertainty); also obj (true)	Knight; Shackle (surprise); judgment (authors' own TH); effectuation; options; action	environment (re: outcomes) + internal limitations on creativity (of options); from tech, from spec problem, from complexity, dynamism
Parnell, J. A., Long, Z., & Lester, D. (2015). Competitive strategy, capabilities and uncertainty in small and medium sized enterprises (SMEs) in China and the United States. Management Decision, 53(2), 402-431.	empirical - survey	perceived environmental uncertainty (PEU) describes the extent to which a manager perceives the organization's environment as unpredictable (Milliken); can be examined through three distinct continuums: simple to complex, stable to unstable, quality/ richness of information available; so, uncertainty is high in environments that are complex, unstable, and lacking high quality information;	[**questionable - measures of predictability, and dynamism, BUT NOT of complexity or lack of information, and too many unrelated**] environmental uncertainty was assessed within market, technological, and competitive realms, and also with scales developed by DeSarbo et al. (2005) - 6 Qs each, some focusing on 'rapid change', 'difficulty in prediction', 'size' and 'frequency' of change, BUT many focusing on 'threats' of rivals/ customers, price sensitivities and opportunities;	to investigate linkages among competitive strategy, strategic capabilities, environmental uncertainty, and organizational performance in small and medium sized enterprises (SMEs) in China and the USA;	support the integrity Miles and Snow generic strategic typology; comparatively few studies in other nations have also considered factors such as capability development and strategic uncertainty; Chinese executives tend to demonstrate high uncertainty avoidance relative to their American counterparts; findings concerning uncertainty and capabilities remain somewhat elusive; an argument could be made that the uncertainty-strategy nexus is tautological - i.e., the business strategy is selected as a means of managing the uncertainty;	firms	prospectors focus on innovation, creating new markets and enacting uncertain environments; seek flexibility to avoid management rigidity and competitive stagnation; craft their strategies and attempt to shape the competitive environment; choice of generic strategy can be viewed as the means by which they address uncertainty; defenders operate in well-developed market to minimize competitive U; prospectors minimize [tech] U by leading its development; analyzers analyze to reduce market U; many have learned to address it by growing and shrinking their operations to fit the circumstances; focus on capabilities that address the U source;	subj = survey; reality; BUT at industry level, obj;	China; SMEs; competitive strategy; capabilities; Miles & Snow;	Chinese SMEs often face high uncertainty in a variety of realms; environmental complexity and dynamism; lack of information; information asymmetry in the market, abrupt and changing government policies, and difficulty accessing capital;
Patatoukas, P. N., Sloan, R. G., & Wang, A. Y. (2022). Valuation uncertainty and short-sales constraints: Evidence from the IPO aftermarket. Management Science, 68(1), 608-634.	empirical - panel	[UNDER-DEFINED - unknown vs noisy vs risk vs ambiguity; knowable over time] IPO valuation uncertainty = uncertainty about future operating performance; that reasonable men may differ in their forecasts.. over time this uncertainty is reduced as the company acquires a history of earnings or lack of them, and the market indicates how it will value these earnings	[*?* proxies for 'unusualness' vs for unknown-ness; signals of noise vs being U or any sort*] VUScore = Our composite valuation uncertainty score using pre-IPO characteristics. A new issuer scores one point for each of the three criteria: (i) it has above median pre-IPO sales growth, (ii) it reports a pre-IPO loss, and (iii) it has above median intangible intensity. To obtain a standardized score, we sum up the points and divide by three; Our ex post measure of valuation uncertainty, around post-IPO earnings announcements. We measure TP Dispersion before each earnings announcement using the most recent price target forecasts made by analysts before the announcement date and since the previous earnings announcement date	Consistent with Miller's overpricing theory, we find that IPOs with a combination of high VU Score and small offering size are associated with more positive first-day returns and more negative lockup expiration returns.	We use the initial public offering (IPO) setting to provide evidence that the combination of valuation uncertainty and short-sales constraints generates significant equity market mispricing; deviations between price and fundamental value appear to be greatest when uncertainty is high (Zhang 2006) and short-sales constraints are binding	firms - IPOs	exploitable = IPOs with a combination of high uncertainty and small offering size are associated with more positive first-day returns and more negative lockup expiration returns; short-selling would help (reduce the constraints that generate mispricing); over time this uncertainty is reduced as the company acquires a history of earnings or lack of them, and the market indicates how it will value these earnings	obj = measure based on accntg data (incldg R&D, sales growth) [pre-IPO]	IPO; short-sales constraints; Miller's TH;	valuation uncertainty = deviations between price and fundamental value; uncertainty about future operating performance; reasonable men may differ in their forecasts; uncertainty about the success of new products or the profitability of a major business expansion; (i) it has above median pre-IPO sales growth, (ii) it reports a pre-IPO loss, and (iii) it has above median intangible intensity

Petrakis, P. E., Kostis, P. C., & Kafka, K. I. (2016). Secular stagnation, faltering innovation, and high uncertainty: New-era entrepreneurship appraisal using knowledge-based thinking. Journal of Business Research, 69(5), 1909-1913.	conceptual - model (box and arrow)	uncertainty refers to non-recurring events, which cannot provide precursor signs for the development of the future (cites Knight); hinders strategic decisions' ability to predict future developments;	[NOT consistent to KU, or diff to risk] five different levels of uncertainty (from a clear enough picture to a totally unknown future) and all are treatable (latter using low investment and flexibility)	study addresses the importance and centrality of strategic planning in decision-making processes, aiming to present a new framework of entrepreneurship appraisal that could be more efficient under conditions of high uncertainty and low rates of return than traditional evaluation methods, and could serve as tool to manage future challenges and develop a future competitive advantage; the level of uncertainty any enterprise faces, regardless of the sector or market in which that company operates, is not necessarily constant throughout the course of its business	traditional methods cannot incorporate the changing environment of low rates of return and high uncertainty; a need exists for new instruments to be used	individuals - entrepreneurs	scenario planning investigates possible future situations and helps in transforming uncertainty into a source of competitive advantage; creativity helps confronting high uncertainty and managing complex situations; cultural background and personality traits determine the behavior of individuals and societies under high uncertainty levels; strategies and evaluation methods are particularly important in dealing with uncertainty;	subj = personal characteristics in the model, so implied; speaks to firms that have a picture versus there being an objective reality; reality	creativity; strategic planning; scenario planning; entrepreneurship appraisal; Drucker;	trends that increase uncertainty characterize new-era conditions; (1) the new multipolar and globalized world; (2) the full competition and market liberalization conditions; (3) the hyper-competition; (4) the transformation from industry to the economy of services; (5) the empowerment of individuals against the changing conditions of globalization; (6) the aging of population; (7) the migration problem; (8) climate change; and (9) the disrupting technologies - their influences are inevitably unpredictable regarding the economies and the societies; lack of awareness;
Posen, H. E., Leiblein, M. J., & Chen, J. S. (2018). Toward a behavioral theory of real options: Noisy signals, bias, and learning. Strategic Management Journal, 39(4), 1112-1138.	conceptual - math model (options analysis)	"volatility"— uncertainty about the prospective (future) value of an asset.. options there is a second form of volatility—uncertainty about the contemporaneous (current) value of an asset.. uncertainty about the future = prospective uncertainty.. a firm has initial subjective beliefs regarding the value of an asset, receives feedback that is subject to *contemporaneous uncertainty* (i.e., noisy feedback).. *prospective uncertainty*. The business press often refers to this idea as "uncertainty," "volatility," or "project uncertainty".. if markets for real assets are incomplete, then real options are subject to contemporaneous uncertainty	[*CONSISTENT with defn of RISK; this is NOT uncertainty] variance - The extent of prospective uncertainty σp, In this standard option valuation formulation, the distribution of prospective uncertainty is assumed to be known.. it observes the noisy signal, ^s1,1ðÞ=s1,1ðÞ+σcεc where contemporaneous uncertainty is σc, and εc is a unit normal distribution.. The extent of both prospective and contemporaneous uncertainty (σp and σc) are assumed to be known to the decision-maker ex ante.. our model defines any particular real option by a single realization from both the prospective and contemporaneous uncertainty distributions	We develop a behavioral theory of real options that relaxes the informational and behavioral assumptions underlying applications of financial options theory to real assets. To do so, we augment real option theory's focus on uncertain future asset values (prospective uncertainty) with feedback learning theory that considers uncertain current asset values (contemporaneous uncertainty).	Model suggests that firms that inappropriately account for contemporaneous uncertainty and are subject to learning biases may experience substantial downside risk in undertaking real options. Moreover, contrary to the standard option result, greater uncertainty may decrease option value	firms	real option investment w/ waiting to learn about future; w/ proper updating rules	subjective beliefs & biases	real options + learning (behavioral TH) + belief updating optimization	about current factor value (noisy feedback at exercise time) + about future factor value; modeled mathematically as volatility/ variance [brownian motion]

Ramoglou, S. (2021). Knowable opportunities in an unknowable future? On the epistemological paradoxes of entrepreneurship theory. Journal of Business Venturing, 36(2), 106090.	conceptual - theory - critique/ clarification	Knightian uncertainty qua unknowability (Knight, 1921). We explain that its correct use alludes to the "epistemological limitations suffered by all agents trying to actualize a desirable state of the world. If properly used, it is meant to communicate an objective epistemological condition: "nobody can know opportunities ex ante"	[*OK, separates known from unknown relevant items*] This conceptual refinement helps us recognize the possibility of "partial knowledge" (Knight, 1921: 199) in a manner that prevents the conclusion of opportunity knowability. The reason is that any given ingredient is only part of a set of ingredients making any given opportunity. And even though one can know a single (or more) OI(s) one can never have full opportunity knowledge. Accordingly, the future is unknowable because the entirety of OIs is unknowable.. The existence of opportunities is, ex ante, unknowable, given the "indefinitely large number of [OIs]" (1921: 210) and "the unmanageable number of kinds of [opportunities] as wholes" (1921: 209).	It is often assumed that opportunities can be known ex ante in spite of the fact that the future is simultaneously acknowledged to be unknowable; we clarify subtle logical aspects underlying the meaningful use of the word "uncertainty" qua unknowability - when properly used, uncertainty reflects the epistemological assessment that enterprising actors may only believe – not know – that new ventures can succeed; when incorrectly used, uncertainty is misrepresented as an obstacle that can be overcome by some and not others.. This concerns the central "knowledge problem" (Townsend et al., 2018) of entrepreneurship, and may be articulated as follows: Are opportunities knowable?..	On the one hand, we submit that opportunities are ineliminably unknowable. On the other hand, however, we argue that there exist knowable Opportunity-Ingredients (OIs) whose knowability varies across contexts.. OIs concern the stable or unstable/observable or unobservable conditions of venture success. By contrast, EEs concern observable change and (typically) refer to the enablers of new venture creation (Davidsson et al., 2020	individuals - entrepreneurs	On the one hand, we submit that opportunities are ineliminably unknowable. On the other hand, however, we argue that there exist knowable Opportunity-Ingredients (OIs) whose knowability varies across contexts; OIs concern the stable or unstable/observable or unobservable conditions of venture success; toward the environmental affordances making both the creation of new ventures and their success possible; OI as a meaningful way of studying what may be knowable in conditions of Knightian uncertainty	obj = unknowability (is to all; not subjective); subj beliefs in reality & individual perceptions	Knight; language logic/ linguistic philosophy (Wittgenstein); definition of entrepreneurship; opportunity;	[concept vs sourced] ineradicable; veil; unmeasurable; unknowable; limits of human knowledge; ignorance; all human designs and acts are fraught with uncertainty; demand unpredictability; unknown unknowns; black swans;
Ramoglou, S., & McMullen, J. S. (2022). "what is an opportunity?": From theoretical mystification to everyday understanding. Academy of Management Review, (ja).	conceptual - theory - word games	Knightian uncertainty = unknowability; the totality of the conditions necessary for the actualization of desirable world-states can never be known in advance; bare minimum, an entrepreneur can never know whether destructive "black swans" will emerge.	OK.. entrepreneurs face Knightian uncertainty because opportunities do not exist prior to entrepreneurial action// The future cannot be known because entrepreneurs cannot know in advance whether the totality of the conditions necessary for the actualization of desired world-states exists// BUT then inconsistent b/c can ..take action and learn	we ask, "How do entrepreneurs use the word opportunity?" and elucidate an actualization theory of entrepreneurship attuned to the everyday understandings that underlie the meaningful use of the word; demonstrating how attention to the logic of ordinary language can alert us to theoretical dead-ends and enable the development of theory that bridges academic and everyday understandings	entrepreneur as chef = generic ingredients constrain what is possible, but the creation of delicious new dishes typically involves knowledge, skill, and effort; what can happen is up to the world – the entrepreneur has no say, but whether what can happen will actually happen is up to the agent – the world has no say [(?!)]; desired futures (A), venture activities (B), and conditions (C) necessary for the actualization of A via B. That is, the "what", "how", and "why" presupposed by opportunity expressions	individuals - entrepreneurs	taking action to learn if conditions exist to make a desirable world-state; can imagine non-actual world-states and actualize them with hard work [little about the actual learning process, or where beliefs/ imaginings come from]; learning about unknown 'constraints'	obj = totality of conditions exists in reality, waiting to be discovered; (subj = indiv beliefs of possibilities)	actualization theory; Wittgenstein; anti-intellectualist philosophy; authors' own (entrepreneurial action);	cannot know for a fact that there will be a large enough consumer base willing to buy at a profit-generating price; cutthroat competition and the presence of a stable institutional and macroeconomic environment can be further sources of uncertainty – not to mention the emergence of destructive "black swans", such as wars and pandemics; incomplete information
Rao, C. H. (1971). Uncertainty, entrepreneurship, and sharecropping in India. Journal of Political Economy, 79(3), 578-595.	empirical - gov't study	U = incomplete knowledge regarding the actual realizable input-output rates as well as the prices and the consequent necessity of acting upon judgment or opinion rather than knowledge (Knight); uncertainty may exist in the sense that the returns from the crop chosen can be identified only with a probability distribution of potential outcomes and not with a unique outcome;	[*NOT consistent - measured output of choice in variance rather than input of unknowns*] measured a variance in profits (under different arrangement); guaranteeing of fixed contractual returns and the emergence of profit as the residual are, therefore, necessary consequences of uncertainty involving entrepreneurial judgment and decision making;	study attempts to explain the coexistence of different farm lease arrangements in terms of the varying significance of entrepreneurial functions;	in India, crop-sharing arrangements are common in areas of relative economic certainty with very little scope for decision making;	farms & individual entrepreneurs	under high uncertainty, large farm size is favored for reducing risk; fixed-cash rents are common in situations of high uncertainty where the scope for decision making is significant or where the crops are highly profitable; fixed-kind rents settled in advance of production imply the sharing of price uncertainties but allocate the yield risks entirely to the tenants; under high degree of uncertainty, managerial diseconomies of large size may be outweighed by the benefits from the reduction of risk due to the operation of the law of large numbers; small landowners and landless laborers would opt for fixed earnings by hiring out their services in situations of high uncertainty;	subj = interpersonal differences in judgments based on differing anticipations regarding prices, yields, etc; reality; obj = variance in profits (under different choices);	farming; sharecropping; economics; Knight; Arrow; risk; diversification;	the returns from any two competing crops reveal a high degree of variance; unpredictable prices and output rates from crops (due to weather); conditions of production in agriculture are extremely varying;

Rapp, D. J., & Olbrich, M. (2023). From Knightian uncertainty to real-structuredness: Further opening the judgment black box. Strategic Entrepreneurship Journal, 17(1), 186-209.	conceptual - box and arrow; typology	U = when outcomes cannot be predicted according to known probabilities; a situation in which neither a priori nor statistical probabilities exist (Knight), and formalized decision rules are inapplicable;	[*CONSISTENT language altho treatment is inconsistent; NOT consistent by mixing TH with reality in modeling U and then commenting on how 'real' people act and succeed; NOT consistent by making a static definition into a dynamic treatment -] entrepreneurs do not simply act at random and hope for the best; instead, they explicitly or implicitly address a diverse set of decision problem characteristics utilizing different types of judgment in a relatively structured manner, ultimately aiming for purposeful action;	entrepreneurial judgment remains a concept that resembles a black box; attempt to further open that black box by developing a dimensionalization of types of judgment;	explicitly link entrepreneurship to Simonian themes by integrating the notion of decision problem structures into the judgment-based approach to entrepreneurship; perceived real-structuredness results from the absence of at least one of the four characteristics of well-structured problems = causality (limited knowledge of options and/or outcomes), appraisability (lack of expertise to appraise different outcomes), solvability (lack of an algorithm to find the best solution), and goal (unknown or competing ends) characteristics; Table 2 as a list of 'what' can be unknown;	individuals - entrepreneurs	judgment (making decisions without knowing the consequences for sure); different elements of judgment, namely skills and experience, creativity, and uncertainty preferences; split up given problem into subproblems that are solved and combine the partial solutions into a satisficing whole (Fig 2); recursive process; so, learning over time; apply heuristics and update;	subj = indiv perceptions; reality; not obj facts;	effectuation; heuristic; ill-structuredness; judgment-based approach; knowledge problems; real structuredness;	unknown demand; unknown probabilities; unknown goals; partially known options and outcomes;
Rindova, V., & Courtney, H. (2020). To shape or adapt: Knowledge problems, epistemologies, and strategic postures under Knightian uncertainty. Academy of Management Review, 45(4), 787-807.	conceptual - theory - framewrk	Knightian U = the distribution of the outcome in a group of instances is NOT known (neither through calculation a priori nor from statistics of past experience).. strategists face uncertainty, rather than risk, when they make significant investment decisions in markets that are changing in complex and unpredictable ways.. uncertain situations involve new and unpredictable interactions with unknown consequences, including unpredictable competitive interactions	[**INCONSISTENT**] U moves from KU to a knowable unknown - through discovery (adapting, diversify, real options = generate more knowledge) or through shaping (design = create new knowledge to the market actors to influence them) the 'new' market	we build on Knight's and Shackle's seminal ideas about how strategists address the incomplete knowledge problems that uncertainty poses. We argue that strategists adopt two distinct strategic postures when crafting strategies in uncertain markets—shaping and adapting—and theorize their constituent elements: intentions, epistemologies, and enactment strategies	[*admission of bait-and-switch =] we focused on the paths and possibilities for knowledge generation, rather than on knowledge limitations, and on the different approaches to knowledge generation when firms adopt shaping versus adapting postures.	individuals - strategists	shaping & adapting; generate additional knowledge; exploration, learning, adaptation, and transformation; action; incremental resource allocations to explore multiple emergent directions vs 'big bets resource commitments to create and enact a new market order	subj = social construction; intentions; pragmatism;	Knight/ Shackle - incomplete knowledge problems; adapting strategies; resource investments; effectuation; Arrow's subjectivity; epistemologies (science vs design)	markets that are changing in complex and unpredictable ways; involve new and unpredictable interactions with unknown consequences, including unpredictable competitive interactions
Ross, J. M., Fisch, J. H., & Varga, E. (2018). Unlocking the value of real options: How firm-specific learning conditions affect R&D investments under uncertainty. Strategic Entrepreneurship Journal, 12(3), 335-353.	empirical - (panel)	demand uncertainty mostly, although other forms alluded to - the role of both *firm-specific* and *industry-wide uncertainty*; the level of uncertainty about demand, this shadow value is influenced by a firm's ability to learn about uncertain variables and to lower the cost of commercialization; hence, both firm-specific and industry-wide sources of uncertainty are important (Knight cited about rents); NO formal definition	[? given no formal definition; speaks to known unknowns, so it is consistent that way; NOT KU, just RISK*] demand U only - For the measure of uncertainty, we follow prior work that focuses on the randomness in demand, which influences prices and cost and determines profitability (Folta & O'Brien, 2004). Specifically, we derived a proxy for uncertainty from estimating a statistical model of the process that determines the conditional variance of an aggregate indicator at the industry level, such as price level or industry output - we estimate GARCH (1,1) models on a time series of monthly industry sales at the three-digit NACE level provided by Destatis for the period 1995–2008	Why do some firms increase R&D investments in the face of uncertainty, while others do not? Contrary to common wisdom, this study posits that uncertainty prompts firms to invest in R&D. The value to invest under uncertainty is, however, bounded by a firm's learning conditions	lots of U talked about, only one measured - a negative effect of demand uncertainty; differ in relative sources of uncertainty; this ***total uncertainty*** (including both unsystematic and systematic components; Instead of waiting and seeing until uncertainty resolves, a firm may undertake an initial investment in order to actively learn about uncertain variables prior to making full-scale investments; ***residual uncertainty*** after learning has taken place prevents fast imitation by others (Lippman & Rumelt, 1982; Rumelt, 1987); Since uncertainty bounds learning and learning can reduce uncertainty, the value to invest in R&D is, therefore, determined by the link between uncertainty and a firm's expected learning rate (Ghemawat, 1991)	firms	options investments to learn; waiting; shadow value; R&D as an option; context matters (ind maturity; firm HR); thru learning (from R&D)	obj (as measured) in a statistical model of variance	real options and learning	firm-specific (production cost) and industry-wide U (demand); given/ exogenous [organization-environment interactions that bound the ex ante value of investing]

Russell, R. D., & Russell, C. J. (1992). An examination of the effects of organizational norms, organizational structure, and environmental uncertainty on entrepreneurial strategy. Journal of Management, 18(4), 639-656.	empirical - survey	environmental U = complexity and dynamism; unpredictable final outcomes; inability to define appropriate means; strategies cannot be formulated and controlled rationally and deliberately;	[*consistent with definition - given based on the measure; NOT consistent with the description of unpredictability and inability to strategize*] environmental U from Miller & Friesen scale (10 items +2 more)	present and test a model of known macro-level antecedents to corporate entrepreneurship (and innovation-supporting behaviors)	the association between uncertainty and increased innovation in entrepreneurial firms exists [ONLY] when innovation-supporting norms are present	indiviiduals - in SBUs	chaotic process of trial and error; process orientation; select initiatives and give them meaning; increased innovation; organic organizational structures; decentralization; diversification; mutual adjustment; informal info exchange; norms and shared beliefs;	subj = perceptions; survey; reality;	strategy; structure; innovation; corporate entrepreneurship	innovation processes; unpredictable final outcomes; inability to define appropriate means of achieving a desired innovation prior to engaging in the process; complexity and dynamism; changes in consumer demand, technology, rivalry;
Schmitt, A., Rosing, K., Zhang, S. X., & Leatherbee, M. (2018). A dynamic model of entrepreneurial uncertainty and business opportunity identification: Exploration as a mediator and entrepreneurial self-efficacy as a moderator. Entrepreneurship Theory and Practice, 42(6), 835-859.	empirical - panel field study	technology aspects and product or service demands have frequently been considered by entrepreneurship research as the most important sources of uncertainty; can't predict or control;	[*?* questionable consistency given Qs do NOT contain the direct measure of lack of predictability or control] knowable unknowns = exploration; U was defined as the perceived inability to predict changes in the environment due to technological innovations and fluctuations in the demand for one's products or services (McKelvie et al., 2011). Uncertainty was measured by two items based on Milliken's (1987) concept of state uncertainty. Participants were confronted with pairs of statements referring to high versus low uncertainty and they had to indicate a mark closer to the statement that best represented their current situation on a 5-point scale (McKelvie et al., 2011). The items are: "The fluctuation in the demand for your product is moderate and steady" (low uncertainty) versus "The demand for your product will fluctuate significantly" (high uncertainty) and "Future technological innovations affecting the viability of the product seem likely, but they are likely to be incremental (not discontinuous)" (low uncertainty) versus "Future technological innovations affecting the viability of the product are likely to be frequent and major" (high uncertainty).	How do entrepreneurs identify business opportunities under varying levels of uncertainty over time? studying the dynamic relationship between perceived uncertainty and opportunity identification within entrepreneurs… explore	Multilevel regression analyses reveal that an increase in the level of perceived uncertainty within entrepreneurs predicted the identification of opportunities through exploration for entrepreneurs high in self-efficacy, but not for those low in self-efficacy. While entrepreneurs perceive relatively high levels of uncertainty in general, their perception of uncertainty is not static but instead fluctuates dynamically over time. Some approaches suggest that perceived uncertainty may increase exploration in entrepreneurs, while others suggest precisely the opposite	individuals - entrepreneurs	exploration w/ self-efficacy; search; activities of review or redesign	subj = perceived U;	Milliken's U types; entropy model of U (Hirsh); entrepreneurial action; self-efficacy	technology aspects and product or service demands have frequently been considered by entrepreneurship research as the most important sources of uncertainty
Schubert, T., Baier, E., & Rammer, C. (2018). Firm capabilities, technological dynamism and the internationalisation of innovation: A behavioural approach. Journal of International Business Studies, 49(1), 70-95.	empirical - survey	uncertainty about the direction technological change b/c decisively affect the *risk* and returns with innovation; unclear which technology will succeed; unpredictability/ instability [no clear formal definition]; knowledge is heterogeneous between firms and more likely to be globally dispersed?;	[*?* does not measure UNpredictability or instability directly] [survey - perception by managers - one dim only = predictability*]: "Technological development is difficult to predict" as an indicator for technological uncertainty (from statement does not apply to item applies fully); "Products become outdated quickly" (instability proxy)	we argue that technological uncertainty in the firm's environment affects its risk preferences differently depending on its technological capabilities; high-capability firms' tendency to concentrate innovation at the home-base when faced by high uncertainty.	develop a behavioural framework of bounded rational decision-making under uncertainty to analyse the role of technological dynamism in the firm's environment for its decision to internationalise innovation	firms	firms with low capabilities will internationalise innovation when faced by technological uncertainty; high-capability firms' tendency to concentrate innovation at the home-base when faced by high uncertainty	subj = knowledge is heterogeneous; use of survey (perceptions)	prospect TH; satisficing	technological change - direction and speed; hi speed and unknown direction = unstable (vs merely unpredictable); knowledge heterogenous
Schwab, A. (2018). Investigating and communicating the uncertainty of effects: The power of graphs. Entrepreneurship Theory and Practice, 42(6), 823-834.	conceptual - editorial - use of graphs to comm U	U = the observed distribution of effects and outcomes [empirical measures of variance/ volatility/ noise] [this is RISK]	[*consistent with depicting variance forms of noise; this is NOT KU/ uncertainty - as ex ante unknowability] ..graphically measured after the fact as noise..	This editorial argues that graphs communicating the distribution of observed effects offer a far more useful way to communicate, evaluate, and discuss uncertainty	Given the uncertainty inherently associated with entrepreneurial activities, meaningful propositions have to be probability statements;.development of meaningful entrepreneurship theory, however, depends on explicitly modeling and discussing details about the uncertainty associated with hypothesized effects	individuals - entrepreneurs + researchers/ readers	better graphs and figures to depict multiple dimensions of measured U; - measured	obj = in measured amount	Bayes; statistical; graphing; visualization; communications	anything in any study on ENT

Shepherd, D. A., Williams, T. A., & Patzelt, H. (2015). Thinking about entrepreneurial decision making: Review and research agenda. Journal of Management, 41(1), 11-46.	conceptual - lit review	uncertainty (citing Knight); procedural U; environmental U; market U; technological U; competency U; lack adequate information; labels and cites; [NO definitions**]	[given NO definitions, NO measures; no consistency**] many different versions (of what); confusions with risk and ambiguity; unhelpful as a literature review on this subject	review of the literature on judgment and decision making in entrepreneurship; categorize articles into a framework (of ENT process steps); analyze context; integrate studies; offer an agenda for future research;	[a literature review about entrepreneurship and its decision-making without tackling uncertainty [?!?]]	individuals - entrepreneurs	heuristics; planning; use of champions; learning; experiment;	subj = heterogeneous agents; perceived uncertainty;	entrepreneurial decision making; author's entrepreneurial action; judgment; Knight;	rate of technological change, and the predictability of the impact of technological change; lower predictability of the impact of demand change; complexity, and change;
Shermon, A., & Moeen, M. (2022). Zooming In or Zooming Out: Entrants' Product Portfolios in the Nascent Drone Industry. Strategic Management Journal. 1-36, ja; 10.1002/smj.3407	empirical - panel	[*what is uncertain is defined; how it is uncertain is NOT - in state v probability*] demand uncertainty = they face insufficient demand knowledge about customers' evolving preferences; in nascent industries; insufficient knowledge about which segments exist and how each segment's commercial viability evolves, thereby making revenue estimations difficult; unknown opportunities... which implies partial knowledge about explicit and latent, functional and price preferences of current and emerging customer segments. Two aspects of demand uncertainty can complicate the above decision-making process. First, the nature and size of customer segments are often not fully known. Inventors may not foresee all the customer segments that a novel product ultimately targets. Second, complete knowledge of customer preferences is often lacking	[*NOT measured - ALL segments in industry assumed uncertain; lacked information - had widely varying demand predictions*] for each segment, customers' preferences and drones' integration into the task workflow were initially unknown.	Although scholars have examined interrelated aspects of entry strategy such as whether and when to enter and technology choices, antecedents of product portfolio strategies in nascent industries remain understudied. To address this research gap, this article explores entrants' pre-entry experience as an influential antecedent.	Faced with demand uncertainty and heterogeneity in a nascent industry, entrants often consider how many customer segments to serve by tailoring the usage breadth of their product portfolios. Portfolio usage breadth is the extent to which products in a portfolio collectively span distinct customer segments. We suggest that when entrants have use experience in contexts that are potential users of the new product, their portfolios exhibit low usage breadth, due to demand-oriented cognition and knowledge.	individuals - entrepreneurs (+ firms)	broader exploration in absence of use experience links to a more systemic tackling of knowledge shortage in many uncertain unfamiliar segments; diversity in approaches can aggregate to a collective knowledge base and reduce industry-wide uncertainty;	obj = assumed that these new industry segments entailed 'known' uncertainty; (subj in reality?; different levels depending on experience in segment)	entry strategy; nascent industries; product portfolio; innovation;	insufficient demand knowledge about customers' evolving preferences; novelty; demand uncertainty implies insufficient knowledge about which segments exist and how each segment's commercial viability evolves; demand heterogeneity exists when customers vary in the relative importance that they assign to each attribute, implying differential willingness to pay and performance thresholds; partial knowledge about explicit and latent, functional and price preferences of current and emerging customer segments + fluctuations over time
Sniazhko, S. (2019). Uncertainty in decision-making: A review of the international business literature. Cogent Business & Management, 6(1), 1650692.	conceptual - lit review	defined as the lack of knowledge about the probabilities of the future state of events (Knightian);	[inconsistent if trying to reduce or cope with KU] thirteen dimensions of uncertainty and eight approaches to managing it; inability of a decision-maker to eliminate uncertainty completely constrains the effectiveness of decision-making and requires the adoption of approaches that either help to reduce, or to cope with, uncertainty;	based on this systematic review, the paper makes three main critical observations about existing research: inconsistency in the conceptualization and measurement of uncertainty, lack of diversity regarding the dimensions of uncertainty included in single studies, and downplaying the role of individual decision-makers; a research agenda is presented that offers suggestions; addresses the inconsistent conceptualization and measurement of uncertainty by organizing and synthesizing the dimensions of uncertainty into an integrative framework that should be useful to scholars in this field	the IB literature lacks clear distinctions between different dimensions of uncertainty and often treats the concept inconsistently; inconsistency is problematic because it provides conflicting results about MNCs' decision-making under uncertainty, impedes knowledge development and a systematic treatment of uncertainty, and presents an incomplete picture of the role uncertainty plays in international decision-making; may result in misleading perceptions of the real environment and subsequently to risky and unjustified decisions; not including a wider spectrum of uncertainties within single studies prevents us from understanding the relationships between them; only partial explanations for MNC decision-making	firms & individuals-multinatls	eight approaches: reducing [Information gathering, Proactive collaboration/ Cooperation, Networking]; coping [Flexibility, Imitation, Reactive collaboration/Cooperation, Control, Avoidance]	subj = when researching managers (and their traits); reality; obj = study measures often at this level when not surveys;	IB/ MNC; Knight; decision-making; Miller (1982);	Environmental uncertainty [(U1) Economic uncertainty (U2) Political uncertainty (U3) Government uncertainty (U4) Cultural uncertainty (U5) Discontinuous uncertainty]; Industry uncertainty [(U6) Input uncertainty (U7) Demand uncertainty (U8) Competition uncertainty (U9) Technological uncertainty]; Firm uncertainty [(U10) Behavioral uncertainty (U11) R&D uncertainty (U12) Operating uncertainty (U13) Previous experience]; unpredictability of factors (exchange rates; economic output; political developments)

Srećković, M. (2018). The performance effect of network and managerial capabilities of entrepreneurial firms. Small Business Economics, 50(4), 807-824.	empiric al -	Environmental dynamism or uncertainty "is characterized by the rate of change and innovation in the industry, as well as the uncertainty or unpredictability of actions of competitors and customers" (Miller and Friesen 1983:222).	[*OK* perceptions of market conditions*] Environmental uncertainty (EU) was measured with three items, based on Miller and Dröge (1986) and Miller and Friesen (1983), using the 7-point Likert scale (Cronbach's alpha = 0.799): 1. The market environment is changing very rapidly 2. Demand and tastes are unpredictable 3. The prices of products/services change frequently	Starting from differences in entrepreneurial orientation between architecture and real estate development firms, we argue that under higher environmental uncertainty, network capabilities are more important for the performance of architecture firms whereas managerial capabilities are more important for the performance of real estate development firms	we differentiate between the entrepreneurial firm, which is similar to the entrepreneurial organization defined by Mintzberg (1973) and the adaptive firm (Mintzberg 1973	firms (also speaks to individu al ENTr/ manager s)	network capabilities are more important for the performance of architecture firms whereas managerial capabilities are more important for the performance of real estate development firms	subj = survey (3-item likert scale perceptions); also speaks to obj U in theory	Porter's value chain model and Grant's hierarchy of organizational capabilities; Mintzberg; dynamic capabilities;	environmental U = the rate of change and innovation in the industry, as well as the uncertainty or unpredictability of actions of competitors and customers
Strausz, R. (2017). A theory of crowdfunding: A mechanism design approach with demand uncertainty and moral hazard. American Economic Review, 107(6), 1430-1476.	empiric al - survey (China)	U = dynamic environment; information is often inaccurate, unavailable, or obsolete; the possible lagged or conflicting feedback from environments; [no explicit definition, altho Knight cited; and unknown a cause]; unpredictability more seen explicitly as a characteristic of dynamics	[*NOT consistent - dynamics in terms of information issues not captured in dynamics measure (which is the main U score as context); more consistent with intolerance measure (which is an indiv-level moderator), but no given definitions of surprise or uncertainty given altho unforeseen events and lack of info are consistent*] intolerance of uncertainty was measured with a 12-item scale from Carleton et al. (2007); typical items include "Uncertainty makes me uneasy, anxious, or stressed" (unforeseen events, doubt, not full info, surprises); used entrepreneurs' perception of the work environment to measure dynamic work environments by the three-item scale from De Hoogh et al. (2005), typical item was "your work environment is dynamic." (+ great opps for change + extent of challenge);	exploring how dynamic environments affect entrepreneur behaviors; this study explains the current phenomenon of emergence of leader's humility and provides a better understanding of the influence of dynamic work environments;	we propose that dynamic environments may contribute entrepreneurs to exhibit more humble leader behaviors; uncertainty can motivate people to exhibit more specific behaviors to reduce uncertainty; feedback-seeking has been shown as an effective way to reduce the uncertainty brought by dynamic external environments; enables people to understand their strengths and weaknesses better, to acknowledge others' thoughts and understand them well, and receive different information and ideas from all kinds of levels in this field; individuals with high intolerance of uncertainty may tend to react in a negative way to dynamic environments;	individu als - entrepre neurs	leaders can react by seeking feedbacks, which would exhibit more humble leader behaviors; show more respect and appreciation to their employees to get more help from them and make full use of collective intelligence; avoid cognitive biases brought by inflated egos and undertake a more accurate self-evaluation; appreciate and welcome new things; [more learning over time, based on feedback]; collect more information about other team members, such as ideas, thoughts, and potential;	subj = survey; perceptions; reality;	dynamic work environments; humble leader behaviors; feedback-seeking behavior; uncertainty reduction theory; intolerance of uncertainty;	imperfect and unbalanced legal and financial supports, relatively unpredictable market demand, rapidly upgrading technologies, and fierce competition; environmental dynamics; rapid and discontinuous change in demand, competitors, technology and/or regulation, such that information is often inaccurate, unavailable, or obsolete; the possible lagged or conflicting feedback from environments;
Subramanian, H., Mitra, S., & Ransbotham, S. (2021). Capturing value in platform business models that rely on user-generated content. Organization Science, 32(3), 804-823.	empiric al - panel	[UNDER-DEFINED - no explicit specification of unknowns and their characteristics] uncertain valuation (of a target firm) = unknown value of target? .due to its generated content?	[*?* NOT DIRECTLY MEASURED input or outcome** assumed that different platform types have different relationships with contextual factors on valuation (purchase price)]	the valuation of platform firms that rely on inputs outside traditional firm boundaries remains an important open question; how can platform firms capture value from user-generated content?	We argue that the type of user-generated content affects switching costs for the user and, thus, affects the value a platform can capture. Using data about the valuation, traffic, and other parameters from several sources, empirical results indicate greater value uncertainty in platforms with user-generated content than in platforms based on firm-generated content	firms	firms with interaction content can better capture value from network effects through higher switching costs than firms with user-contributed content; switching costs substitute for formal contracts that are infeasible for user generated content + providing functionality not easily replicated by alternative platforms; age/ time	obj = (implied) firms with platform/ UGC dependence	network effects; platform strategy; business models; firm boundaries; switching costs;	uncertainty on how user generated content (UGC) creates value—and who benefits from it—because voluntary user contributions cannot be mandated or contracted or its quality assured; high current usage may not translate into future profits when switching costs are low; user engagement may be ephemeral because of low entry barriers and low switching costs; changing dynamics of trust and privacy can prevent the firm from effectively monetizing
Suddaby, R., Israelsen, T., Robert Mitchell, J., & Lim, D. S. (2023). Entrepreneurial visions as rhetorical history: A diegetic narrative model of stakeholder enrollment. Academy of Management Review, 48(2), 220-243.	concept ual - 'trop'olo gy; verbal argume nts	the future is unknown; market opportunity cannot be predicted ex ante; when outcomes are unknowable; [*U is ill-defined; mostly mixed with risk in the text*]	[*NOT consistent, partly b/c the definition is poor/ mixed with risk concept; partly b/c there is no measure, given the conceptual nature of the paper; partly b/c 'the project' has historically arguable analogies, so has a basis for some {subjective} knowability'; AND, nothing to stop delay and learning from taking place for some stakeholders*] engage in a risky and uncertain proposed project; ability to make that future SEEM less risky than it actually is;	How do entrepreneurs convince potential stakeholders to place valuable resources at risk in the present for an entrepreneurial project in an uncertain future? how do entrepreneurs construct narratives that unite stakeholders with different perceptions of uncertainty about the future and persuade them to engage in collective action?	challenge for entrepreneurs, however, is how to construct a narrative that unites stakeholders with different perceptions of the degree of risk or uncertainty posed by the future; address this question with a diegetic narrative model of stakeholder enrollment; to reduce variation in how potential stakeholders view the future, a story must embed a vision of the future in a coherent and collectively held narrative of the past;	individu als - entrepre neurs & stakehol ders	persuade stakeholders to engage in risky projects in an uncertain future through visions, compelling narratives of the future; a story must embed a vision of the future in a coherent and collectively held narrative of the past; placing it in a broader narrative of a known past informed by a community's collective memory;	subj = perceptions; stakeholders often rely on subjective information;	rhetorical history; storytelling; narratives; stakeholders; historical reasoning; tropes; authors' own work;	technological and scientific innovation; revolutionary change; social change; instability;

Tang, Y., & Wezel, F. C. (2015). Up to standard?: Market positioning and performance of Hong Kong films, 1975–1997. Journal of Business Venturing, 30(3), 452-466.	empirical - historical event analysis	market U = challenges the status quo and elicits different beliefs among actors;	[? difficult to determine - a blunt counter does not capture belief updating over time; no measure of actors' beliefs] U event = transfer of sovereignty over Hong Kong from the United Kingdom to China in 1997; 23-yr pre-event was 'a period that was marked by substantial market uncertainty'; presumption is that, as the impending handover drew closer, market participants perceived greater uncertainty; for any year between 1975 and 1983, the indicator of market uncertainty was coded as 0, the indicator has a value of 1 for 1984, and a value of 14 for 1997;	we predict that the propensity of entrants to blend multiple categories increases with market uncertainty; RQs = conditions are market entrants more likely to blend market categories, and when are they rewarded for doing so?	differentiation is rewarded only within the confines of taken-for-granted market categories; entrepreneurs, however, routinely engage in combining existing market categories; paper attempts to reconcile these seemingly different views by focusing on the role of market uncertainty; the analysis of a large sample of Hong Kong films during 1975–1997;	by inidv film as indiv project/ ventures (?) [what about studios?]	by proposing offerings that blend market categories, entrants do try to seize such emerging opportunities under U; span (diversify) but do so differently than rivals, as U increases	obj = countdown to governing switch; (regardless if felt individually)	market positioning; category spanning; differentiation; film industry;	transition of governing body from British to Chinese in 1990s; political, regulatory, institutional unpredictability (though could observe events in China and Taiwan itself); enterprising actors adventure into uncharted waters = films spanning categories??; reduced the confidence of consumers and their spending not only in durable goods but also in non-durable ones; no one could say for sure how a communist and a capitalist system would function together in harmony; mass emmigration; high volatility of economy;
Townsend, D. M., Hunt, R. A., McMullen, J. S., & Sarasvathy, S. D. (2018). Uncertainty, knowledge problems, and entrepreneurial action. Academy of Management Annals, 12(2), 659-687.	conceptual - lit review w/ theory, typology	unknowingness - three sources of unknowingness that have been consistently and errantly subsumed by conceptions of uncertainty in contemporary entrepreneurial action research: complexity, ambiguity, and equivocality; if uncertainty is defined as a structural feature of the objective world, *few remedies exist to resolve it because the information simply does not exist*. If uncertainty describes the ignorance of the individual actor, they can resolve it by exploring the external world until the "correct" information is discovered. However, if uncertainty is defined as a fuzzy, unclear set of subjective perspectives or preferences, entrepreneurial actions intended to influence these environments can reduce the overall level of "uncertainty" by creating intersubjective agreement.	[**INCONSISTENT** for U] => probabilistic environment (if-then) [outcome U only] with the prescription that the discovery of critical data through entrepreneurial action will resolve the knowledge problem.... [knowable unknown]	literature review with … we then set forth a multilevel research agenda for exploring entrepreneurial action under conditions of ambiguity, complexity, equivocality, and uncertainty	Knightian uncertainty as a precursor to profit-making, the identification, description, and operationalization of uncertainty as a construct continue to exhibit conflicting definitions, tautological measures, and unwitting conflation with more precise constructs along the spectrum of ignorance and unknowingness	individuals - entrepreneurs	apply entrepreneurial action (responding to the constraints of the environment and in enacting various organizing mechanisms); social influence; collect information; search; more data can complicate decision-making though; framing [(kitchen sink?)]	subj & obj; structural & personal; review of lit	THs of authors = entrepreneurial action + effectuation; Knight; March; bricolage; Simon;	three sources of unknowingness that have been consistently and errantly subsumed by conceptions of uncertainty in contemporary entrepreneurial action research: complexity, ambiguity, and equivocality (+ usual exog and endog sources, like novelty)

Trigeorgis, L., & Reuer, J. J. (2017). Real options theory in strategic management. Strategic Management Journal, 38(1), 42-63.	conceptual - lit eview	to defer or stage market entry when facing *exogenous, market demand uncertainty*.. Learning- value of investing hinges on reduced *endogenous uncertainty*.. Real option terms may also differ across firms, driving heterogeneous firm behavior (e.g., a firm facing less *firm-specific uncertainty* than a rival may enter first, gaining first-mover advantages).. is that many different uncertainties can affect their value, and thus, firms' investment behavior … broadly classified into *exogenous uncertainties* (e.g., market demand or some competitive uncertainty such as from random entry), *endogenous uncertainties* (e.g., technological uncertainty that might be resolved through further learning-type investment, or *behavioral uncertainties* such as arising from the behavior of a JV partner, or other uncertainties over which the firm may have some, but perhaps limited, influence such as through non-market strategies to shape political risk. [mostly RISKS]	[*speaks to RISKS, not actual uncertainty - given real options; NO KU here] variance - as in traditional ROT; dynamic and unpredictable environments; many description of what is risky, and its resolution over time	This article provides a review of real options theory (ROT) in strategic management research. We review the fundamentals of ROT and provide a taxonomy of this research	Uncertainty, a key driver in ROT,.. The fundamental decision asymmetry of options involving the right but not the obligation to act also gives rise to an asymmetry in firm outcomes in the presence of uncertainty.. Uncertainty leverages the impact of decision flexibility and opens a window of opportunity that can be a source of value rather than a penalty per se	individuals - managers	real options - identify shadow options, create them, manage them, exercise them	obj (but could be adjusted for subj), as calculable w/ options	real options TH (U as beneficial [to opportunity])	ususual exogenous variance/ volatility of factor's value (into the future) [demand] + endogenous [technological] + behavioral
Vedula, S., & Matusik, S. F. (2017). Geographic, network, and competitor social cues: evidence from US venture capitalists internationalization decisions. Strategic Entrepreneurship Journal, 11(4), 393-421.	empirical - panel	U = cannot draw on previous experience; volatile [no formal defn]	[*although no formal definition, NOT consistent with the idea that previous experience cannot be drawn upon just b/c this is volatility*] U not measured directly… a control used for volatility = "performance volatility". To do so, we followed Gaba and Terlaak (2013) and calculated the standard deviation of the number of start-ups taken public over the course of the rolling window period. This variable controls for the performance-related uncertainty (not specifically related to internationalization) experienced by the firm. PLUS To account for this temporal variability in deal flow, we followed prior research and included a measure of marketplace volatility, computed as the annual standard deviation in the daily value-weighted excess return on the NASDAQ (e.g., Beckmanetal.,2004; Gaba & Terlaak, 2013).	We examine how social cues drive strategic decision-making under uncertainty, specifically in the context of U.S. VC firms' first internationalization decisions. We aim to contribute to research on inter-organizational imitation by better developing our understanding of what types of social cues are most relevant in driving firms' imitative behaviors	Early foundational studies showed that firms imitate their peers when faced with uncertain decisions (e.g., DiMaggio & Powell, 1983; Haunschild & Miner, 1997; Levitt & March, 1988; Martin, Swaminathan, & Mitchell, 1998; Podolny, 1994)..firms that operate in uncertain environments do not automatically imitate the actions of their peers—rather the extent to which they either follow or ignore their peers is conditioned by the nature of information inherent in observable social cues as well as the idiosyncratic ways in which firms process information (Gaba&Terlaak,2013;Simon &Lieberman,2010; Strang&Still,2006)... [issue of causal ambiguity]	firms	imitation; informational cues; experience (local)	obj = measured as performance volatility (std dev of startup #) + market volatility (std dev of excess returns on NASDAQ); subj = perceived value of info in new context	imitation; informational cues;	causal ambiguity in social cues; exogenous unfamiliar environments (expanding to new countries)

Vilanova, L., & Vitanova, I. (2020). Unwrapping opportunity confidence: how do different types of feasibility beliefs affect venture emergence?. Small Business Economics, 55(1), 215-236.	empirical - PSED data	PEU has been defined as the nascent entrepreneur's perceptions of his/ her ability to understand or to predict the state of various environmental conditions (. PEU also apprehends the extent to which the nascent entrepreneur anticipates that environmental conditions are favorable (if perceived uncertainty is low) or unfavorable (if perceived uncertainty is high) for accomplishing key startup activities and reaching important milestones	[*consistent w/ defn or PEU*perceptions of capabilities vs of envir directly**] To ascertain low PEU, we used responses to the following 11-item question (Cronbach's alpha = 0.82): Considering the economic and community context for the new firm, how certain are you that the new business will be able to accomplish the following? The 11 items address obtaining raw materials, attracting employees; obtaining startup capital; obtaining working capital; dealing with distributors; attracting customers; competing with other firms; complying with local, state, and federal regulations; keeping up with technological advances; obtaining help from a bank; and obtaining help from venture capital (Liao and Gartner 2006; Matthew and Human 2004).	Findings that self-efficacy and how perceived uncertainty have distinct effects suggest that focusing solely on one type of belief or on a multi-dimensional construct of opportunity confidence is problematic; our results suggest instead that (downward) biased perceptions of environmental uncertainty (rather than excessive self-efficacy) might be the main driver of nascent entrepreneurs' failure to make their venture operational	examines whether and how entrepreneurial self-efficacy and how perceived environmental uncertainty—two feasibility beliefs that are assumed to increase the opportunity confidence of nascent entrepreneurs—have distinct or similar effects on venture emergence; how perceived environmental uncertainty induces other more complex and less favorable effects	individuals - entrepreneurs	(downward) biased perceptions of environmental uncertainty (rather than excessive self-efficacy) might be the main driver of nascent entrepreneurs' failure to make their venture operational	subj = perceived U; PEU; PSED1 survey;	nascent entrepreneurs; entrepreneurial action; self-efficacy; beliefs; Milliken's 3Us;	environmental U = the unknowable external environment; unpredictable environment + how that will impact the firm + consequences of action; survey Qs about dealing with suppliers, customers, regulators, partners, employees
Wang, Y. (2022). Uncertainty, entrepreneurship, and the organization of corruption. Small Business Economics, 58:121–139	conceptual - theory - math model w/ propositions & proofs	[UNDER-DEFINED] corruption-induced uncertainty = lack of knowledge of bribe that must be paid (and hence ENT income); implied; unknowingness NOT specified in text, but IS in model	[*?* Ok, but simply variance *CONSISTENCY undetermined*; this is RISK, not U; lack of knowledge NOT measured] X is a measure of uncertainty. An increase in X implies an increase in the variance of x; x is a positively valued random variable following a uniform distribution w/ known interval*; the value of x is realized at the time that bribes are demanded, which is unobservable to private individuals and intermediaries when loans are made, and occupations are chosen.. the appearance of the random variable x which apparently makes the bribe random, and hence the return to entrepreneurship. In this way, corruption creates uncertainty for private individuals about the relative payoffs from the advanced occupation; X determines the spread of the distribution of x, which provides a measure of uncertainty about bribe payments	This paper has integrated two new ingredients into the traditional occupational choice framework: financial market imperfection due to asymmetric information between entrepreneurs and financial intermediaries, and public-sector imperfection due to rent-seeking induced uncertainty on bribe demand. Under disorganized corruption, bribe payments are uncertain, and capital market imperfections surface	There is a strong presumption that a more organized system of corruption is less damaging to entrepreneurial activities because of two essential features. First, it internalizes externality effects that bear on bribe-demanders. Second, it reduces the corruption-induced uncertainty that impacts on bribe-payers	individuals - private agents	disorganized rent-seeking allows both corruption-induced uncertainty and capital market imperfections to surface, while organized rent-seeking prevents such outcomes; implication is that the latter type of corruption regime is most likely to be less harmful to entrepreneurial activity	obj = in model (rent extraction is a random variable which follows some exogenous stochastic process); subj in reality	occupational choice models; bribery/ corruption/ rent-seeking; IO theory	financial market imperfection due to asymmetric information between entrepreneurs and financial intermediaries, and public-sector imperfection due to rent-seeking induced uncertainty on bribe demand; corruption is seen as introducing arbitrariness and randomness into the costs of doing business; bankruptcy;
Welter, C., & Kim, S. (2018). Effectuation under risk and uncertainty: A simulation model. Journal of Business Venturing, 33(1), 100-116.	conceptual - simulation - NK model	Predictive ability in uncertain or ambiguous contexts is nil, by definition.. From a Knightian uncertainty perspective, prediction is impossible, as neither outcomes nor probabilities are known ex ante.	[**inconsistent - N, K remain same sizes, new landscape pulled from uniform distrn {min assumption} - neither risk {probs known} nor KU {unknown/ unknowable states & probs}** a purely reactive sim-agent, U is not a decision concept; it simply reacts to new feedback] The landscape will shift over time to simulate uncertainty or risk. Pure risk is where $\tau = 0$ and the landscape does not change. Pure uncertainty is where $\tau = 1$ and the landscape is generated anew at each shock..u is a new random draw from a *uniform* distribution u[0,1].	How effective is effectuation, as opposed to causation, in the context of risk versus uncertainty?.. Results suggest that effectuation is the dominant decision-making strategy in both uncertain and risky environments until the entrepreneur can predict the future with a very high degree of accuracy	Using an agent-based simulation model, this paper investigates the effectiveness of effectuation relative to causation in uncertain and risky contexts.	simulated firm (or decision-maker)	effectuation; effectuation outperforms causation in both risky and uncertain contexts until the entrepreneur can predict the future correctly; [but prediction impossible)?]	obj = a simulation; (noted that in reality it is subj)	effectuation [though not all dimensions simulated]; bounded rationality; Knight; March; Simon; entrepreneurial action; NK models	create uncertainty by changing the simulated fitness landscape or remaking it anew (with a shock) [but, drawn from a uniform distribution!]

Westgren, R., & Wuebker, R. (2019). An economic model of strategic entrepreneurship. Strategic Entrepreneurship Journal, 13(4), 507-528.	conceptual - math model	unknown production functions; epistemic = lack of knowledge about production outcomes, competitive reactions, buyers' (subjective) preferences and other uncertainties associated with new products, new markets, and other elements of innovation and entry; [KU - Knight cited];	[*CONSISTENT in language and in notation, given there is no distribution information, although factors are operationalized w/o argument that all would/ could be known* - NO actual measurement of term ex ante; only ex post - in a manner that is NOT consistent, given measures difference from expectations, which should just be noise according to TH*] uncertainty bearing—in the Knightian sense—can be examined using the production function, cost function, profit function, and revenues of the new entrant and comparing them to the entrepreneur's expectations of these formed in the pre-entry period; uncertainty bearing is measured as the difference between the conjecture about prices, costs, and profits made in the first period measured against the outcome of entry in the second period; the entrepreneur's uncertainty bearing includes the differences between expectations and realizations about product demand, production cost, product quality, transaction costs, product price, and hence, profits; the degree of uncertainty around each of these expected variables differs by the circumstances of the venture;	how do new entrants create and capture value in established industries? we model entrepreneurial entry and competition as occurring simultaneously in production technology space and product attribute space;	argues that returns to entrepreneurial action can be generated through four main mechanisms: innovation, uncertainty-bearing, new business models, or inter-industry arbitrage—either uniquely, or in combination;	individuals - entrepreneurs	[makes case that real entrepreneurs will form conjectures regardless of (K) U, and those can be compared to what the outcomes are to estimate how much/ whether(?) U was borne]; judgment; expectations;	obj = modeled in math; (but subj = buyers' perceptions)	economic history; entrepreneurial rents; strategic entrepreneurship; value creation; Knight;	lack of knowledge about production outcomes, competitive reactions, buyers' (subjective) preferences and other uncertainties associated with new products, new markets, and other elements of innovation and entry; de novo entry; innovation (no cases to observe);
Wood, M. S., Bakker, R. M., & Fisher, G. (2021). Back to the future: A time-calibrated theory of entrepreneurial action. Academy of Management Review, 46(1), 147-171.	conceptual - theory - time-dimns as U; props	face an unknowable future that necessitates taking action under conditions of uncertainty (..this uncertainty creates hesitancy toward action.. time is an essential part of the uncertainty[?].. We use the term “uncertainty” to reflect Knightian uncertainty, where a context is uncertain when one does not know the “range of possible outcomes of a decision (i.e., taking action), nor their probability” + U's about timing (start, speed..)	[*INCONSISTENT - here, future is imaginable / knowable through action, over time.. not taken as given?*] operating under uncertainty as entrepreneurs formulate visions of “what could be”; conditions of uncertainty—meaning that as entrepreneurs contemplate action, the efforts envisioned can result in a plurality of outcomes and thus the results of action are unknown at the time of contemplation	contributions to entrepreneurial action theory by encapsulating the temporal positioning of action under uncertainty (Alvarez & Barney, 2020), extending insights on the role of narratives in entrepreneurship, and deepening the conversation on the role of time in entrepreneurship theory	that entrepreneurial action is oriented toward novel creations that unfold under conditions of uncertainty	individuals - entrepreneurs	given time = learning model; entrepreneurs play a role in creating what unfolds; hence, their actions can enact results that are favorable (but, may be wrong); temporal positioning, length, ordering matter; vigilance and externalization matter; stories formed with proximal initialization and narrower date ranges; quick pace with a short time span to achievement of milestones; and chronology narratives with less difficult tasks set forth early on and a sequence flow of self-reinforcing tasks will increase the likelihood of action	subj = individual conceptions, visions;	entrepreneurial action; creation school; temporal positioning; narratives; effectuation; bricolage;	unknowable future; novelty (in innovation, technology, venture); results of actions unknown when taken;

Wood, M., Bakker, R. M., & Fisher, G. (2021). Unreasoned, Non-Deliberative, or Temporally Uncertain? Elaborating Time-Calibrated Entrepreneurial Action. Academy of Management Review, (ja).	concept ual - theory - dialogue respons e	Knightian U (stated, not defined*) - as shocks, separate from unintended consequences of (bad) actions chosen	[*consistent, but could be both, given causality implied unknown*] In our theory, occurrences of unanticipated outcomes are not artifacts of the degree of reason, or even of any (lack of) intentionality in the entrepreneurs' narratives that fuel the genesis of action, but instead are artifacts of Knightian uncertainty in the process of entrepreneurship;. time-calibrations that end in a surprise outcome do not necessarily equate to unreasoned or unintentional behavior—this more likely equates to acting under uncertain conditions in which the plurality of outcomes is an a-priori unknown	We contrast an a-priori perspective of entrepreneurial action with a post-hoc outcome perspective and illustrate how confounding the two leads to radically different conjectures about the role of the unexpected and unintended in the entrepreneurial journey vis-à-vis the operating conditions of uncertainty	elements of surprise and unintended, or even unimagined, outcomes are most likely due to the uncertainty inherent in the process of entrepreneurial action rather than due to the intentionality behind undertaking action in the first place	individu als - entrepre neurs	engaging in thoughtful and deliberate action at the exclusion of non-deliberative action, such as those observed in impulsive behavior; acting with intentionality as they time-calibrate their endeavors through the construction of narratives	subj = personal thought; some forethought; [?]	time; dialogue = authors' TH; entrepreneurial action;	they point to the "surprise endings" and "unintended outcomes" that are commonplace in entrepreneurial endeavors; elements of surprise and unintended, or even unimagined, outcomes are most likely due to the uncertainty inherent; lack complete information; believability of that by others; unintentional action;
Wuebker, R., Hampl, N., & Wuestenhagen, R. (2015). The strength of strong ties in an emerging industry: Experimental evidence of the effects of status hierarchies and personal ties in venture capitalist decision making. Strategic Entrepreneurship Journal, 9(2), 167-187.	empiric al - experim emtal (survey online)	uncertainty = the difficulty firms have in predicting the future, which comes from incomplete knowledge;	[**NOT consistent with definition about incomplete knowledge or difficulties of prediction directly {other than one level of tech}**] market risk = regulatory exposure level; technology risk = state of development (from in production to works in the lab); management risk = founder experience level; operationalized uncertainty as market uncertainty by defining the context of the experimental choice task as an opportunity to invest in a newly emerging industry, namely clean energy [*not sure this 'greater' context affects relative levels of knowledge in scenarios*]	explore whether, under high levels of market uncertainty, strong personal ties exert more influence over investment decisions than the presence of a high-status investor in the deal;	study is the first to perform a joint examination of the role of social ties and status hierarchies in venture capital decision making; also explore the moderating effects that market structure and experience play in shaping these decision processes; context for our study is venture capital investment, where formal and informal social systems coordinate exchanges in environments characterized by high levels of uncertainty and information problems;	individu als - VCs	personal ties—specifically, whether or not the deal came from a trusted referral in the investor's network—are more important than the reputation of the lead investor present in the deal; resort to strong ties than to weak ties; rely on existing networks when they are confronted with market-level uncertainty; gathering information from social networks, both pre- and post-investment;	obj = information as given (trusted)about 'risk' levels; (implied subj = how interpreted as being weighted vs other attributes?)	venture capital; conjoint analysis; decision making; social network theory;	informational problems; an emerging industry in which traditional risk/return parameters are more difficult to determine; severe change; incomplete knowledge; unpredictable markets (immature) and (unproven) technologies; unemerged best financing practice; unpredictable rivals and input costs;
York, J. G., & Venkataraman, S. (2010). The entrepreneur–environment nexus: Uncertainty, innovation, and allocation. Journal of business Venturing, 25(5), 449-463.	concept ual - word model	take on uncertainty (Knight, 1921); "uncertainty", or risks we cannot assign probability to or predict in an accurate manner (Knight, 1921); create action in the face of ambiguity; unknown factors which cannot be optimized; environmental uncertainty; the benefits of environmentally beneficial products unknown; investment in moving to environmentally superior practices without such a supplier network is often too prohibitive and uncertain;	[consistent in explanation/ illustration of 'what' is uncertain in sense defined] [NOT consistent in that it is assumed action can 'solve' KU] larger environmental dilemmas, such as human-induced climate change, inherently involve uncertainty; it is impossible to predict what effects such changes will have; the effects all depend on future, unknowable actions; there is not only uncertainty around the existence and severity of some environmental problems, but also uncertainty about the best methods to address these problems and the consequences of various solutions; ENT action privatizes 'risk' (NOT uncertainty?); greater uncertainty can lead to greater residuals [what is 'greater'? - either unknowable or not]	examine environmental degradation through the lens of entrepreneurship theory and argue that uncertainty, innovation and resource allocation all have direct bearing on environmental problems; present a theory outlining under what conditions entrepreneurial action will address each of these elements; the entrepreneurial role in addressing the uncertainty of environmental problems	we see that the greater the uncertainty, the higher the opportunity for innovations; the less restrictive regulation is on new solutions, the more likely we are to see innovations which address environmental problems emerge through entrepreneurial action; regulations that put in place command and control mechanisms to deal with these problems have not only proven to be largely ineffective, but they can reduce uncertainty and entrepreneurial incentives[?]; our analysis suggests that we should focus on maximizing the conditions for multiple experiments, thus increasing our odds to find new solutions [naively optimistic??]	the environ ment?/ individu als - entrepre neurs and manager s	entrepreneurship is inherently concerned with solving problems of uncertainty, innovation, and resource allocation; ENT as a process which reduces uncertainty; ENT as learning by doing/ experimenting; ENT'l activity is a signal that reduces U to incumbents; a need for political and economic freedom for ENTs to act;	subj = perceived U; implicitly also obj = when describing objectively real issues like climate change	environmental entrepreneurship ; sustainability; environment; innovation/ creation; effectuation;	depend on future, unknowable actions; the future is unknowable, and the framing of environmental issues occurs in a future context; based on forecasts and beliefs about what will occur in the future and are open to debate; a diversity of interests amongst members; asymmetry in the information between producers and consumers regarding the environmental practices behind a product or service;

Zahra, S. A., Neubaum, D. O., & El–Hagrassey, G. M. (2002). Competitive analysis and new venture performance: Understanding the impact of strategic uncertainty and venture origin. Entrepreneurship Theory and Practice, 27(1), 1-28.	empirical - survey	competitive uncertainty = managers' subjective assessment of the uncertainty of their firms' external environments, weighted by managers' evaluation of the importance of relevant environmental sectors to the success of their firms' strategy; U = refers to the difference between the amount of information required to perform a task and the amount of information available; strategic uncertainty = defines the perceived lack of information about key dimensions of the environment that determine company performance	[NOT consistent w/ defn of info gap; consistent with idea that uncertainty is affected by dynamism with complexity] Strategic Uncertainty = Importance x (Change x Complexity), with scores summed over sectors (competitive, consumer, technological, regulatory, economic, and socio-cultural)	examines the moderating effect of strategic uncertainty on the relationship between CA system characteristics and new venture performance; H5: The association between an effective CA and new venture performance will be higher when perceived strategic uncertainty is high	using survey data from 228 new ventures, this study concludes that the formality, comprehensiveness, and user orientation of competitive analysis (CA) activities are positively associated with new venture performance; strategic uncertainty and venture origin also significantly moderate the relationship between CA and new venture performance; benefits of CA would likely increase when strategic uncertainty is high as it provides timely and rich data; require careful analysis and planning; venture managers should consider the level of strategic uncertainty in their environment when designing CA systems	individuals - entrepreneurs/ new venture managers	rely on conjectures and develop different scenarios of potential actions and possible payoffs from these actions; environmental scanning process;	subj = subjective assessment of the uncertainty; survey of managers;	RBV; DCV; competitive analysis;	competitors do not always behave in rational or comprehensible ways, reflecting internal political realities within companies; external environment; the interaction of dynamism and complexity (rather than the mere existence of one of these two conditions) that is likely to cause managers to experience uncertainty about their firms' environment
Zellweger, T. M., & Zenger, T. R. (2021). Entrepreneurs as scientists: A pragmatist approach to producing value out of uncertainty. Academy of Management Review, (ja).	conceptual - theory - verbal process model	KU = action unfolds under what Knight varyingly describes as "absolute unpredictability" (1921, p. 310) and "true" (1921, p. 232), non-probabilistic uncertainty	[*INCONSISTENT if KU transformed into risk => knowable thru learning**] because of uncertainty about the fit of their beliefs to the market, entrepreneurs seek to test their beliefs, from which they progressively learn about the belief's value and update the belief correspondingly.. [{forming beliefs = 'exploiting uncertainty' ?? - why?/ effectual?}]	Our aim in this paper is to build an integrative entrepreneur-as-scientist perspective of entrepreneurial action. The perspective we advance explores the scope of science-like behavior deployed by entrepreneurs and clarifies the related inferential challenges that complicate value creation under uncertainty. Our entrepreneur-as-scientist perspective explores how entrepreneurs use distinct categories of "scientific" action to generate the information necessary for them to transform uncertainty into risk.	Building on pragmatism, we advance an entrepreneur-as-scientist perspective and depict entrepreneurs as engaging in causally inferential action by forming beliefs, testing these beliefs, and responding to the feedback received. However, this sequence of entrepreneurial actions arrives with a set of companion doubts;. insights contribute to the micro-foundations of entrepreneurial action and strategy by explaining how entrepreneurs generate the information to produce value out of uncertainty	individuals - entrepreneurs	engaging in causally inferential action by forming beliefs, testing these beliefs, and responding to the feedback received; use distinct categories of "scientific" action to generate the information necessary for them to transform uncertainty into risk;	subj = perceived values; (bridge with obj truth over time) [tentative]	pragmatism; heuristics; entrepreneurial action; information; Knight	absolute unpredictability; also the doubt caused by taking action; information both on available options and their probabilities is not available a priori novelty; product-market fit; socialization pressures and also environmental uncertainty;
Zellweger, T. M., & Zenger, T. R. (2022). Entrepreneurs as Scientists: A Pragmatist Alternative to the Creation-Discovery Debate. Academy of Management Review, (ja).	conceptual - theory - dialogue response	[*looks defined, but… somehow can produce value under it?*] uncertainty—in settings of "unknown unknowns"; problems w/ unknown solutions; + uncertainty on how to interpret feedback; uncertainty allows doubts to arise	[*unknown but apparently knowable thru experiment - INCONSISTENT*] nonetheless compose solutions and test them? Sets aside questions of knowableness and prescribes acting on theories and social construction	while we wholeheartedly agree that entrepreneurs act to create value as they solve problems, in doing so, all humans, including entrepreneurs, engineers, and artists act as scientists, and,.while we reject the placement of our perspective in the discovery camp, we argue that our entrepreneur as scientist perspective and pragmatism more generally find little use for the made vs. found distinction	not only are entrepreneurs scientists, but engineers and designers are scientists as well. They are pragmatist scientists, who adopt a quasi-scientific process to produce value under uncertainty	individuals - entrepreneurs	learn over time - to create value as they solve problems; compose theories, test assumptions, compose solutions, evaluate feedback; explore the fit and usefulness of beliefs;	subj = personal beliefs; often wrong;	scientific method; pragmatism; creation vs discovery;	in settings of "unknown unknowns" that a scientific approach is of particular value [?!]; select problems with unknown solutions; uncertainty about how to interpret feedback because it is theory laden; unpredictable product-market fit; the belief's value often remains unknown even after the deployment of actions; novelty;

Zhang, S. X., Gao, R., Odeh, N., & Leatherbee, M. (2021). A microfoundational model of real options reasoning: The roles of individual search propensity and perceived uncertainty. Strategic Entrepreneurship Journal, 15(1), 98-120.	empiric al - panel survey	[U, perceived - lack info vs there is objective unknowability*; unpredictable outcomes*] three types of perceived uncertainty (i.e., state, effect, and response uncertainty) of Milliken (1987); Higher uncertainty brings greater upside potential and downside of a given course of action; As the subjective assessment of probabilities; State uncertainty happens when managers "perceive the organizational environment, or a particular component of that environment, to be unpredictable" . Effect uncertainty refers to "an inability to predict what the nature of the impact of a future state of the environment or environmental change will be on the organization" . Response uncertainty entails "a lack of knowledge of response options and/or an inability to predict the likely consequences of a response choice" (.	[*consistent - perceptions of unpredictability* LEVEL-type w/ characteristic being 'what'/ outcome vs probability] Measured the three types of perceived uncertainty of Milliken (1987) with the scale developed for entrepreneurship (McKelvie et al., 2011), with two 5-point items. State uncertainty is measured as uncertainty about the rate of demand change and rate of technological change, which are uncertainties perceived by firm leaders on the state of the environment per se. Effect uncertainty is measured as the predictability of the effects of demand change and technological change on their ventures, which captures the uncertainties perceived by firm leaders on the environmental effects on their focal organizations. Response uncertainty is measured as the uncertainty on the firms' actions to sustain innovative leadership and the potential lead-time over competitors, which is firm leaders' perceived uncertainty about firm actions	Our study aims to develop a micro-foundational model of ROR. To explain firm-level ROR-based behaviors, we identify two critical individual-level factors: search propensity and perceived uncertainty, which correspond to two fundamental distinctions of real options from financial options—options availability and uncertainty assessment	To explain heterogeneity in **real options reasoning** (ROR) across entrepreneurial ventures, we propose a micro-foundational model to explore the relationships between a firm leader's search propensity, perceived uncertainty and the firm-level ROR-based behaviors	individu als - entrepre neurs	search propensity describes an individual trait that consists of four behavioral patterns—that is, questioning, observing, experimenting, and idea networking —that are conducive to opportunity recognition; U=> more options-based behaviors [& w/ search], more so with effect, less with response, not with state [?]; embed flexibility in their ventures; [w/i indiv effects not signif]	subj = perceived Us; surveys; items on likert scale (McKelvie + 2011), measured monthly*; subj in reality;	real options TH; search; adaptation; bounded rationality;	perceived effect and response uncertainties; three types of perceived uncertainty (i.e., state, effect, and response uncertainty) of Milliken (1987); unpredictable environment; unpredictable consequences/ impacts; technological change; demand change; rates of change
Zhang, Z., Nan, G., Li, M., & Tan, Y. (2022). Competitive entry of information goods under quality uncertainty. Manageme nt Science, 68(4), 2869-2888.	concept ual - theory - math model	[*unpredictable; unknown but knowable; INFO ASYMM vs U*] product quality uncertainty = unpredictable quality; not be able to fully and accurately evaluate the product quality (e.g., reliability, durability, flexibility, ease of use) before consumption	[*knowable; INFO ASYM; not U; prior belief value] Consumers have uncertain valuations of product B before purchase due to imperfect information about the quality of product B. Their uncertainty is resolved after personal consumption; consumers have a prior belief λ that the value of product B will be lower than expected	When confronted with a new product, consumers often find it difficult to predict how it will perform, and such uncertainty reduces consumers' willingness to adopt the product. In this paper, we consider a market whereby consumers decide when and which product to buy, given that they know the product quality of the incumbent but are uncertain about that of the entrant	We investigate how consumer uncertainty about product quality affects firms' behavior-based pricing and customer acquisition and retention dynamics. Using a two-period vertical model, we find that, under high-end encroachment, an increase in consumer uncertainty reduces the entrant's profit and hurts the incumbent's profit when the quality differential between the products is relatively small, whereas, under low-end encroachment, increasing uncertainty not only benefits the incumbent but also can favor the entrant...we develop a two-period vertical model in which the firms price discriminate between the informed and uninformed consumers based on consumer purchase behavior	individu als - consum ers (+ firms as entrants)	marketing activities [substantial effort to demonstrate the quality of their products through third-party expert certifications, product trials, advertisements, and positive product reviews, word of mouth comms], which aim to reduce consumer uncertainty about product functionalities, may fail to improve profitability; entrant lowers the price for uninformed customers; acquire all consumers who do not buy from the incumbent by providing subsidies and to drop the low-valuation customers by means of a high price after their uncertainty is resolved; uncertainty is resolved after personal consumption; firm can benefit from an increasing uncertainty when its product is inferior to the competing product [!]	obj = math measure for uncertain product quality level; (subj = belief levels may be individual)	competitive strategy; vertical differentiation; consumer behavior; behavior-based pricing;	consumer uncertainty about product quality; not be able to fully and accurately evaluate the product quality (e.g., reliability, durability, flexibility, ease of use) before consumption; novelty; lack of information;

Table 3 – Supporting Table of Raw Data and Initial Analysis of the 'Other' [non-Entrepreneurship] Management Literature related to Uncertainty

CITE	PAPER TYPE	C1	C2	U-DEFINITION(S)	MEASURED/ CONSISTENCY	DECISION/RQ	NOTES
Abdi, M., & Aulakh, P. S. (2017). Locus of uncertainty and the relationship between contractual and relational governance in cross-border interfirm relationships. Journal of Management, 43(3), 771-803.	empirical - cross-sectional, cross-border	strat - SAs, JVs, intl	U as context	[*U as unpredictability* bounded in behavioral] Uncertainty has been recognized as the major source of complication in economic exchanges; *behavioral uncertainty* = difficulty in assessment of partner behavior and conduct based on readily available measures and caused by sociocognitive disparities and lack of common grounds; *environmental uncertainty* = instability and unpredictability of the external environment;	[*subjective measures - change and stability ratings, perceived uncertainty, info flows, monitoring - mostly INDIRECT rather than on future unpredictability*] a four-item 5-point semantic differential scale to measure the environmental uncertainty in the operational environment of the licensee or distributor .. included two items quantifying the unpredictability of future demand conditions in the foreign country (very low to very high): (a) How do you evaluate the stability of sales forecast in this foreign country? and (b) How do you evaluate the stability of market share in this foreign country? a third item was included to operationalize the industry life cycle since industries in earlier stages of their life cycle experience faster and less predictable changes (introduction to decline), we complemented these with a fourth item (very low to very high) quantifying the "frequency of change in government regulations" in the foreign country as another major aspect of environmental uncertainty in cross-border business relations; used a four-item 5-point Likert scale to operationalize the extent of behavioral uncertainty among partners (strongly disagree to strongly agree): (a) There is a high level of uncertainty in our relationship with this partner; (b) Our unit and our foreign partner keep each other well informed (reverse-coded); (c) Our unit closely monitors the extent to which the foreign partner follows established procedures (reverse-coded); and (d) Our unit works very closely with this foreign partner in all aspects of the business (reverse-coded).	We argue that environmental uncertainty (i.e., instability and unpredictability of the external environment) drives the formal and relational arrangements into a more substitutive relationship by elevating the adaptation complications in which increasing reliance on either form of governance inhibits the effective operation of the other. Contrastingly, behavioral uncertainty (in the form of inadequate common grounds and shared frameworks among collaborating firms) encumbers the understanding of partner behavior and conduct and drives the governance mechanisms into a more complementary relationship in which contractual and relational mechanisms facilitate the effective operation of each other	The relationship between contractual and relational arrangements in interorganizational relationships has been subject to an ongoing debate. We propose that in the context of cross-border partnerships, the governance mechanisms can be both substitutes and complements depending upon contingencies posed by uncertainties of two different origins: environmental and behavioral
Abdurakhmonov, M., Ridge, J. W., Hill, A. D., & Loncarich, H. (2022). Strategic Risk and Lobbying: Investigating lobbying breadth as risk management. Journal of Management, 48(5), 1103-1130.	empirical - cross-sectional	strat - lobby, risk mgmt	U as context	[*U as unpredictable outcomes and probabilities of a defined what*] *political uncertainty*, defined as uncertainty associated with changes in regulation or public policy and future government actions; uncertainty as to not only if and how a governmental action will occur but also where and when it may originate; increases the difficulty with which executives can accurately forecast future scenarios and/or odds of those scenarios; strategic risk—defined as resource allocations with more outcome uncertainty	[*?* INDIRECT - not nec about unpredictability but about perceived and stated issues of that time; heavy overlap with RISK; addressable - inconsistent?*] To measure political uncertainty, we use a measure developed by Hassan et al (2019) in which they conduct a content analysis of quarterly earnings calls to calculate the amount of attention a firm places on political uncertainty.. we calculate political uncertainty as the average quarterly political uncertainty over the focal year's quarterly measurements... political uncertainty has been linked to weaker economic conditions and high volatility in stock prices; often peaks in presidential election years; available slack, creates an adaptive benefit for firms that protects them from environmental uncertainties;	To address the paucity of research on drivers of Corp Political Activity breadth and enhance our understanding of this growing aspect of firm nonmarket strategy, we build on extant theory suggesting firms broaden their lobbying—the most common and largest form of —as risks in their political environment increase. We then expand the foundational theorizing to address other aspects that may influence a firm's risk profile and, thus, affect the degree to which the firm tries to broaden lobbying to protect against strategic risk	if lobbying breadth serves as risk management strategy, then other aspects that affect decisions about the amount of risk protection a firm may need should also affect this relationship. We argue that CEOs' ownership and firms' political uncertainty may exacerbate exposure from firm risk taking to government actions, thus strengthening the insurance relationship

Andrei, D., Carlin, B., & Hasler, M. (2019). Asset pricing with disagreement and uncertainty about the length of business cycles. Management Science, 65(6), 2900-2923.	theory - math model w/ emp calibration	econ - DMkg	U as context	[*new* type of U, defined by authors for this paper - UNDER-DEFINED in terms of what characteristics the U has, objective vs seemingly subjective*] uncertain about the length of the business cycle; *Structural uncertainty*, is defined as the product of two variables: the uncertainty about growth persistence and the difference between the growth rate and its long-term mean… structural uncertainty is a function of how much uncertainty is perceived by agents and the degree to which the economy is in an expansion or contraction	[*consistent w/ 'new' definition - a product; each is measurable - second is variance* based on learning, so not U at decision-time? stationarity issue*] U = (f̂ – f)*γ; γ = the posterior variance (uncertainty) of the filtered mean-reversion speed (filter) are such that filter is normally distributed with mean λ and variance γ; referred to as Bayesian uncertainty - from the learning model	Risk premia and Sharpe ratios tend to rise during recessions; asset return volatility is time-varying and predictable; it increases during recessions, but also during periods of rapid technological progress; the risk–return trade-off, which states that greater risk demands greater return, is time-varying and its sign flips over time ..so far, no consensus has been reached as to which model can simultaneously explain all of these empirical regularities. The purpose of this paper is to offer such a model	We study an economy with incomplete information in which two agents are uncertain and disagree about the length of business cycles. That is, the agents do not question whether the economy is growing or not, but instead continuously estimate how long economic cycles will last—i.e., they learn about the persistence of fundamentals. Learning about persistence generates high and persistent stock return volatility
Belderbos, R., Tong, T. W., & Wu, S. (2019). Multinational investment and the value of growth options: Alignment of incremental strategy to environmental uncertainty. Strategic Management Journal, 40(1), 127-152.	empirical analysis uses a panel dataset	real options	account for in (growth) option value	NO explicit definition of uncertainty (e.g., demand) -- it is ***exogenous uncertainty***, or ***environmental uncertainty***, that can only reduce with the passage of time, that will bring about option value (Cuypers & Martin, 2010; Folta, 1998; Pindyck, 1988).. endogenous uncertainty, or uncertainty that firms can actively shape through investment or other means, may not be systematically related to option valuation per se.. analysis was limited to the role of host market uncertainty, and we abstracted from other sources of uncertainty firms may be confronted with, such as those related to the institutional and political environment	[not consistent] Market Uncertainty is then the average of the uncertainty measures across the host countries in which the firm is active… We capture the volatility of a host country's economic growth by regressing the country's gross domestic product (GDP) over 5 years against time and using the **root mean square error** (RMSE) of the regression scaled by the value of GDP to arrive at a standardized proxy of market uncertainty for each host country and year (e.g., Kogut, 1991; Li & Li, 2010). - ***GDP vs per industry volatility***?	we contribute to extant research by investigating how incremental strategy and environmental uncertainty interact to generate growth option value from firms' multinational investment	We show evidence that multinational investment creates growth option value for firms operating affiliates in host countries with high market uncertainty. In such uncertain environments, however, incremental investment strategies—limiting the equity stake or the size of investment in affiliates, across all countries or within each country—prove critical to the value of growth options. Creating growth option value therefore requires an alignment of firms' incremental investment strategy to the uncertain country environments they confront.
Belloni, A., Lopomo, G., & Wang, S. (2017). Resource allocation under demand uncertainty and private information. Management Science, 63(12), 4219-4235.	theory - math w/ theories, sim	strat - resc alletn	U as context -	demand uncertainty = UNDER-DEFINED (re: knowable or not; in text examples, unlikely the distrn known, although bounds may be - ambiguity?)	[*?* RISK, NOT U, given the mean is known, and in sim, the distribution is also known* in examples, bounds and probs known*] The demand uncertainty is represented by a publicly observable random variable D with zero mean; for numerical analysis, the math of the distribtn function is provided (variance computable)	We show that when upstream suppliers have private information about their production capacities, and downstream have private information about their local demands, the performance of the entire market is affected by their relative bargaining power... when a concentrated upstream sector can dictate the terms of trade, the market is likely to be plagued with distortions generated by the presence of irreducible information rents, which in turn stem from the downstream agents' direct exposure to demand uncertainty	We study the effect of multilateral private information on the efficiency of markets where capacity-constrained upstream agents supply a resource to downstream entities facing uncertain end-demands. We analyze two models: a "pooling system," in which a single downstream principal pools a resource from multiple upstream agents; and a "distribution system," in which one upstream principal allocates a resource across multiple downstream agents
Berchicci, L., & King, A. A. (2021) Building Knowledge by Mapping Model Uncertainty in Six Studies of Social & Financial Performance. Strategic Management Journal.	theory - new approach to integrating emp studies	DMkg - interp conflctg data	model U	"epistemic" or "model" uncertainty - uncertain and unreported assumptions make it difficult for readers of empirical research to use published reports as a basis for justified belief, so the first step in a model uncertainty analysis is the selection of a set of assumptions to include in the assessment; Diffuse priors instead define beliefs that are uncertain about the right assumptions prior to observing evidence; The overall range of results provides a visual impression of the ambiguity created by epistemic (model) uncertainty and aleatoric (statistical) uncertainty	[*OK, UNUSUAL form of U - which ASSUMPTIONS to use/ were used - as in KNOWABLE?*] Bayesian analysis provides a way to synthesize the numerous estimates made in a model uncertainty analysis; In a model uncertainty analysis, we are interested in determining the probability that a particular model matches the true data-generation process	we demonstrate a new method for evaluating and integrating multiple quasi-replications, and we propose that the method could also be used proactively, prior to replication, to increase the transparency of research results	we propose a complement to replication that emphasizes the mapping of epistemic uncertainties. We demonstrate our approach by exploring the results of six related studies on the link between social and financial performance. We show that our method allows the synthesis of seemingly conflicting findings, and we propose that it should be used proactively; For many of the models, the confidence interval measuring aleatoric uncertainty (the gray region) is smaller than the uncertainty created by model selection (i.e., the range of estimates for b across the models). This reinforces the importance of considering model uncertainty when forming inferences

Berger, L., & Eeckhoudt, L. (2021). Risk, ambiguity, and the value of diversification. Management Science, 67(3), 1639-1647.	theory - math model w/ props	DMkg	U as context, mitigation	Ambiguous = agents are uncertain about which probability law (or model) to use to describe the asset-return processes; the exact probability distribution of asset returns might not be perfectly known	[INCONSISTENT*translated from unknown into competing expert predictions* weighted probabilities of known possible events* RISK rather than U/ ambiguity in calculations, w/ heuristics applied to finite possible probabilities and known payoffs*] By contrast, the uncertainty about the correctness of the experts is of an epistemic nature such that no objective probability measure can be associated with either expert. If the DM still forms a probability measure over the experts' distributions, these probabilities are subjective by nature, reflecting the DM's degree of belief in each expert	we show that (1) the value of diversification is always positive under risk aversion but, contrary to what is suggested by economic wisdom, (2) the presence of ambiguity may reduce or leave unchanged the individual's desire to diversify, even under (possibly extreme) ambiguity aversion	Diversification is a basic economic principle that helps to hedge against uncertainty. It is, therefore, intuitive that both risk aversion and ambiguity aversion should positively affect the value of diversification. In this paper, we show that this intuition (1) is true for risk aversion but (2) is not necessarily true for ambiguity aversion
Berger, L., Emmerling, J., & Tavoni, M. (2017). Managing catastrophic climate risks under model uncertainty aversion. Management Science, 63(3), 749-765.	analytical - model gen then applctn to exstg data	DMkg envir policy	model U	the notion of model uncertainty that corresponds to situations in which different data-generating mechanisms or models are considered as possible or plausible by the decision maker; separates this from pure risk effects.. (Knightian) uncertainty (also called ambiguity), which characterizes situations in which some events do not have an obvious, unanimously agreed upon probability assignment (Ghirardato et al. 2004)... In this paper, we use the terms "Knightian uncertainty," "ambiguity," and "deep uncertainty" interchangeably	[*inconsistent*; theory uses SEU-like beliefs of DMkr and ambiguity avoidance on updated probs over time* NOT KU - as models {states} known] Model uncertainty is introduced by relaxing the assumption that all the elements of the maximization program are objectively known or commonly agreed upon, so that the probability model over future consumption is no longer unique. We assume that a true climatic process is in place and generates observations, but that this true process and the probability model representing it are unknown to the decision maker	results indicate that the structure of model uncertainty, and specifically how model disagreement varies in abatement, is the key driver of optimal abatement and that model uncertainty warrants a higher level of climate change mitigation.. In view of this disagreement among experts or models, how should a rational policy decision maker proceed?	We propose a robust risk management approach to deal with the problem of catastrophic climate change that incorporates both risk and model uncertainty. Using an analytical model of abatement, we show how aversion to model uncertainty influences the optimal level of mitigation. We disentangle the role of preferences from the structure of model uncertainty, which we define by means of a simple measure of disagreement across models
Bodrožić, Z., & S. Adler, P. (2022). Alternative futures for the digital transformation: A macro-level Schumpeterian perspective. Organization Science, 33(1), 105-125.	theory - model w/ propositions	strat - digtl xftm	U as context -	[UNDER-DEFINED, implied*] U as … uncharted territory here and different actors advocated competing, alternative options.. the future trajectory of this revolution is caused not only by our ignorance but also by the underdetermined nature of this deployment period	[*? OK. UNKNOWN/ABLE FUTURE, possibly shapable?*FOUR SCENARIOS, no probabilities*] uncertain evolution of management models and public policy regimes, it is easy to understand the current deep uncertainty about the future trajectory of the digital transformation	This paper aims to bound the uncertainty about the direction that the digital transformation will take, and to identify the collective choices we face in shaping that direction. To do this, we advance a conceptual framework that locates the factors that will shape this trajectory, and we use this framework to identify several plausible alternative scenarios for it	This paper develops and deploys a theoretical framework for assessing the prospects of a cluster of technologies driving what is often called the digital transformation. There is considerable uncertainty regarding this transformation's future trajectory, and to understand and bound that uncertainty, we build on Schumpeter's macro-level theory of economy-wide, technological revolutions and on the work of several scholars who have extended that theory
Bolton, G. E., Kusterer, D. J., & Mans, J. (2019). Inflated reputations: Uncertainty, leniency, and moral wiggle room in trader feedback systems. Management Science, 65(11), 5371-5391.	experiment - lab studies	DMkg - ratings	U as context	[*asymmetric information + unknowable shock*] attributional uncertainty = unknown to 'buyer' whether any difference to expectations is due to exogenous shocks and/or agent actions; known to 'seller' ex post	[*INCONSISTENT* - NOT U; but RISK*] Uncertainty treatment where in 50% of all auctions, the Buyers receive the shipped quality plus a random integer drawn from a normal distribution with mean 0 and standard deviation of 10. This shock happens randomly, and neither the seller nor the buyer is informed of whether quality has been changed or not. Hence, buyers cannot infer the sellers' responsibility when receiving something else than promised from the received quality with certainty. The shock provides a noisy signal of what the seller sent that is approximately unbiased, the small discrepancy as a result of the cutoffs implied by the admissible quality domain (*players know this, w/ visual examples of random draws*)	we investigate whether uncertainty about seller responsibility can lead to lenient feedback giving. We hypothesize that in the face of such uncertainty, people prefer making leniency errors to making severity errors… Theoretical and experimental evidence, much of it from the labor and law and economics literatures, shows that, in the face of attributional uncertainty, people tend to rate leniently. We hypothesize that this tendency extends to market feedback rating systems	The reputation information provided by market feedback systems tends to be compressed in the sense that reliable and unreliable sellers have similar feedback scores. The experiment presented here features a market in which what a buyer receives is a noisy signal of what was actually sent. We focus on the influence the noise has on endogenously given feedback. The attributional uncertainty creates room for leniency in feedback giving. We find that buyer leniency reduces the informativeness of the feedback system and, in combination with uncertainty, diminishes seller trustworthiness
Botelho, T. L., & Abraham, M. (2017). Pursuing quality: How search costs and uncertainty magnify gender-based double standards in a multistage evaluation process. Administrative Science Quarterly, 62(4), 698-730.	empirical - field study	HR - evaltns	U as variation of info	uncertainty resulting from missing performance information; greater uncertainty stemming from variation in the availability of pertinent information	[very rough measure of relative U - as less vs more info; vs 'missing'/ as yet viewed ? - not really consistent given availability is optional] The degree of uncertainty in their two-stage evaluative process is lower in the second (feedback) stage = ***Conditional on a recommendation being viewed***, gender does not play a role	We find that double standards disadvantaging women are most likely when evaluators face heightened search costs related to the number of candidates being compared or higher levels of uncertainty stemming from variation in the amount of pertinent information available.. using gender as a status characteristic to address a problem of uncertainty	The inherent uncertainty resulting from missing performance information often leads evaluators to rely on status characteristics as indicators of candidates' expected performance or quality (e.g., Podolny, 1993, 2005; Simcoe and Waguespack, 2011; Azoulay, Stuart, and Wang, 2014; Kim and King, 2014), making evaluations more of an art than a science

Busenbark, J. R., Lange, D., & Certo, S. T. (2017). Foreshadowing as impression management: Illuminating the path for security analysts. Strategic Management Journal, 38(12), 2486-2507.	empirical	strat - signalg	U as context	uncertain about the inner workings of the firm,	[questionable consistency] The dispersion in analysts' stock recommendations for a firm represents a common operationalization of analyst uncertainty about a firm (Hong, Kubik, & Solomon, 2000). The dispersion of security analyst buy-sell recommendations for a firm is calculated as the standard deviation of the recommendations. Since recommendations take a value from 1 (strong buy) to 5 (strong sell), a numerical dispersion can be calculated and is provided by I/B/E/S. This standard deviation measure is often used by scholars studying variance in analyst recommendations (Jegadeesh & Kim, 2009).	How managers might negotiate that balancing act, meaning how they might disclose information to influence analyst assessments without sharing too much information.. effective foreshadowing is ambiguous enough not to receive a strong negative reaction	We hypothesize and find that managers who foreshadow acquisition announcements receive fewer analyst downgrades following the announcements, especially when there is more analyst uncertainty about the firm
Cettolin, E., & Riedl, A. (2017). Justice under uncertainty. Management Science, 63(11), 3739-3759.	theory + empirical (experimental) based on math	DMkg - alloctn justc	U as context -	justice under outcome uncertainty = UNDER-DEFINED - implied that possible policy outcome states are known but probs may not be (i.e., ambiguity); exposure to uncertainty is exogenous and randomly assigned.	[*RISK - mean and probs KNOWN* NOT U*] the other recipient's earnings are almost always uncertain. Specifically, for the latter, final earnings can be larger or smaller than the allocation but are in expectation equal to the allocation in all problems.. Recipient U's final outcome depends on which of two possible events realizes after the allocation of xU. The "good" event H realizes with probability p in which case the amount xU allocated to U is multiplied by kH > 1. With probability 1 - p the "bad" event l realizes, with the consequence that xU is multiplied by kl (1 > kl > 0)	Importantly, due to uncertainty, the ultimate outcome of almost any policy choice is often unknown ex ante. Hence, the importance to understand how people perceive justice under uncertainty.. What constitutes a just allocation of resources when recipients of these resources are exposed to uncertainty? Specifically, we are interested whether otherwise similar people differ in their views on justice when the outcome of an allocation is uncertain	Uncertain outcomes are an inevitable feature of policy choices and their public support often depends on their perceived justice. We theoretically and experimentally explore just allocations when recipients are exposed to certainty and uncertainty. In the experiment, uninvolved participants unequivocally choose to allocate resources equally between recipients, when there is certainty. In stark contrast, with uncertainty just allocations are widely dispersed and recipients exposed to higher degrees of uncertainty are allocated less.
Delage, E., Kuhn, D., & Wiesemann, W. (2019). "Dice"-sion–making under uncertainty: When can a random decision reduce risk?. Management Science, 65(7), 3282-3301.	theory - math model w/ props	DMkg	U as randomztn	[OK] ambiguity = Ellsberg urn; bounded unknown probabilities in a project selection	[AMBIGUITY - possible states known, unknown (possibly bounded) probabilities - OK; consistent]	we investigated whether randomized strategies can strictly outperform the best deterministic strategy in stochastic and distributionally robust optimization problems that involve (worst case) risk measures… our results indicate that randomized decisions may be beneficial in several classes of recently studied distributionally robust optimization problems, such as project management, appointment scheduling, vehicle routing, and supply chain design problems	we explore whether randomization can help a rational decision maker who has all of the resources to determine an optimal solution and who is not subjected to the strategic reactions of other agents
Diehl, M. R., Richter, A., & Sarnecki, A. (2018). Variations in employee performance in response to organizational justice: The sensitizing effect of socioeconomic conditions. Journal of management, 44(6), 2375-2404.	empirical - meta-analysis	HRM - justc	U as context	[*U as unpredictability] the immediate work environment as the focal source of (un)certainty, employees use their evaluations of organizational justice to reduce their feelings of uncertainty; highlighting the socioeconomic environment as a fundamental source of (un)certainty that critically affects people's lives. Uncertainty can be conceptualized as the perception and feeling of unpredictability and lack of knowledge with regard to current or future events. However, UMT scholars are relatively unspecific with respect to the sources and types of uncertainty that reduce the control of individuals over their own lives and contribute to their feelings of vulnerability	[*U bufferable (subjective feelings), external, INDIRECT measure - of sources, NOT unpredictable; inconsistent] we draw attention to an elemental, broader type of uncertainty —that arising from unfavorable SECs (socio-econ condns); the experience of organizational justice provides employees with a buffer against this kind of uncertainty...we focus on three SECs, namely, rule of law, human development, and income inequality, that are especially salient to individuals' feelings of socioeconomic uncertainty and vulnerability; measured the rule of law using the World Bank Governance Indicator (WGI) assessing the quality of governance; measured the level of human development by using the Human Development Index (HDI) based on GDP per capita income, average life expectancy, and average number of years of formal education; measured income inequality using the Gini coefficient, the most widely used index of inequality	According to uncertainty management theory (UMT), organizational justice helps individuals to cope with uncertainty. Employees will thus respond stronger to organizational justice when uncertainty is high. We contribute to UMT by highlighting poor socioeconomic conditions, specifically, weak rule of law, low human development, and high income inequality, as salient sources of uncertainty. We argue that when these conditions are unfavorable, the effects of organizational justice on employee reactions will be stronger than when they are more favorable	Our findings suggest that the uncertainty that originates outside organizational boundaries is valuable in the analysis of organizational justice. In contrast to the microlevel perspective taken in much of the extant UMT-based research (and in organizational justice research more generally), our study responds to calls to put greater emphasis on contextual factors and to close the macro–micro gap in this literature

Dutt, N., & Joseph, J. (2019). Regulatory uncertainty, corporate structure, and strategic agendas: Evidence from the US renewable electricity industry. Academy of Management Journal, 62(3), 800-827.	empirical - panel	strat - DMkg	U as context, aversion	Regulatory U = the perception of significant regulatory instability (as a type of environmental U)	[not consistent] Regulatory uncertainty is the primary independent variable. It is a count of the number of years remaining until an organization must be compliant with its state's RPS (renewable portfolio standards). Time to compliance may range from 1–20 years. We reason that the greater the number of years, the greater the level of uncertainty	By linking models of decision making under uncertainty and learning with the attention-based view, we develop a more comprehensive understanding of the ways uncertainty influences organizational attention.. Our study clarifies how uncertainty is processed and responded to within corporate hierarchies	To better understand the contingencies around organizations' responses to regulatory uncertainty, we consider the influence of corporate structure on attentional processing
El Nayal, O., Slangen, A., van Oosterhout, J., & van Essen, M. (2020). Towards a Democratic New Normal? Investor Reactions to Interim-Regime Dominance during Violent Events. Journal of Management Studies, 57(3), 505-536.	empirical (CAR) - event study	intl	effects/ interpret	Since interim regimes may develop the private intention to become autocratic rulers at any point during their tenure, potential and actual investors in local firms face substantial **political uncertainty** during interim periods. (Most prior management studies of political uncertainty conceptualized such uncertainty as originating from a lack of checks and balances in a country's political system)	[not consistent as…] U not measured	we propose that investors interpret higher interim-regime dominance as a signal of weaker democratic intentions (greater U?) and associate such weaker intentions with a gloomier political outlook for local firms	event study methodology to 94 spells of violence in Egypt during the Arab Spring, we find substantial support for our hypotheses
Feldhaus, C., Sobotta, T., & Werner, P. (2019). Norm uncertainty and voluntary payments in the field. Management Science, 65(4), 1855-1866.	empirical - experimental labs	DMkg pay for svc	U as context	[*UNDER-DEFINED*, not really have any stakes] *norm uncertainty* = no clear distributional info on a very bounded set of possibilities - for a willingness-to-pay (non-strategic) decision	[*questionably consistent, but bounded - esp below* signals also given; no penalties, no gain, voluntary*] use of payment norm - The mall has a public restroom where guests can freely choose how much they want to pay. Payment for the service is expected but not enforced so that customers can refuse to pay. Importantly, there is no clear reference price for the service, which allows us to study behavior under uncertainty about the payment norm.. also, likely based on experience and what coins have on person	The question is then how decision makers who seek to conform to norms arrive at their choices. This is the starting point of our study, in which we investigate how behavior responds to exogenous changes in subtle environmental cues that implicitly signal information about the relevant norm...Our study is also related to research on the effects of norms and social preferences in "pay-what-you-want" environments	We investigate behavioral reactions toward exogenous changes of implicit norm-relevant information in a natural field setting where customers are free to choose if and how much to pay for a service. Customers' voluntary payments are significantly affected by subtle information cues: … Consistent with the conjecture that this effect is in large part driven by customers' uncertainty about the actual norm
Fischer, R., Ferreira, M. C., Van Meurs, N., Gok, K., Jiang, D. Y., Fontaine, J. R., ... & Abubakar, A. (2019). Does organizational formalization facilitate voice and helping organizational citizenship behaviors? It depends on (national) uncertainty norms. Journal of International Business Studies, 50(1), 125-134.	empirical - cross	ob/ hr - OCB.. IB	U as context (natl)	U about how to behave and what to expect in one's immediate and extended social and physical environment for reasons of social survival	[?CONSISTENCY?] focus on nation-level processes that characterize perceptions of uncertainty within nations, due to institutional, political, and economic forces that shape everyday routines and practices.. perceived uncertainty, we adopted four items measuring normative perceptions of nation-level uncertainty (Sully de Luque & Javidan, 2004), with an example item being: "Most people lead highly structured lives with few unexpected events" measured on five-point scales (reversed scored, 1 "very typical" to 5 "not at all typical"). These items are phrased in terms of observable behaviors, therefore, allowing us to capture perceptions of descriptive norms using a referent-shift consensus model (Chan, 1998). Higher scores indicate more uncertainty.	Our objective is to examine the joint influence of organizational formalization and national uncertainty on OCB to deepen our understanding of when and how culture matters for international business	helping organizational citizenship behaviors (OCBs) vary across cultures, depending on employees' perceived level of organizational formalization and national uncertainty. We predict that in contexts of uncertainty, cognitive resources are engaged in coping with this uncertainty. Organizational formalization can provide structure that frees up cognitive resources to engage in OCB.
Foss, N. J. (2020). Behavioral strategy and the COVID-19 disruption. Journal of Management, 46(8), 1322-1329.	editorial - theorizing	DMkg	U as context	[unpredictable vs ambiguous (w/o probabilities but w/ known states) - real U*] no one in the business community appears to have anticipated it (i.e., placed a probability on its happening)	[*U as something dealt with - knowable unknowns or even searchable/ experience-based decisions; INCONSISTENT] in the deeply uncertain and ambiguous nature of the initial phases of the COVID-19 disruption; how COVID-19 may influence the economy was fundamentally ambiguous; approaches = grope and learn or read signals and apply previous experience, or minimax, or heuristics;	argue that the emerging behavioral strategy view offers unique insight into decision making in a situation of disruption, understood here as a situation in which a low-probability or even entirely unanticipated event emerges that has drastic impact and consequences at a systemic level	the disruption also points to weakness in current behavioral strategy thinking, notably with respect to the role of models vis-à-vis judgment in strategic decision making, the deeply social (political, institutional) nature of strategy making, and the treatment of fundamental uncertainty; that strategy in general, and behavioral strategy more specifically, does not have strong frameworks for dealing with uncertainty that goes beyond standard treatments of risky decision making in various ways

Foss, N. J., Klein, P. G., Lien, L. B., Zellweger, T., & Zenger, T. (2021). Ownership competence. Strategic Management Journal, 42(2), 302-328.	theory - box & arrow, tables, typology	strat - ownshp	U as context -	KU assumed; enironmental U = unanticipated changes; frequent environmental shocks; Knight (1921, p. 231) observed, under uncertainty "business decisions […] deal with situations which are far too unique […] for any sort of statistical tabulation to have any value for guidance. The conception of an objectively measurable probability or chance is simply inapplicable." Van den Steen (2017: 4550) observes that "fundamental uncertainty forces people to rely on intuition and judgment	[* INCONSISTENT if OPTIONABLE, or can DELAY*] Under uncertainty "there is often no way to resolve such uncertainty except by waiting for the outcome" (Van den Steen, 2017: 4550); OPTIONS - proactively confronting uncertainty over time in a flexible fashion, rather than by attempting to avoid uncertainty" (Leiblein, 2003: 948)	We develop the concept of ownership competence—the skill with which ownership is used as an instrument to create value—and decompose it into matching competence (what to own), governance competence (how to own), and timing competence (when to own).. ownership's role as an instrument to match judgment about resource use and governance with the firm's evolving environment under uncertainty	Ownership implies irrevocable control over resources, which may be particularly valuable when coordinating resources under uncertainty (Coase, 1937). In particular, owners gain residual control rights over resources—rights to decide resource use in conditions not specified by prior agreement
Gaba, A., Popescu, D. G., & Chen, Z. (2019). Assessing uncertainty from point forecasts. Management Science, 65(1), 90-106.	math model w/ sim	DMkg - exprt opnns	U as prediction factors	parameter uncertainty = the uncertainty about the parameter sigma given x (point forecasts); predictive uncertainty = the uncertainty of ˜y given sigma; where mu and sigma-sq are unknown mean and variance, respectively; also U about correlation among expert opinions	[*U's as variances in model distributions of parameters and of full model prediction* UNKNOWN but modeled as predicted/predictable distributions -? inconsistent] given description is modeled, … but, when applied to reality, U may not be simply unknown variance	The paper develops a model for combining point forecasts into a predictive distribution for a variable of interest. Our approach allows for point forecasts to be correlated and admits uncertainty on the distribution parameters given the forecasts. We show that ignoring dependence or parameter uncertainty can lead to assuming an unrealistically narrow predictive distribution.	Predicting an unrealized future variable is a ubiquitous endeavor, for it is crucial in shaping many decisions that we must make. For example, an investor or a financial institution might predict a future currency exchange rate for its hedging or trading strategy; despite the presence of extensive data and models, subjective human judgment remains a key element in predictions across numerous real-life settings; subjective forecasts for a variable often come in the form of point forecasts—i.e., single-valued predictions for that variable
Geiger, D., Danner-Schröder, A., & Kremser, W. (2021). Getting ahead of time—Performing temporal boundaries to coordinate routines under temporal uncertainty. Administrative Science Quarterly, 66(1), 220-264.	empirical - case study of firefightrs	DMkg emrgcy	U as context - in emrgncy	temporal uncertainty—a fundamental "uncertainty about when crucial events or actions are going to occur" (McGrath and Kelly, 1986: 407)	[*OK* not prob or state, just timing, w/i bounds of ops] Firefighters operate under conditions of high temporal uncertainty as defined above: each deployment is different, and unexpected events are likely to occur (Bechky and Okhuysen, 2011). Firefighters cannot predict events or the times at which they may occur during a deployment; each deployment may significantly differ from the next, and as a consequence, an incremental fitting-in with external pacers is not an option; main challenge was that the temporal character of the deployment as a whole was unclear ex-ante and could change midway, i.e., there was high temporal uncertainty	crisis-management organizations in particular, like ER teams, firefighters, and other emergency response organizations, regularly have to accomplish temporal coordination under conditions of temporal uncertainty; we outline how a routine dynamics perspective can enrich our understanding of how actors engage in temporal structuring when confronted with the challenges posed by temporal uncertainty	temporal uncertainty renders situated and incremental forms of temporal structuring problematic + make it challenging to properly and collectively establish whether an event is critical or not. As a consequence, actors might not have enough time to collectively (re)negotiate what to do when... High levels of perceived temporal uncertainty usually resulted in the performance of one routine at a time, whereas low uncertainty apparently allowed for parallel routine performance at the same time
Ghili, S., & Klibanoff, P. (2021). If It Is Surely Better, Do It More? Implications for Preferences Under Ambiguity. Management Science, 67(12), 7619-7636.	theory - math models	DMkg	U as context; ambigty aversion	[UNDER-DEFINED for real world; ok for math] ambiguity/U = some state probabilities, with bounds on components that make up those probabilities; stylized examples given	[*?*as ambiguity yes*] four states of the world, bounded probabilities; probabilities known in calculations, ambiguous in others, depending on preference functions assumed (w/ ambiguity aversion)… We consider in this example sets of probability distributions of the following parametric form: C_ {(r(1−δ)(1−κ), (1−r)(1−δ)(1−κ), δ(1−κ),κ) : κ ∈K,δ ∈D, r ∈ R}, where K _ [κ, κ] ⊆ [0, 1), D _ [δ, δ] ⊆ [0, 1), and R _ [r, r] ⊆ [0, 1]... The set C is constructed so that ambiguity about each of these parameters is fixed no matter what value is taken by the other two parameters	This paper proposes and investigates a preference condition, monotonicity in optimal mixtures, having particular relevance for comparative statics of behavior under ambiguity-sensitive preferences.	Consider a canonical problem in choice under uncertainty: choosing from a convex feasible set consisting of all (Anscombe–Aumann) mixtures of two acts f and g, {αf + (1 − α)g : α ∈ [0, 1]}.
Gupta, V., & Rusmevichientong, P. (2021). Small-data, large-scale linear optimization with uncertain objectives. Management Science, 67(1), 220-241.	theory - math model w/ theorems and numerical ex	strat - DMkg	U as context in optmztn	[IMPRECSION, NOT U*] in the small-data, large-scale regime, all estimates have bounded precision… In the small-data, large-scale regime, the dimension of the problem Pn increases with n while the precision remains bounded; IRL may be less known (e.g., biased, and with UNknown precision); unknown demand	[*consistent with RISK, not U - just NOISE w/ known variance*] the objective coefficients μ are unknown. Instead, we are given noisy estimates ˆμj for each j, each of which was formed using only a small amount of relevant data… We write ˆμj =^ 1(m, v) to indicate that the random variable ˆμj is normally distributed with mean m and variance v. Importantly, we adopt the following assumption on the estimates ˆμj. Assumption 2.1 (Model for ˆμ). For each j = 1, . . . , n, ˆμj is unbiased, that is, E[ˆμj] = μj, and has known precision vj, that is, E[(ˆμj − μj)2] = 1/vj.	First, the small-data, large-scale regime is structurally different from the large-sample regime, and consequently, traditional methods may perform quite poorly in this regime. Second, it is possible to design novel methods that retain the strong large-sample performance guarantees of traditional methods but that additionally have provably good and empirically strong performance in the small-data, large-scale regime	Optimization applications often depend on a huge number of uncertain parameters. In many contexts, however, the amount of relevant data per parameter is small, and hence, we may only have imprecise estimates. We term this setting—in which the number of uncertainties is large but all estimates have low precision—the small-data, large-scale regime. We formalize a model for this new regime, focusing on optimization problems with uncertain linear objectives.

Håkanson, L., & Kappen, P. (2017). The 'casino model'of internationalization: An alternative Uppsala paradigm. Journal of International Business Studies, 48(9), 1103-1113.	empirical - replcation	strat - intlztn	U reduction	U = at the roulette table, the probability of any one number coming up is known and well defined – a situation very different from that of uncertainty and partial ignorance facing firms considering investments in foreign countries	{not consistent] U not measured directly; Psychic distance rank is measured as a ranking variable ranging from 1 (closest to Sweden) to 20 (furthest from Sweden) following Johanson & Wiedersheim-Paul (1975	The Casino Model uncovers a number of new research issues pertaining to internationalization and to the nature of strategic decision-making under conditions of environmental uncertainty and partial ignorance	the 'behavioral paradigm' = new research questions were formulated, premised on boundedly rational decision-makers with limited knowledge, and acting under conditions of uncertainty and partial ignorance
Hanousek, J., Shamshur, A., Svejnar, J., & Tresl, J. (2021). Corruption level and uncertainty, FDI and domestic investment. Journal of International Business Studies, 52(9), 1750-1774.	empirical - panel, survey	IB - DMkg	U as context - local condns	Uncertainty about corruption (uncertainty about the need to make unofficial payments to government officials to conduct business); This definition of corruption uncertainty follows Rodriguez et al. (2005), who argue that corruption uncertainty may capture not only statistical uncertainty but also the broader definition of uncertainty whose probability distribution is **unknown**, such as unmeasurable uncertainty discussed by Knight (1921). Uncertainty associated with the size, target, frequency, and outcome of corrupt transactions...while estimating the effect of corruption uncertainty, we also control for and estimate the effects of economic uncertainty, political uncertainty, inflation uncertainty, judiciary uncertainty, and financial uncertainty	[*STDDEV (risk) vs U used for this - INCONSISTENT w/ KU described*] Rodriguez et al. (2005) define corrupt environments along two dimensions: pervasiveness (related to the level) and arbitrariness (related to the uncertainty) of corruption…We obtain the top manager's response to the following survey statement/question: 'It is common for firms in my line of business to have to pay some irregular 'additional payments or gifts' to get things done with regard to customs, taxes, licenses, regulations, services, etc." The responses are on a scale from 1 (Never) to 6 (Always), which we normalize to fall in the closed interval between 0 and 1. Based on these responses, we infer the average likelihood that a firm in a given cluster encounters requests for bribery in its business transactions. We construct our corruption uncertainty measure as the standard deviation of a given answer(x) to the above survey statement/ question. In particular, we create a numerical variable [(x - 1)/5] and calculate the standard deviation of the answers in each cluster. Corruption Uncertainty is thus defined for each cluster; (stddev of survey Qs used for other Us as well)	we estimate the effects of uncertainty about corruption together with the effects of the level of corruption to assess the relative importance of these two effects (and at the local level)	Based on real options theory and institutional factors, we develop a theoretical framework for investment in the presence of corruption and use a sample of private firms to carry out the first large-scale analysis of the impact of the level of corruption and uncertainty about corruption on post-entry investment of MNE subsidiaries
Hardisty, D. J., & Pfeffer, J. (2017). Intertemporal uncertainty avoidance: When the future is uncertain, people prefer the present, and when the present is uncertain, people prefer the future. Management Science, 63(2), 519-527.	empirical - 3 studies (experiments)	DMkg time	time U, payoffs now or fut U	are also uncertain (e.g., a 50% chance of receiving $100 in one week) => uncertainty here is RISK (prob known of possible states)	[*CONSISTENT*] U = risk [inherent possibly that future also = risk, as with a discount factor to compensate]	these results suggest that perceptions of uncertainty (and preferences for uncertainty) may influence intertemporal choices, with perceived future uncertainty (even if only implicit) leading people to choose immediate, certain rewards (Epper et al. 2011). Extending this line of research to losses, our results suggest an important hypothesis: implicit future uncertainty could increase the preference for immediate, certain losses as well	Three studies explored the effects of uncertainty on people's time preferences for financial gains and losses. In general, individuals seek to avoid uncertainty in situations of intertemporal choice. While holding the expected value of payouts constant, participants preferred immediate gains and losses if the future was uncertain, and preferred future gains and losses if the present was uncertain.
Hendriks, G., Slangen, A. H., & Heugens, P. P. (2018). How a firm's domestic footprint and domestic environmental uncertainties jointly shape added cultural distances: The roles of resource dependence and headquarters attention. Journal of Management Studies, 55(6), 883-909.	empirical - panel	strat	effects - reduce	we distinguish between domestic ***uncertainty about governmental policies*** and domestic ***uncertainty about industry demand***.. headquarters executives often can steer the outcome of the former type of uncertainty somewhat, they usually cannot steer the outcome of the latter type.. perhaps the two most important macro-level uncertainties about resource contributions to firms are policy uncertainty and demand uncertainty.. ***Policy uncertainty*** reflects the ease with which a given branch of a country's government can undo existing policies or implement new ones (Delios and Henisz, 2003; Holburn and Zelner, 2010) ..***Demand uncertainty***, on the other hand, reflects the volatility of demand in a given national industry (Dunning and Lundan, 2008; Miller, 1993)	[consistent] - Domestic policy uncertainty is operationalized through Henisz's (2000) POLCONIII index. This index measures on a zero-to-one scale the level of political constraints on policy changes in a given country in a given year..[+ other robustness, RPE score] To measure domestic demand uncertainty, we derived conditional variances from time series data on countries' annual consumption over the period 1990–2007, using generalized autoregressive conditional heteroskedasticity (GARCH) models (Bollerslev, 1986; Folta and O'Brien, 2004)	We shed light on that role by exploring how the size of a firm's domestic footprint influences the cultural distance that the firm adds to its country portfolio when expanding internationally.. we hypothesize that a firm's domestic footprint has a negative relationship with added cultural distance, and that domestic policy uncertainty strengthens this relationship whereas domestic demand uncertainty weakens it	According to RDT, senior managers have two main options for dealing with uncertainties about actors' resource contributions: they can attempt to actively influence the outcome of such uncertainties or diversify them away (Drees and Heugens, 2013; Pfeffer and Salancik, 1978).

Huang, G., Luo, H., & Xia, J. (2019). Invest in information or wing it? a model of dynamic pricing with seller learning. Management Science, 65(12), 5556-5583.	theory - math model w/ emp calibration	DMkg - pricing	U as context	[*asymmetric info - Buyer knows, but Seller does not* learning process takes place, so, knowable*] item-specific demand uncertainty = derives from the seller's lack of information about item-specific heterogeneity or the preference of local consumers... the seller's residual uncertainty should mostly be about local buyers' preference for a particular used car; dynamic pricing with demand uncertainty (see Rothschild 1974, Grossman et al. 1977, Easley and Keifer 1988, Aghion et al. 1991, Mirman et al. 1993, Trefler 1993, Mason and V¨alim¨aki 2011)	[*inconsistent* all shocks, noise, beliefs provided have known, normal distributions* NOT really U, but risk*] modeled as a continuous variable.. uncertain about ξj,; assume that ξj ∼ N (0, σ2)… noisy signal (same error distn char); buyer also has an idiosyncratic preference shock (N[0,..])	More specifically, what is the value of the information that sellers can acquire through their initial assessment and subsequent learning in the selling process? From a theoretical perspective, how does the seller's learning in the selling process affect the optimal pricing strategy? To answer these questions, we develop a structural model of dynamic pricing with seller learning	This paper develops a dynamic pricing model for products with significant item-specific demand uncertainty, in which a forward-looking seller learns about the item-specific demand through an initial assessment, as well as during the selling process. The model demonstrates how seller learning, through several mechanisms, can lead to the commonly observed downward trend in the prices of individual items
Iurkov, V., & Benito, G. R. (2020). Change in domestic network centrality, uncertainty, and the foreign divestment decisions of firms. Journal of International Business Studies, 51(5), 788-812.	empirical - long + cross-sect	IB - frgn divst	U as context - intrnl & extrnl	We distinguish between two different types of uncertainty: firm-specific uncertainty that is unique to a firm and lies within its control, and domestic market uncertainty that is independent of what happens within a firm and is outside its control	[*questionable consistency - internal control; external control for large firms - only VOLATILITY*] firm-specific uncertainty, is measured as the volatility of the net sales of each firm over the 5 years preceding year t; Domestic market uncertainty, is computed in a way similar to firm-specific uncertainty. However, instead of regressing individual firm's sales on year, we regress the sales of all U.S. firms in a specific industry (defined with a four-digit SIC code) on year and divide the standard error of the regression slope coefficient by the mean of industry sales (Bergh & Lawless, 1998); Foreign market uncertainty was calculated in several steps. We first identified countries in which a focal firm had subsidiaries in a given year. Then, similarly to domestic market uncertainty, we calculated the sales volatility of all publicly listed firms in a focal firm's primary industry in a given foreign country in a given year. Finally, we computed the weighted average of sales volatility across all foreign countries in a focal firm's portfolio of foreign subsidiaries in a given year	If domestic interfirm networks transmit information about new business opportunities at home, would access to such information possibly trigger the decision of a multinational firm to reallocate resources from abroad to home?	we argue that the positive association between an increase in firm centrality in the domestic network and foreign divestment is stronger under higher uncertainty, as pursuing new business opportunities at home becomes more appealing. We distinguish between firm-specific uncertainty and domestic market uncertainty
Jia, N. (2018). The "make and/or buy" decisions of corporate political lobbying: Integrating the economic efficiency and legitimacy perspectives. Academy of Management Review, 43(2), 307-326.	theoretical - flow model of lobbying	strat - DMkg	U as context, reductn	U = in assessing the validity and credibility of the content in ascertaining the quality (i.e., the validity and credibility) of the arguments presented by lobbying entities regarding the consequences of implementing certain public policies on public and/or private benefits (Downs, 1957; Drutman, 2015; White, 2003).	[consistent] U = at the core of politics is uncertainty over what the political reality is (Downs, 1957). Policy makers have only imperfect knowledge of the true state of the world, and it is this very uncertainty regarding a policy's consequences for various stakeholders that makes policy makers willing to learn from these stakeholders about their preferences	However, when the political audience faces substantial uncertainty about lobbying content, it relies on the perceived legitimacy of the lobbying entity to draw inferences about the quality of such content; therefore, the legitimacy of a potential lobbying entity matters to firms making sourcing decisions related to lobbying....	some customers may encounter substantial uncertainties in evaluating the substantive content of the product or service delivered to them. While one natural solution is for these customers to expend greater efforts in evaluation, a large body of research has demonstrated that a powerful shortcut commonly adopted in this context is to rely on judgments regarding the "legitimacy" of an entity in order to draw inferences about the activities undertaken or goods produced by that entity
Jia, N., Rai, A., & Xu, S. X. (2020). Reducing capital market anomaly: The role of information technology using an information uncertainty lens. Management Science, 66(2), 979-1001.	empirical - event-based firm study	IT - ES use	U as context, mitigation	[UNDER-DEFINED in terms of characteristics of what is unknown] Information uncertainty—a driver of the under-reaction anomaly—is defined as ambiguity with respect to the implications of new information for a firm's value, which potentially stems from two sources: the volatility of a firm's underlying fundamentals and poor information	[*questionable* proxies only used, speak to volatility and firm characteristics, ALL measured pre-event*] var(signal) = var(v) + var(e), where var(v) is a firm's underlying fundamentals volatility, and var(e) reflects the quality of information; we sort sample firms—using each of the six IU proxies (Section 3.1 above)—into IU quartiles, U1 (lowest) through U4 (highest). To reiterate, the IU proxies are ex ante— based on data from past years; IU proxies = firm age, size, analyst coverage, dispersion in analysts' forecasts, stock volatility, cash flow volatility	We examine the impact of information technology (IT) implementations by public companies on a capital market anomaly. We shed light on "market efficiency" (Fama 1965) and contribute to the literature on IT business value by identifying a market-level impact of firm IT,	We investigate how firms use information technology (IT) implementation to mitigate an anomaly in capital markets: investors underreacting to new public information. The theory of information uncertainty (IU) suggests that the anomaly is amplified with IU; that is, with ambiguity in information about firm value. We theorize that a firm's IT in general— and enterprise systems (ES) in particular—can mitigate IU

Kalay, A., Nallareddy, S., & Sadka, G. (2018). Uncertainty and sectoral shifts: The interaction between firm-level and aggregate-level shocks, and macroeconomic activity. Management Science, 64(1), 198-214.	empirical - panel, at macro-level	macro-econ	U as context - shocks	Uncertainty about both aggregate growth and/or firm-level growth = experienced contemporaneously and multiplied in effect on macroeconomic activity; (no prescription other than reducing policy uncertainty)	[*OK* MANY complicated volatilty terms PLUS interactions, at many levels of SHOCK* based on observed & forecast data] we define the variable Unc, which is an indicator variable equal to one for the highest quartile of political uncertainty shocks. In other words, the variable Unc receives the value of one for the most positive quartile of political uncertainty shock quarters and zero otherwise; For aggregate-level shocks, we employ aggregate profitability, economic policy uncertainty, and the Chicago Board Options Exchange (CBOE) Volatility Index (VIX). For firm-level shocks, we employ cross-sectional earnings dispersion and idiosyncratic return volatility	This study predicts and finds that the interaction of firm-level and aggregate level shocks explains a significant portion of shocks to macroeconomic activity. Specifically, we hypothesize that the relation between uncertainty and economic growth is most pronounced when both firm-level and aggregate-level uncertainty are high simultaneously	This paper examines the interaction between firm-level and aggregate-level shocks and how it relates to overall macroeconomic activity. Specifically, we examine this interaction for two types of shocks: uncertainty shocks and performance shocks
Kim, S., Lee, G., & Kang, H. G. (2021). Risk management and corporate social responsibility. Strategic Management Journal, 42(1), 202-230.	empirical -	strat - insurnc CSR, FIN	U as firm volatility	[UNDER-DEFINED - irl, unknowns of states and probabilities*] firm value uncertainty = volatility (stock price); market uncertainty = market volatility	[*consistent w/ defn - ONLY VOLATILITIES implied by Options, of stocks with them; perceived, known* more RISK than U] We use IvyDB OptionMetrics to calculate the implied volatility of out-of-the-money (OTM) options on the stocks of the firms in our CSR data sample. Given that individual equity options are American,1 we employ Cox, Ross, and Rubinstein's (1979) binomial tree model to calculate implied volatility numerically using the bid-ask midpoint of daily closing prices. Volatility is a measure of that risk, so “implied” volatility can be computed from the option price. In short, analyzing implied volatility can identify the option's value, which indicates a firm's risk	The results reveal the “terms” of a CSR-as-insurance contract, confirm that CSR creates risk-management benefits, and suggest that financial markets price this benefit in economically significant ways. Whether such reputational insurance exists and is significant is ultimately an empirical question. How are CSR's insurance benefits quantified? Does a put option's value reflect CSR's insurance benefits?	We introduce an innovative method of identifying the risk-management benefit of corporate social responsibility (CSR). Option-implied volatility captures the financial markets' expectations of a firm's future risk, so if CSR is related to risk management benefits, it should be related to lower implied volatility. We find that CSR is associated with low implied volatility and that CSR's insurance benefit is larger for firms that have high leverage, growth opportunities, or uncertainty
Kutzner, F. L., Read, D., Stewart, N., & Brown, G. (2017). Choosing the Devil You Don’t Know: Evidence for Limited Sensitivity to Sample Size–Based Uncertainty When It Offers an Advantage. Management Science, 63(5), 1519-1528.	theory - math model + experiment + sim	strat DMkg	U in info of options	option U = uncertainty over distrn of outcomes for any one option, with more than one option available; sample size-based U = where the option U is differentiated based on the sample size of the information known (sampled) for the unknown distribution	[*OK - ambiguity-like, real U*] 'spinner' unknown/ covered (i.e., prob unknown) but sample given (min bounds), varying in sample size (range of distrns)	These decisions share two key features. First, the target for acceptable performance is a stretch target, meaning it exceeds the average or expected level for both options. And, second, the decision-maker has more information about the performance of one of the options. it is likely the low-information option is the one to go with, because of and not in spite of that lack of information. In this paper we investigate peoples’ sensitivity to amount of information when making choices under uncertainty in the presence of performance targets.	Many decision-makers seek to optimize choices between uncertain options such as strategies, employees, or products. When performance targets must be met, attending to observed past performance is not enough to optimize choices—option uncertainty must also be considered. For example, for stretch targets that exceed observed performance, more uncertain options are often better bets. A significant determinant of option uncertainty is sample size: for a given option, the smaller the sample of information we have about it, the greater the uncertainty.
Lang, M. (2017). First-order and second-order ambiguity aversion. Management Science, 63(4), 1254-1269.	theory - math, w/ theories & lemmas	DMkg ambig	U forms	ambiguity = unknown coin (states known but prob unknown); First-order ambiguity aversion - Maxmin expected utility; Second-order ambiguity aversion - Multiplier preferences	[*OK* real U, consistent*] introduce a general ambiguity premium and define first-order and second-order ambiguity aversion depending on the speed of convergence of the ambiguity premium as ambiguity disappears; second-order ambiguity aversion implies approximately uncertainty-neutral behavior for small amounts of ambiguity in contrast to second- order ambiguity aversion, first-order ambiguity aversion generally implies strikingly different predictions even if small amounts of ambiguity are involved; *BUT deals with ambiguity via subjective beliefs	Yet different models of uncertainty aversion arrive at strikingly different conclusions regarding economic behavior.. the shape of the indifference curves explains why predictions vary between different models of uncertainty aversion. In particular, the key distinction is whether indifference curves are kinked or smooth	Different models of uncertainty aversion imply strikingly different economic behavior. The key to understanding these differences lies in the dichotomy between first- order and second-order ambiguity aversion.. definition and its characterization are independent of specific representations of decisions under uncertainty... with second-order ambiguity aversion, a positive exposure to ambiguity is optimal if and only if there is a subjective belief such that the act’s expected outcome is positive; with first-order ambiguity aversion, zero exposure to ambiguity can be optimal

Lee, K. H. (2018). Cross-border mergers and acquisitions amid political uncertainty: A bargaining perspective. Strategic Management Journal, 39(11), 2992-3005.	empirical - natural experiment	strat/ IB - M&A	U as context -	Political uncertainty, or uncertainty about future government policies; The host government's economic policies (e.g., labor laws, exchange rate, corporate taxation) shape its business landscape and affect investment outcomes, and the uncertainty over such policies. Our focus is heightened political uncertainty right before national elections and its influence on cross-border M&A bargaining outcomes. National elections, in general, present the possibility of changes in economic policies and the political environment (Vaaler, 2008), and their outcomes are largely unpredictable	[*INDIRECT, one example; unpredictability a question, of oucome and of possible policies] Using national elections to measure political uncertainty. Election year is defined as a dummy equal to 1 if there is a forthcoming election in the target country within one year after the acquisition announcement, and 0 otherwise [blunt*]	Our research contributes to the literature on cross-border M&As in complementing earlier research by showing that political uncertainty influences the de facto bargaining process of cross-border deals	We argue that political uncertainty alters the relative bargaining power between acquiring versus target firms. The host country's political uncertainty makes the returns on cross-border acquisitions more unpredictable. Accordingly, foreign acquirers demand compensation for such uncertainty in negotiations, otherwise they will not consider their acquisitions profitable.
Leiblein, M. J., Chen, J. S., & Posen, H. E. (2017). Resource allocation in strategic factor markets: A realistic real options approach to generating competitive advantage. Journal of Management, 43(8), 2588-2608.	theory - model (verbal), props	strat - real optns	U as context	[*unknowns - knowable thru learning, and using options volatility*] uncertainty about factor values; real-world firms face two types of uncertainty when making capital allocation decisions—*contemporaneous U* = uncertainty regarding the current value of an asset (feedback learning), arising from incomplete info; and *prospective U* = uncertainty about its future value (real options) ..these two types of uncertainty underpin distinct sources of market failure in strategic factor markets	[*knowables; noise; ignorance - NOT nec consistent*] arrival of new information reduces U; level of contemporaneous uncertainty = a function of the noisiness of the new information; cognitive reflection (ability) can provide advantage under U; At very high levels of contemporaneous uncertainty, prospective uncertainty is, practically speaking, irrelevant	This paper develops a realistic real option theory of resource allocation decisions in strategic factor markets. We argue that competitive advantage may emerge not only from luck, or ex ante differences in information or complementary assets, but also because firms differ in a specific type of learning ability—the ability to integrate new information to exercise a contingent claim on an asset in a factor market	We recognize that market failure may result from uncertainty regarding the current and/or future value of an asset, which map, respectively, to uncertainty as modeled in the feedback learning and real options literatures
Li, C., Liang, J., & Farh, J. L. (2020). Speaking up when water is murky: An uncertainty-based model linking perceived organizational politics to employee voice. Journal of Management, 46(3), 443-469.	emperical - exprmnt + field study	HRM - voice	U as psych context	[*feeling from unpredictability of outcomes - what defined vs U characteristics*] Because of the existence of power dynamics and unwritten rules, organizational politics represent a social context marked with uncertainty that makes the cognitive appraisal of voice consequences more ifficult…*psychological U* = lack the situational understanding needed to predict the future, reduced feeling of control, the general state of unease derived from an employee's inability to predict outcomes in a given situation	[*?* unclear perceptions of quality of outcomes vs their unpredictability - historic assessment - somewhat INconsistent*] Eight items were adapted from the scale developed by Duncan (1972) to measure participants' felt inability to predict or assess the consequences of their actions in the scenario. Sample items include "It is difficult to determine if the decision was correct" and "I cannot tell if the expectations of others are met."; uncertainty perceptions are not unmanageable; created by org politics	It is not known whether and when employees speak up in contexts where the costs and benefits of voice are not readily assessed. The purpose of this research is to answer this question by exploring the impact of employees' perceived organizational politics (POP)—a social context in which complicated interpersonal relationships make it difficult to predict the outcomes of voice—on promotive and prohibitive voice	POP is negatively related to the two types of voice through psychological uncertainty, even after controlling for psychological safety and felt obligation to voice. Furthermore, job autonomy weakened the negative influence of psychological uncertainty on promotive voice, whereas job security weakened the negative influence of psychological uncertainty on prohibitive voice
Li, D., Tong, T. W., Xiao, Y., & Zhang, F. (2021). Terrorism-induced uncertainty and firm R&D investment: A real options view. Journal of International Business Studies, 1-13.	empirical - panel + quasi-expermnt	strat - R&D invst	U as context - terrorsm	[*UNDER-DEFINED*] terrorism-induced uncertainty = terrorism introduces uncertainty to firm investment decisions by disrupting global value chains, creating stress among workers, suppressing market demand, and increasing the cost of external financing.. uncertainty over returns from R&D projects?	[*NOT measured DIRECTLY; the factor that 'creates' U is measured instead*] explanatory variable Terrorism is measured by the Global Terrorism Index developed annually by the IEP using data from the Global Terrorism Database; justified in real options logic?	Drawing on real options theory, we argue that terrorism will lead firms to reduce their R&D investment because terrorism-induced uncertainty increases the value of the deferral option in R&D. However, strong national institutions, including strong patent rights protection and low expropriation hazards, will mitigate firms' disincentive to invest in R&D stemming from uncertainty.	Yet to date, there is no systematic, theoretical, or empirical inquiry into the potential impact of terrorism on firms' R&D investment, especially with a multi-country design
Li, H., Hausknecht, J. P., & Dragoni, L. (2020). Initial and longer-term change in unit-level turnover following leader succession: Contingent effects of outgoing and incoming leader characteristics. Organization Science, 31(2), 458-476.	empirical - longitudinal data	ob/ hr	effects - look to see what reduces it	that **uncertainty** arises when people encounter situations that are ambiguous and unpredictable and suggest that complete uncertainty occurs when there is a 50–50 probability that an event has positive versus negative consequence (Kramer 1999, Bradac 2001, Brashers 2001).	[inconsistent as NOT measured] - DV = turnover rates around GM exit events	theorize that leader exits disrupt the status quo and heighten remaining members' feelings of uncertainty and propose that characteristics of the outgoing and incoming leaders help members forecast their future work situation and influence their decisions to stay or leave.	we conclude that the magnitude and direction of leader-succession effects on unit turnover rates depends on uncertainty-reducing characteristics associated with both outgoing and incoming leaders. **uncertainty-management theory** (Berger and Calabrese 1975, Kramer 1999, Brashers 2001).. uncertainty-management theory suggests that what people do in response to uncertainty is determined by their appraisal and emotional responses related to the event or experience

Luan, S., Reb, J., & Gigerenzer, G. (2019). Ecological rationality: Fast-and-frugal heuristics for managerial decision making under uncertainty. Academy of Management Journal, 62(6), 1735-1759.	empirical - data + sim + experiment	strat - HR - selctn DMKg	U as context	Situations of uncertainty, in contrast, are defined by the absence of perfect foresight, where the full set of states, their consequences, or the probabilities are not known or knowable. Optimization is by definition impossible here. Under uncertainty, even large amounts of historical data do not guarantee that a strategy that was optimal in the past will also be the best in the future	[questionable consistency] Study 1 = U as an outcome hard to predict from very limited set of parameters (and history); Study 2 = U from random draws, linear environment modeled; Study 3 = just a decision w/ signals to participant (no mention of U) … overall ???	The aim of this article is to propose ecological rationality as an alternative to current views about the nature of heuristics in managerial decisions. (The key insight from the bias–variance analysis of prediction error is that, under situations of uncertainty, it is difficult for a model to have both a small bias and a small variance)	under conditions of uncertainty common to managerial decision making, managers can actually make better decisions using fast-and-frugal heuristics. Interestingly, some of the conditions typical of managerial decisions match well with those under which heuristics tend to be particularly effective, including fundamental uncertainty (rather than risk; Knight, 1921) and limited opportunities to learn (Gigerenzer, 2016). Under these conditions, it becomes exceedingly difficult to predict future states or events. Simon also argued that, in an uncertain world, which characterizes many managerial decisions, no single strategy performs best across all situations
Luo, Y. (2022). New connectivity in the fragmented world. Journal of International Business Studies, 1-19.	theory - box & arrow, tables	IB	U as context	[*U as shocks; under-defined characteristics vs potential sources*] extreme uncertainties and disruptions that jeopardize physical flows of trade, investment, and workforce; external shocks; digitization a potential source of uncertainty; climate change, cyber-attacks.	[*inconsistent in terms of what can address 'shocks'; U NOT measured] networks address some operating uncertainties;	This article illustrates this connectivity's conceptual components, theoretical framework, and broad implications for IB research. We further show how MNEs leverage new connectivity to bolster competitive vitality and organizational adaptability when facing unprecedented uncertainties in a fractured and fragile world	We are entering a significantly fragmented world that is full of extreme disruptions and adversities. New connectivity in digital form proves the essential characteristic to help international businesses better cope with these disruptions. This connectivity signifies a dominant feature of the new era of international business and a critical catalyst to address new uncertainties in today's fragmented world. However, this new normal raises a series of complex issues that extend the IB research agenda
Makarevich, A., & Kim, Y. C. (2019). Following in partners' footsteps: An uncertainty-reduction perspective on firms' choice of new markets. Journal of Management Studies, 56(7), 1314-1344.	empirical - panel	VC intl dec	U reduction	U = newness, unfamiliar contingencies, unexperienced [no formal defn]	[questionable as U not measured directly]… there are controls for domain newness, age and ave experience; there is a measure of familiarity = relevance of a firm's prior experience to a potential new market is determined by how closely related the firm's prior markets are to the potential new market	our understanding of how firms choose new markets for entry is incomplete...We theorize the mechanisms through which presence of firms' partners in new markets reduces firms' uncertainty with respect to those markets and suggest that firms tend to choose new markets where their partners are present.	The results of this study indicate that firms' choice of new markets for entry is a nuanced process that is affected by the interplay of firms' collaborative ties, the structure of their network, and firms' internal capabilities
Mislavsky, R., & Simonsohn, U. (2018). When risk is weird: Unexplained transaction features lower valuations. Management Science, 64(11), 5395-5404.	experimental - six studies (Mturk, lab)	DMkg choice w risk	risk or weirdness	[*NOT U?; but explicit yet UNDER-EXPLAINED features*(e.g., buy a coin-flip's outcome)] an aversion to unexplained transaction features by focusing on a research paradigm where researchers unintentionally manipulated the presence of unexplained transaction features and obtained a result, often referred to as the "uncertainty effect" (Gneezy et al. 2006).	[* consistent but NOT U - simply unusual, underexplained/ underexperienced conditions* weird but not risky] two options - Imagine that you are at an event where there are tokens for sale. These tokens can be redeemed at a cashier for your choice of either a $50 Walmart gift card or a $50 Target gift card. What is the highest amount you would be willing to pay for one of these tokens?	we identify a transaction attribute that negatively influences willingness to pay: the extent to which it contains features that lack an explanation (are 'weird') We conjecture that the presence of unexplained features lowers willingness to pay because it triggers reactions akin to ambiguity aversion (Ellsberg 1961, Frisch and Baron 1988, Keren and Gerritsen 1999) in general and comparative ignorance in particular (Chow and Sarin 2001	In six experiments, we show that risky options used in previous research paradigms often attained uncertainty via adding an unexplained transaction feature (e.g., purchasing a coin flip or lottery), and behavior that appears to reflect risk aversion could instead reflect an aversion to weird transactions. Specifically, willingness to pay drops just as much when adding risk to a transaction as when adding unexplained features. Holding transaction features constant, adding additional risk does not further reduce willingness to pay. We interpret our work as generalizing ambiguity aversion
Moon, A., & Nelson, L. D. (2020). The uncertain value of uncertainty: When consumers are unwilling to pay for what they like. Management Science, 66(10), 4686-4702.	empirical - experimental labs	DMkg	U as context	[*RISK+, inconsistently described*] uncertain outcome? = reverse auction vacation, coin-flip w/ outcome states known, unknown prob distrn w/ limited known possible states	[*consistent w/ definition - RISK {lottery w/ known possible outcomes but sometimes unknown prob distrbn} - not U*] Imagine that there is a lottery in which you will receive a 1-pound bag of ground coffee from one of two possible places (both are equally likely).	Uncertainty brings an emotional mixture that makes valuation a challenge. WTP is often thought of as a proxy for attitudinal measures, such as expected enjoyment (e.g., Kahneman et al., 1999), but we found that these two measures display distinct patterns for this uncertain prospect. These findings also provide initial evidence against a direct risk aversion explanation of the uncertainty effect.	Do people have an irrational dislike for risk? People pay less for uncertain prospects than their worst possible outcomes, and researchers have proposed that this effect occurs because people strongly dislike risk. We challenge this proposition across seven studies.

Neururer, T., Papadakis, G., & Riedl, E. J. (2020). The effect of reporting streaks on ex ante uncertainty. Management Science, 66(8), 3771-3787.	empirical - fin dB	FIN - investr	U as context, mitigation	[*about what defined, but UNDER-DEFINED in terms of U characteristics - unknown distribution..] investor uncertainty = regarding the content of upcoming firm earnings announcements	[*questionable* all historically measured as volatilities, variances - more RISK than U*] We use two dependent variables related to investor uncertainty for the earnings announcement: implied volatilities, which provides a direct measure of ex ante uncertainty, and the variance risk premium (VRP), which provides a measure of investor perceptions and attitude regarding uncertainty. Both variables are calculated using short-term (30-day) options with maturities surrounding the impending quarterly earnings announcements	This paper examines whether consistency in achieving earnings targets—which we refer to interchangeably as reporting consistency and reporting streaks—is a determinant of investor uncertainty regarding the content of upcoming earnings announcement. Thus we predict that perceptions of un- certainty surrounding the upcoming earnings announcement will be decreasing in the length of the reporting streak	This paper predicts and finds that investor uncertainty surrounding a key information release event—the earnings announcement—is decreasing in a firm's reporting streak. We use two proxies related to investor ex ante uncertainty and corresponding pricing of such uncertainty: option-implied volatilities and variance risk premiums; both are measured with maturities surrounding the impending quarterly earnings announcement...
Nguyen, Q., Kim, T., & Papanastassiou, M. (2018). Policy uncertainty, derivatives use, and firm-level FDI. Journal of International Business Studies, 49(1), 96-126.	empirical - panel	strat - FDI + derivtv	U reduction thru hedge	U = Economic Policy Uncertainty = re: timing and content of govtl policy changes; As in Frank Knight (1921), we define uncertainty as individuals' *inability to forecast* the likelihood of events happening;	[inconsistent] ..to develop our EPU index, we consider the leading newspapers in each country of our sample like Baker et al. (2016), we scale the raw counts by the total number of articles in these newspapers that satisfy our search criteria, in the same newspaper for each country in our sample. This process yields an EPU series for each country, which we normalize to unit standard deviation for the 2003–2013 time period. Finally, we rescale the EPU series to an average value of 100 from 2003 to 2013.; We use the S&P 500 volatility index (VIX) to proxy for global policy uncertainty.	We explore the link between uncertainty in economic policy, firm-level FDI, and firm hedging behavior – building upon a newspaper-based index of economic policy uncertainty (EPU). We find that the relative difference in EPU between home and host country has a significant relationship with FDI.)..	contribute to the literature by linking national policy uncertainty to firms' real managerial decision-making – in this case FDI and corporate derivatives use. Our study quantifies the effect of EPU on firm level FDI and hedging behavior
Petracou, E. V., Xepapadeas, A., & Yannacopoulos, A. N. (2022). Decision Making Under Model Uncertainty: Fréchet–Wasserstein Mean Preferences. Management Science, 68(2), 1195-1211.	theory - math model w/ props	DMkg	U as context, of a variable	[unknown probability distrbn = UNCERTAINTY, but with multiple guesses - ok IRL] if a decision-maker (DM) faces a random variable (lottery) X and the probability measure Q can describe the distribution of X, then according to the expected utility functional, the utility of X is U(X) = EQ[u(X)]. This is a straight-forward basis for decision rules; however, it is not clear what the basis would be if there are doubts as to whether Q is the right model to describe the distribution of X—a situation usually referred to as *model uncertainty*	[inconsistent - measured as DISPERSION of the guesses, not as objective U itself**] Asks a set of experts to provide a model describing a random variable X. The DM wishes to evaluate X, a task that requires determining the probability distribution of X. The experts are not unanimous concerning the distribution of X; hence, the DM faces n possible probabilistic models (priors) Qi, with the set M:= {Qi, i _ 1, : : : ,n} regarded as a reference set. The DM is not confident of the absolute validity of any of them, which constitutes the case of model uncertainty	This paper contributes to the literature on decision-making under multiple probability models by studying a class of variational preferences. These preferences are defined in terms of Frechet mean utility functionals, which are based on the Wasserstein metric in the space of probability models	What would happen if more than one probability measure for X exists? Should the DM pick one model out of this set, use ex ante information to construct a subjective prior probability over models (Marinacci 2015), or do something else?
Sartor, M. A., & Beamish, P. W. (2018). Host market government corruption and the equity-based foreign entry strategies of multinational enterprises. Journal of International Business Studies, 49(3), 346-370.	empirical - panel	strat - DMkg MNE	U as context; signalled by corrptn; reduction	***institutional U*** => Informal institutions garner at least two distinct types of uncertainty. ***Behavioral uncertainty*** is uncertainty related to the behavior of transaction partners (Griffith, Harmancioglu, & Droge, 2009). ***Environmental uncertainty*** is the inability to predict the external environment within which the MNE and its subsidiaries are situated. One type of environmental uncertainty that is especially relevant to our research context, ***response uncertainty***, is the inability to predict the likely consequences of a response choice (Milliken, 1987).. that corruption can be a general source of uncertainty	[questionable - trust to mitigate beh U] INDIRECT/ PROXY as corruption TYPE=> ..under conditions of more pervasive grand corruption, we proposed that the primary source of uncertainty is environmental uncertainty, while behavioral uncertainty will predominate under conditions of heightened petty corruption pervasiveness.. measures for both grand corruption and petty corruption, we selected items from the Global Competitiveness Reports (GCR)	propose that grand and petty corruption precipitate different types of uncertainty (environmental and behavioral) which motivate MNEs to vary their equity-based foreign entry strategies (entry mode and partnering).. How does host market government corruption impact the equity-based foreign entry strategies of multinational enterprises (MNEs)?	leverage insights from transaction cost economics to advance an uncertainty-oriented framework which can be used to explain the impact of host market government corruption on the equity-based entry strategies of MNEs.

Sartor, M. A., & Beamish, P. W. (2020). Integration-oriented strategies, host market corruption and the likelihood of foreign subsidiary exit from emerging markets. Journal of International Business Studies, 51(3), 414-431.	empirical - Japenese MNE activity	strat - IB - exit dec	U as context, corruptn as signal; reduction	U = agent behavior unpredictability + difficulty in predicting outcomes of decisions; ***Behavioral*** uncertainty is the lack of predictability with respect to the behavior and actions of the foreign subsidiary's agents including its employees, managers, equity partners, and others empowered to act on behalf of the subsidiary in the host country (collectively, "agents") (Krishnan, Martin & Noorderhaven, 2006; Zhao, Luo & Suh, 2004). ***Environmental*** (response) uncertainty (herein, ''environmental uncertainty'') is the lack of predictability with respect to the outcomes and consequences of the firm's decisions in the host country environment	[inconsistent - U measured INDIRECTLY only through corruption levels] The level of corruption in foreign host markets constitutes "an important source of uncertainty" for multinational enterprises that invest in emerging markets (Luo, 2011; Puffer, McCarthy & Boisot, 2010).. Host market corruption was measured using Transparency International's Corruption Perception Index (CPI). We reverse-coded the CPI data so that higher scores indicate a higher level of corruption	Our work provides guidance to developed country MNEs that seek insights with respect to the utility of strategies that might be implemented in host emerging markets characterized by more pronounced levels of corruption	We theorize that uncertainty operates as the mechanism that underpins the corruption market exit relationship, and that an MNE's strategic choices with respect to its subsidiary investments contribute to reducing this uncertainty.. Foreign-investing MNEs frequently structure their subsidiary investments to reduce uncertainty (Sartor & Beamish, 2014)
Shum, S., Tong, S., & Xiao, T. (2017). On the impact of uncertain cost reduction when selling to strategic customers. Management Science, 63(3), 843-860.	mathematical model - props	DMkg strat	U as context - tech evo and cost effects	[UNDER-DEFINED] at the beginning of the selling season, the firm faces uncertainty in future cost, and customers may also face uncertainty in future price.. we focus on supply uncertainty instead of demand uncertainty. In our model, the future production cost is uncertain	[*questionable due to under-definition - U as risk - as known mean and variance*] ε measures uncertainty in cost reduction and has a mean of 0 and variance σ^2	In particular, a firm is usually uncertain about the magnitude of cost reduction at the beginning, and will only know it as technology evolves. In this case, what is the impact of the uncertainty in cost reduction?,..	examine the impact of cost reduction under dynamic pricing, price commitment, and price matching when cost reduction can come from production learning or from technology advancement. The firm makes pricing decisions when facing uncertainty in future cost, and strategic customers decide whether to wait when facing uncertainty in future price. We show that in general the firm's profit is higher when future cost is more uncertain
Skandera, D. J., McKenny, A. F., & Combs, J. G. (2022). The influence of task environmental uncertainty on the balance between normative and strategic corporate social responsibility. Journal of Management, 01492063211070270.	empirical - panel	strat - CSR	U as context	[*U as incomplete info about outcomes, then reduced to plus others' expectations] Uncertainty, defined as managers' incomplete knowledge regarding an action's potential consequences; Uncertainty related to resource access and firms' ability to meet diverse stakeholder expectations; uncertainty due to changing stakeholders and stakeholder expectations;	[inconsistent - *U can be reduced by imitation? .the three sources include knowables and unpredictables (dynamism); measures on IND characteristics, vs U directly*] the influence of munificence-, complexity-, and dynamism-based uncertainties... Uncertainty about what stakeholders expect or the consequences of failing to meet expectations encourages managers to reduce risk by leaning more on established industry CSR norms; By shaping the amount and nature of uncertainty managers perceive within an industry, each task environment dimension – munificence, complexity, dynamism – influences firm behavior...resource scarcity leads to uncertainty about the availability of and access to resources...measure munificence in industries' task environments, we calculated each industry's standardized sales growth; measure complexity in industries' task environments, we calculated the inverse of each industry's average Herfindahl-Hirschman (concentration) Index; measure dynamism in industries' task environments, we calculated each industry's standardized sales volatility	We draw from optimal distinctiveness research to explain how different types of uncertainty created by industry task environments shift the balance between conforming to industry CSR norms and pursuing differentiated CSR activities; task environmental uncertainty as an antecedent to how managers attempt to achieve optimal distinctiveness regarding CSR and explains how different sources of uncertainty shape these attempts; Has the influence of industry task environments (in terms of munificence, complexity, and dynamism) on the balance between normative industry effects and strategic firm effects on CSR variance strengthened over time?	we find that managers emphasize normative (strategic) CSR to a greater (lesser) extent in low-munificence and high-complexity task environments, where uncertainty drives managers toward the security of established industry CSR norms, and to a lesser (greater) extent in high-dynamism task environments, where following uncertain CSR norms is less attractive
Spieth, P., Röth, T., Clauss, T., & Klos, C. (2021). Technological frames in the digital age: Theory, measurement instrument, and future research areas. Journal of Management Studies, 58(7), 1962-1993.	empirical - survey	strat, DMkg - sens-mkg	U as context	[*unknowns over many dimensions*] tech uncertainty = when actors encounter digital technologies for the first time, they are unsure about what they are, how they perform, against which criteria they should be judged, and how they will affect their business; sense-making w/ frames	[inconsistent – as NO MEASURE of U*] survey Qs about change and job insecurity; nothing about the uncertainty defined in paper about tech itself	we theorize on the antecedent of technological frames on the individual level and undertook a rigorous scale development process encompassing five steps and samples. The resulting measurement instrument assesses five distinct but interrelated dimensions of an actor's technological frame (personal attitude, application value, organizational influence, industrial influence, and supervisor influence).	Digital technologies fuel technological change that generates substantial uncertainty and complexity. Corporate actors rely on their technological frames to cope with these challenges. Technological frames determine how actors interpret, assess, and shape a technology's development, usage, and trajectory. However, the research fails to provide insights into the microfoundations that can explain the consequences of heterogeneity in technological frames

Sutton, T., Devine, R. A., Lamont, B. T., & Holmes Jr, R. M. (2021). Resource dependence, uncertainty, and the allocation of corporate political activity across multiple jurisdictions. Academy of Management Journal, 64(1), 38-62.	empirical - panel (US)	strat - dmkg	U as context - two types	"State uncertainty" exists when managers and their firms find that the external environment is unpredictable - not predict how major stakeholders will behave; "Response uncertainty" is a lack of understanding about what response options exist, or about the consequences of response options, for addressing conditions in the environment (Milliken, 1987: 137) - source or object of response strategies changes.	[inconsistent – as U measured very indirectly; NOT about prediction*] State U = we used the Janis–Fadner coefficient of imbalance (Janis & Fadner, 1965) to measure the national media tenor of each firm in a given year + local media tenor measure was constructed using the same method that was employed for national media tenor (but with local newspapers) + measure SMO resources, we scaled the income received by environmental SMOs headquartered in a state by the state's population; Response U = TMT turnover, we divided the number of executives who left each year by the number of TMT members at the beginning of that year (Walsh, 1988) + measures for gubernatorial and legislative turnover by dividing the number of newly elected officials by the total number of each state's offices	negative national media tenor and oppositional social movement organization resources increase state uncertainty (i.e., government's likely behavior toward firms becomes less predictable), strengthening the relationship between firms' dependence on jurisdictions and their use of political contributions in those jurisdictions & top management team turnover and politician turnover increase response uncertainty (i.e., the effectiveness of firms' efforts to manage their dependence becomes less clear), weakening the relationship between dependence and political contributions	We explain how some environmental factors increase the state uncertainty associated with firms' dependence on government jurisdictions, whereas other factors increase response uncertainty
Tannenbaum, D., Fox, C. R., & Ülkümen, G. (2017). Judgment extremity and accuracy under epistemic vs. aleatory uncertainty. Management Science, 63(2), 497-518.	empirical - 4 studies, online + lab	DMkg - judgmnt	U as context - 2 types	uncertainty of inherently stochastic events (*aleatory uncertainty*) and uncertainty in assessments of what is or will be true (*epistemic uncertainty*).. For the purposes of this paper, we distinguish events whose outcomes are viewed as potentially knowable (*epistemic uncertainty*) from events whose outcomes are viewed as random (*aleatory uncertainty*)	[*INCONSISTENT - one vs many events, subjective for EARS, then based on disinformed prompt] epistemic as singular event (prob) & aleatory as one in a series of similar events (prob); participants rated the degree of epistemic and aleatory uncertainty associated with determining the outcome of the game. This was done using a 10-item epistemic–aleatory rating scale (EARS) that has been developed and validated elsewhere (Fox et al. 2016). The scale prompted participants to rate their agreement with a set of statements that measured feelings of both epistemic uncertainty (e.g., "determining which team will win is something that becomes more predictable with additional knowledge or skills") and aleatory uncertainty (e.g., "determining which team will win is something that has an element of randomness"); we varied the task instructions to either promote pattern seeking (thereby making epistemic uncertainty salient) or promote thinking about the relative frequencies of stochastic events (thereby making aleatory uncertainty salient).	we focus on judgment extremity, the degree to which probabilistic beliefs approach 0 or 1… We assert that people naturally distinguish two dimensions of uncertainty (Fox and Ülkümen 2011), and this distinction critically influences judgment extremity.. Across four studies, we find that judgments are more extreme for events viewed as more epistemic and less extreme for events viewed as more aleatory	People view uncertain events as knowable in principle (epistemic uncertainty), as fundamentally random (aleatory uncertainty), or as some mixture of the two. We show that people make more extreme probability judgments (i.e., closer to 0 or 1) for events they view as entailing more epistemic uncertainty and less aleatory uncertainty.. Judgment under uncertainty entails two challenges— what to believe and how strongly to hold those beliefs.
Tian, X. (2022). Uncertainty and the shadow banking crisis: Estimates from a dynamic model. Management Science, 68(2), 1469-1496.	theory - math model w/ data calibrtn	FIN - bnkg	U as context	[UNDER-DEFINED - defines what is shocked but not how - states, probabilities; unpredictability is U in real life*] uncertainty shocks = ; During the 2007–2009 financial crisis, the asset return uncertainty of shadow banks increased by 147%;	[questionable – as measures of noise and volatility based on real data; ex post; in model use of probabilities of shocks over time*] The uncertainty on bank asset return σt is then defined as the cross-sectional dispersion of the residual eit…Asset return uncertainty is defined as the standard deviation of the residual term after fitting the panel data of individual bank gross ROA into an AR(1) process, controlling for time and bank-level fixed effects and other bank-level heterogeneities; Also use option prices information of non-bank financial institutions in the Option Metric database and back out the implied uncertainty using the Black-Scholes formula. Uncertainty is measured as the annual average of daily (365-day) implied volatility of at-the-money-forward call options; in model = Denote $\sigma t-1$ as the aggregate shock to the standard deviation of idiosyncratic asset return shocks	Despite the substantial and growing literature on uncertainty shocks and shadow banks, little work has been done to quantify the extent to which uncertainty shocks could explain the large deleveraging and asset contraction in the shadow banking industry and study the impact of alternative shocks in a comprehensive manner. This paper aims to fill the gap by providing a tractable quantitative framework to dissect the shadow banking dynamics	develop a quantitative framework with uncertainty fluctuations and endogenous bank default to study the dynamics of shadow banking. I argue that the increase in asset return uncertainty during the crisis results in a spread spike, making it more costly for shadow banks to roll over their debt in the short-term debt market. As a result, these financial institutions are forced to deleverage, leading to a decrease in credit intermediation

Venus, M., Stam, D., & Van Knippenberg, D. (2019). Visions of change as visions of continuity. Academy of Management Journal, 62(3), 667-690.	empirical - field (survey) + lab studies	ldrshp - vision	U level as context; reduce	Employee experience work U = work + envir U/ predictability; work uncertainty, which can be defined as the sense of doubt about the meaning of a work situation, or of what it will bring in the future (Bordia et al., 2004; Colquitt, LePine, Piccolo, Zapata, & Rich, 2012); Study 2 = Uncertainty was operationalized as the amount of uncertainty regarding the consequences of the change	[consistent] Study 1 = To assess employee experienced work uncertainty, we used the 4-item measure that was developed by Colquitt et al. (2012) in order to represent key elements of work and environmental uncertainty. Examples of items are "There is a lot of uncertainty at work right now" and "I cannot predict how things will go at work; Study 2 = = the high uncertainty condition, however, participants read statements such as "the changes could be very disruptive and there is a lot of uncertainty right now," "it could threaten the continuity with regard to the atmosphere in the programs and to the way students interact with each other," and "because of this, although not entirely certain, the changes could be seen as a threat to the continuity with regard to the identity of the program,"	we hypothesize that leaders that communicate visions of change can address this resistance by assuring followers that the essence of the organizational identity will remain unchanged—making their vision of change also a vision of continuity. In line with our proposition that collective continuity is valued because it serves an uncertainty-reduction function, such visions should be more predictive of vision effectiveness the higher follower work-related uncertainty	by showing that the uncertainty reduction motive (Hogg, 2012) can play a key role in explaining reactions to change, this research adds to the literature that has adopted a social identity perspective in explaining reactions to change
Villena, V. H., Choi, T. Y., & Revilla, E. (2019). Revisiting interorganizational trust: is more always better or could more be worse?. Journal of Management, 45(2), 752-785.	empirical - survey + secondary	strat - biz relnshp	U as context	[external, unpredictable - many states known; history known from which to form beliefs, but alertness matters? - UNDER-DEFINED in character vs as to what] *buyer dependence U* = uncertainty about its supplier's behavior or potential supply disruption; market instability U = uncertainty engendered by its competitors, new technology, and changing customer needs... accurate and complete information is more difficult to obtain, interfirm coordination becomes more difficult, and risk taking becomes a mainstay... in uncertain markets, a buyer's alertness becomes more critical..	[INCONSISTENT - dependence is NOT U; market is volatility not unpredictability*] Buyer dependence: indicate the extent to which - If the relationship with this supplier dissolves, your company would face many troubles; If the relationship with this supplier dissolves, it would create important difficulties for your company; If the relationship with this supplier dissolves, your company would lose significant knowledge; If the relationship with this supplier dissolves, your company would lose significant investments... Information for market instability was obtained from the SABI databases over the 2003-to-2007 period. Market instability measures the net sales' volatility of each buyer's industry over the preceding 5 years	This study conducts an investigation of interorganizational trust and its positive and negative effects. We consider how positive and negative effects operate differently under two types of uncertainties —buyer dependence and market instability. Trust is studied in the buyer–supplier relationship (BSR) context from the buyer's perspective	The results also suggest that the positive and negative effects of trust become more pronounced when buyers are highly dependent on suppliers or when environmental uncertainty surrounding buyers is low… environmental uncertainty stemming from political, technological, and regulatory sources may also play a role in the trust– performance association. As such, we suggest that future studies should consider these additional sources of uncertainty
Wang, X., Cho, S. H., & Scheller-Wolf, A. (2021). Green technology development and adoption: competition, regulation, and uncertainty—a global game approach. Management Science, 67(1), 201-219.	theory - math model w/ props	strat - tech adptn	U in choice's payoff	[U of what given; doesn't specify how - in states, probabilities, rival reaction] the uncertainty regarding the benefits of a green technology may arise from different sources: The uncertainty concerning an enhanced reputation and demand gain is primarily a result of the market and the new green technology itself, whereas the uncertainty around the reduced risks from regulatory fines stems from the uncertainty surrounding government regulation	[questionable given under-definition – seems mostly RISK = know distrn of noise term* inconsistent; NOT U] because of uncertainty, firms do not know what decisions other firms will make. To capture this, we posit that firms may share basic market information but may still disagree about the payoff of adopting the technology; specifically, we model them as observing noisy private signals about the payoff... The unknown parameter θ, representing the maximum of this benefit when $\alpha = 0$, is called the "fundamental" of the new technology. Firm 1 cannot observe θ directly, but instead it observes a noisy private signal $x1 = \theta + \varepsilon1$, where $\varepsilon1$ is distributed uniformly on $[-e, +e]$ with $e > 0$ (where e is common knowledge). We assume that firm 1's prior belief on θ is very noisy, causing firm 1 to rely fully on its signal x1 to estimate θ...also a regulatory probability that is complex, but has only two known states as outcomes (parameters for distrn seem known)	In practice, the benefit of a new technology is often highly uncertain. We aim to provide insight into how this uncertainty of a new technology's payoff and the strategic complementarity induced by regulation based on industry capability, jointly affect firms' incentives to develop or adopt a new green technology. To do this, we develop a game-theoretic model	We develop a novel model of regulation in which the probability of a stricter standard being enacted increases with an industry's voluntary adoption level. In addition, in our model, the benefit of a new green technology is both uncertain and correlated across firms, and firms' decisions exhibit both strategic substitutability (because the marketing benefit of a new green technology decreases as more firms adopt it) and complementarity (because the stricter standard is more likely to be enforced as more firms adopt it).

Westphal, J. D., & Zhu, D. H. (2019). Under the radar: How firms manage competitive uncertainty by appointing friends of other chief executive officers to their boards. Strategic Management Journal, 40(1), 79-107.	EMP(survey)	strat	reduce	**Competitive uncertainty** is higher to the extent that top executives have difficulty reliably predicting or anticipating the actions of competitors or the consequences of these actions (i.e., in the absence of communication) (Soda & Usai, 1999; Sutcliffe & Zaheer, 1998). Similarly, competitive uncertainty arises from difficulties in inferring the intentions or plans of competitors from their actions alone (Porter, 1980).	[consistent] We used multiple measures of competitive uncertainty. First, we used a multi-item survey scale that directly measures competitive uncertainty as defined in our theoretical argument. We developed a second measure of competitive uncertainty by conducting a text analysis of security analyst reports for companies in the sample frame in each year of the study. We screened for sentences in the reports that referred to competitive uncertainty using a dictionary of synonymous words and phrases (available from the authors on request). As our third measure of competitive uncertainty, we used the mean-deviated concentration level of the focal firm's primary industry, following a long line of prior research (Burt, 1983; Palmer et al., 1995; Pfeffer & Salancik, 1978; Westphal et al., 2006) these prior studies suggest that competitive uncertainty tends to be relatively high in industries with an intermediate level of market concentration.	Our theory suggests that the appointments of outside directors who are friends of rival firms' CEOs help the firm manage competitive uncertainty by gaining access to important information about rival firms and achieve effective interfirm cooperation, which reduces the likelihood of destructive competition and provides a source of competitive advantage relative to firms that lack such ties	1. How predictable would the actions of competitors be, in the absence of measures to reduce the uncertainty? [5-point scale: not at all… somewhat… very predictable]. 2. How predictable would competition with other firms be, without strategies to reduce the uncertainty? [5-point scale: not at all…somewhat…very predictable]. 3. To what extent would it be difficult to anticipate the actions of competitors, without strategies to reduce the uncertainty? [5-point scale: not at all…somewhat…very much so]. 4. To what extent would it be difficult to infer the intentions or plans of competitors from their actions alone? [5-point scale: not at all… somewhat… very much so]. 5. To what extent would it be difficult to predict competition with other firms, in the absence of measures to reduce the uncertainty? [5-point scale: not at all…somewhat…very much so]. 6. [At the focal firm] how much uncertainty would you face in regards to the actions of competitors, in the absence of strategies to reduce the uncertainty? [5-point scale: very little uncertainty… some uncertainty…a great deal of uncertainty].
Wibbens, P. D. (2021). A formal framework for the RBV: Resource dynamics as a Markov process. Strategic Management Journal.*	math model w/ sim	strat - RBV; invstmt	U as context -	fundamentally uncertain - Uncertainty plays a fundamental role in resource dynamics: it allows firms having heterogeneous expectations about the value of resources, leading to strategic factor market imperfections so as to obtain a resource below its “true” value, leading to above-normal returns; internally a firm's own resource position might be unobservable – such causal ambiguity can by itself already lead to sustained performance heterogeneity; resource positions can change due to exogenous shocks, or “luck”	[questionable as *captures only the 'luck'* *uses probability and path-dependency only*] The Bellman equation can be used to analyze a wide range of strategic situations under uncertainty; a matrix Q called the infinitesimal generator completely characterizes the evolution of the stochastic process ..follows from the Markov and time-homogeneity assumptions (Bhat &Miller,2002,p.195). The transpose of Q describes the transition rate from one state to another over an infinitesimally short period	the primary contribution of this article as the specific implementation and mathematical language of the Markov framework. Perhaps the most useful result in the framework is a version of the Bellman equation that links profit, investment, and value in a competitive game with infinite horizon, as it defines a rigorous and unambiguous notion of “value” within the RBV	This article introduces a formal framework for long-term resource dynamics under uncertainty.. central premise is that resource positions of competing firms in an industry can be identified with states in a Markov model
Wibbens, P. D. (2021). The role of competitive amplification in explaining sustained performance heterogeneity. Strategic Management Journal, 42(10), 1769-1792.	formal model	strat - comp dyn	effects of U as prob over time	the investment dynamics determine the (stochastic) evolution of the resource positions over time.. over a short period of time Δt, the probability of gaining a resource is $f(y)\Delta t$. Thus, the function $f(y)$ is the resource gain hazard, describing the expected rate of gaining resources per year for a given investment rate y.	[consistent] Over time, the result of firm investment is characterized by a probability distribution, which captures the fact that resource investments are uncertain due to causal ambiguity (Dierickx & Cool, 1989; Lippman & Rumelt, 1982).	what factors shape the accumulation of resource stocks and the resulting performance heterogeneity in an oligopoly? .. introduce an oligopolistic model of resource competition under uncertainty.	uncertainty as probability in what appears to be a sim/ algebraic analysis of a model

Xie, X., Shen, W., & Zajac, E. J. (2021). When is a governmental mandate not a mandate? Predicting organizational compliance under semicoercive conditions. Journal of Management, 47(8), 2169-2197.	empirical - panel	strat - DMkg cmplnc	U as context	[*IMPLIED, not explicitly defined; outcome states known, probabilities expectedly knowable = RISK?] enforcement U = unpredictable(?) requirement to adhere to a law/ regulation	[inconsistent as *NOT MEASURED*] outcomes (compliance) are measured rather than the decision-related uncertainties; also measured are factors that could influence compliance, like institutional development in locality of firm and media coverage	our study seeks to extend prior research by (1) introducing and defining the notion of "semicoercive" pressures in the not-infrequent settings where governmental mandates are issued in an institutional environment with considerable enforcement uncertainty, (2) introducing the possibility of (and then documenting the existence of) surprising heterogeneity in firms' behavioral response to what appears to be a clear governmental mandate, and (3) explaining the specific direction of this heterogeneity by developing and testing a framework for analysis that identifies ex ante the legal, political, and social factors that shape firms' differential sensitivity to the mandate	While institutional theorists have long viewed governmental mandates as a prototypical coercive pressure generating homogeneous organizational compliance, we suggest that such mandates are often subject to enforcement uncertainty, resulting in a pressure more aptly characterized as "semicoercive" and a compliance result more aptly characterized as heterogeneous
Yao, F. K., Jiang, K., Combs, D. R., & Chang, S. (2020). Informal institutions and absorptive capacity: A cross-country meta-analytic study. Journal of International Business Studies, 1-19.	empirical - (meta)	intl	reduce	According to Williamson (1985), uncertainty can be conceptualized in terms of **behavioral uncertainty** and **environmental uncertainty**. Whereas behavioral uncertainty results from the possibility of "strategic non-disclosure, disguise, or distortion of information" by exchange partners, environmental uncertainty concerns an organization's inability to predict and comprehend the external environment (Williamson, 1985: 57).	[inconsistent as] U not measured	how do informal institutions in society alter the relationship of a firm's investment in absorptive capacity and improvements in its knowledge, innovation, and eventually performance –	we highlight reducing behavioral and environmental uncertainty as the mechanisms whereby informal institutions facilitate the conversion from a firm's absorptive capacity to its performance outcomes
Zhu, T., Xie, J., & Sim, M. (2022). Joint estimation and robustness optimization. Management Science, 68(3), 1659-1677.	theory - new method, w/ case study	DMkg - optmzn	U as context	[*parameter value inaccuracy; based on real data, so more RISK than U*] In classical robust optimization, the input parameters are not specified exactly, but instead are characterized by a so-called uncertainty set	[consistent - *estimatable set, consistent with statistical estimation of RISK, not U] The estimate uncertainty set can be approximately interpreted as the set of all parameter values (i.e., predictive models) that would not be rejected by a likelihood ratio test … maximizing the size of the estimate uncertainty set is asymptotically equivalent to maximizing the corresponding confidence level... U(r) is the uncertainty set, which is usually a normed ball of radius r centered at the estimate ˆβ,	how does one account for uncertainty in the predictive model in a data-driven way when making a decision… the JERO model maximizes the uncertainty set's size so as to obtain solutions that are relatively immune to estimation errors...the goal is to find a solution x that remains feasible for the largest possible uncertainty set	We propose a joint estimation and robustness optimization (JERO) framework to mitigate estimation uncertainty in optimization problems by seamlessly incorporating both the parameter estimation procedure and the optimization problem. Toward that end, we construct an uncertainty set that incorporates all of the data, and the size of the uncertainty set is based on how well the parameters are estimated from that data when using a particular estimation procedure..

Table 4 – Complementary Table of Raw Data and Initial Analysis of Select Psychology and Economics Literature related to Uncertainty

Citation/ Source	dB =E/P	TH/EMP/SURV	U - Type/ Defn (Abstract)	U - Context (Abstract)
Al-Najjar, N. I., & Shmaya, E. (2019). Recursive utility and parameter uncertainty. Journal of Economic Theory, 181, 274-288.	E	th - model	consumption process with unknown parameter	explore how the Epstein-Zin utility captures an agent's sensitivity to parameter uncertainty; the agent is averse to parameter uncertainty
Antonakakis, N., Gabauer, D., Gupta, R., & Plakandaras, V. (2018). Dynamic connectedness of uncertainty across developed economies: A time-varying approach. Economics Letters, 166, 63-75.	E	emp	Economic uncertainty	we focus on the transmission channel of uncertainty between developed economies, examining potential spillover effects; our empirical results indicate of a significant spillover of uncertainty from the E.U. to the U.S.
Azqueta-Gavaldón, A. (2017). Developing news-based economic policy uncertainty index with unsupervised machine learning. Economics Letters, 158, 47-50.	E	th - index	a news-based Economic Policy Uncertainty (EPU) index	creating a news-based Economic Policy Uncertainty (EPU) index by employing an unsupervised algorithm able to deduce the subject of each article without the need for pre-labeled data
Baillon, A., & L'haridon, O. (2021). Discrete Arrow–Pratt indexes for risk and uncertainty. Economic Theory, 72(4), 1375-1393.	E	th model	applicable to both risk and uncertainty [?]	Arrow-Pratt index, a gold standard in studies of risk attitudes; introduce a discrete Arrow-Pratt index, and its relative counterpart, that can be directly obtained from choices
Baillon, A., Liu, N., & van Dolder, D. (2017). Comparing uncertainty aversion towards different sources. Theory and Decision, 83(1), 1-18.	E	th - defns	comparative uncertainty aversion for a single agent towards different sources of uncertainty; ambiguity aversion	propose simple behavioral definitions of comparative uncertainty aversion for a single agent towards different sources of uncertainty. Our definitions allow for the comparison of utility curvature; to study the effects of learning and situational factors on uncertainty preferences, and to compare uncertainty preferences between different agents
Balbus, Ł., Reffett, K., & Woźny, Ł. (2018). On uniqueness of time-consistent Markov policies for quasi-hyperbolic consumers under uncertainty. Journal of Economic Theory, 176, 293-310.	E	th - model	condition on a transition probability; works for returns unbounded from above [?]	a time-consistent stationary Markov consumption policy for a quasi-hyperbolic household under uncertainty
Barnett, W. A., Han, Q., & Zhang, J. (2021). Monetary services aggregation under uncertainty: A behavioral economics extension using Choquet expectation. Journal of Economic Behavior & Organization, 182, 437-447.	E	th - math model	uncertainty under weaker axiomatic assumptions by using Choquet expectations	A central tenet of behavioral economics is that the axioms producing expected utility maximization by consumers are too strong to be descriptive of rational behavior; as a special case under the stronger assumption of additive probability measure
Basu, S., & Bundick, B. (2017). Uncertainty shocks in a model of effective demand. Econometrica, 85(3), 937-958.	E	emp + model	uncertainty about the future; An identified uncertainty shock in the data; We calibrate our uncertainty shock process using fluctuations in implied stock market volatility; applies to a large set of shocks that change expectations of the future without changing current fundamentals.	Can increased uncertainty about the future cause a contraction in output and its components? argue that increased uncertainty about the future likely played a role in worsening the Great Recession.
Basu, S., & Bundick, B. (2018). Uncertainty shocks in a model of effective demand: Reply. Econometrica, 86(4), 1527-1531.	E	emp	uncertainty shock; the propagation of uncertainty shocks to macroeconomic outcomes.	economy's response to an uncertainty shock

Battigalli, P., Cerreia-Vioglio, S., Maccheroni, F., & Marinacci, M. (2017). Mixed extensions of decision problems under uncertainty. Economic Theory, 63, 827-866.	E	th - model	uncertainty, a decision maker considers a set of alternative actions whose consequences depend on uncertain factors beyond his control; each mixed action induces a map from states to probability distributions over consequences	We argue that our framework is more expressive as it allows us to be both explicit and parsimonious about the assumed richness of the set of conceivable actions, and to directly capture preference for randomization as an expression of uncertainty aversion.
Beissner, P., & Riedel, F. (2019). Equilibria under Knightian price uncertainty. Econometrica, 87(1), 37-64.	E	th - model analysis	Knightian uncertainty about state prices; ambiguity	study economies with Knightian uncertainty about state prices; Arrow-Debreu equilibria turn out to be non-robust with respect to the introduction of Knightian uncertainty
Berardi, M. (2022). Uncertainty and sentiments in asset prices. Journal of Economic Behavior & Organization, 202, 498-516.	E	math model+	the uncertainty generated by imperfect information; the source of noise generating uncertainty, whether fundamental or informational; sparked by exogenous shocks to beliefs	a novel way to model sentiments in asset prices; the higher the uncertainty, the larger the scope for psychological attitudes to affect expectations.
Berger, L., & Bosetti, V. (2020). Characterizing ambiguity attitudes using model uncertainty. Journal of Economic Behavior & Organization, 180, 621-637.	E	expermnt	model uncertainty; quantify the strength of individuals' attitude toward ambiguity in the context of the smooth model	the results of an experiment eliciting individuals' attitudes toward risk and model uncertainty; results provide empirical evidence of decreasing absolute ambiguity aversion (DAAA) and constant relative ambiguity aversion (CRAA); shed new light on the way ambiguity attitudes may affect important decisions, such as the choice of health insurance policies or the optimal investment strategy in the face of climate change
Bich, P. (2019). Strategic uncertainty and equilibrium selection in discontinuous games. Journal of Economic Theory, 183, 786-822.	E	th - games	model strategic uncertainty	prove it exists in large classes of discontinuous games; we don't use probabilities to model players' strategies and beliefs about other players' strategies; e prudent equilibrium concept removes most nonintuitive solutions of the game
Birru, J., & Young, T. (2022). Sentiment and uncertainty. Journal of Financial Economics, 146(3), 1148-1169.	E	emp - fin mkts	various proxies for uncertainty; one-standard-deviation increase in aggregate uncertainty	asset prices
Bland, J. R., & Rosokha, Y. (2021). Learning under uncertainty with multiple priors: experimental investigation. Journal of Risk and Uncertainty, 62, 157-176.	E	exprmnt - est model	ambiguity [?] (as different from compound risk)	run an experiment to compare belief formation and learning under ambiguity and under compound risk at the individual level; we find strong evidence against a common assumption that participants' initial beliefs (and priors) are consistent with information provided about the uncertain process
Blavatskyy, P. (2021). A measure of ambiguity (Knightian uncertainty). Theory and Decision, 91(2), 153-171.	E	th measure	Uncertain or ambiguous events cannot be objectively measured by probabilities, i.e. different decision-makers may disagree about their likelihood of occurrence;	proposes a new decision-theoretical approach on how to measure ambiguity (Knightian uncertainty) that is analogous to axiomatic risk; proposed measure of ambiguity is derived from a novel assumption that ambiguity of any choice alternative can be decomposed into a left-tail ambiguity (uncertainty in the realization of relatively undesirable outcomes) and a right tail ambiguity (uncertainty in the realization of relatively desirable outcomes)
Borenstein, S., Bushnell, J., Wolak, F. A., & Zaragoza-Watkins, M. (2019). Expecting the unexpected: Emissions uncertainty and environmental market design. American Economic Review, 109(11), 3953-77.	E	emp	large ex ante uncertainty in business-as-usual emissions and in the abatement that might result from non-market policies	study potential equilibria in California's cap-and-trade market for greenhouse gases; implies that the market price is very likely to be determined by an administrative price floor or ceiling

Burghart, D. R. (2018). Maximum probabilities, information, and choice under uncertainty. Economics letters, 167, 43-47.	E	th - model	uses the maximum probability for each possible outcome and the amount of information conveyed by this upper envelope	proposes a simple, expected utility-like model for decision making under uncertainty; with applications to medical decision making and financial asset demand
Burghart, D. R., Epper, T., & Fehr, E. (2020). The uncertainty triangle–Uncovering heterogeneity in attitudes towards uncertainty. Journal of risk and uncertainty, 60, 125-156.	E	th - graphical tool + emp test	heterogeneity in attitudes towards uncertainty; uncertainty attitude is everywhere constant in the triangle	develops a graphical tool--the uncertainty triangle--that allows for testing whether choices under uncertainty obey the generalized axiom of revealed preference; of 60% with constant uncertainty attitudes.. 48% were uncertainty averse, 22% uncertainty seeking, and 30% uncertainty neutral
Burzoni, M., Riedel, F., & Soner, H. M. (2021). Viability and arbitrage under Knightian uncertainty. Econometrica, 89(3), 1207-1234.	E	th - model	Knightian uncertainty in markets	reconsider the microeconomic foundations of financial economics; present a model that does not carry any probabilistic structure ex ante, yet is based on a common order
Butters, R. A. (2019). On demand uncertainty in the newsvendor model. Economics Letters, 185, 108746.	E	emp - comp statics	the level of demand uncertainty; distributions of demand that are greater in the dispersive order	provide three comparative statics involving the level of demand uncertainty for the newsvendor mode
Byun, S. J., & Jo, S. (2018). Heterogeneity in the dynamic effects of uncertainty on investment. Canadian Journal of Economics/Revue canadienne d'économique, 51(1), 127-155.	E	emp	aggregate profit uncertainty = the conditional standard deviation of a common factor across unforecasted fluctuations in the sales growth of different industries	examine how aggregate profit uncertainty influences capital investment activities, focusing on heterogeneous responses of firms; results highlight the importance of accounting for heterogeneity in the transmission of uncertainty, allowing us to reconcile different views on the effect of uncertainty in the existing literature
Cai, Z. (2019). Dynamic information acquisition and time-varying uncertainty. Journal of economic theory, 184, 104947.	E	th - models - static & dyn	transitory uncertainty shocks can have long-lasting impacts; uncertainty [? volatility]	studies the role of information acquisition in propagating/stabilizing uncertainty shocks in a dynamic financial market; uncertainty raises the valueof information.. however, uncertainty can depress information acquisition through a dynamic complementarity channel; Direct government purchases can stimulate information production, eliminate equilibrium multiplicity, and attenuate the impacts of uncertainty shocks
Çelen, B., & Özgür, O. (2018). Final-offer arbitration with uncertainty averse parties. Games and Economic Behavior, 109, 484-500.	E	th - model	arbitral uncertainty	Final-offer arbitration (FOA) is a widely used binding dispute resolution mechanism; build an equilibrium model of FOA with players averse to arbitral uncertainty; increase in arbitral uncertainty increases the likelihood of negotiated agreements
Cettolin, E., & Riedl, A. (2019). Revealed preferences under uncertainty: Incomplete preferences and preferences for randomization. Journal of Economic Theory, 181, 547-585.	E	expermnts	risk vs ambiguity (incomplete preferences)	present a set of experiments testing for incomplete preferences due to uncertainty

Chatterjee, P., & Milani, F. (2020). Perceived uncertainty shocks, excess optimism-pessimism, and learning in the business cycle. Journal of Economic Behavior & Organization, 179, 342-360.	E	emp - survey + model	their beliefs may be influenced by their perceptions about future uncertainty; perceived uncertainty shocks	What are the effects of beliefs, sentiment, and uncertainty, over the business cycle? Shifts in perceived uncertainty can also affect real activity and inflation through a confidence channel, as they play an important role in belief formation; the contribution and interaction of first-moment--sentiment--shocks versus second-moment--perceived uncertainty--shocks.
Chortareas, G., & Noikokyris, E. (2021). Investment, firm-specific uncertainty, and financial flexibility. Journal of Economic Behavior & Organization, 192, 25-35.	E	emp	investment under uncertainty [volatility?]	We study how financial flexibility impacts on firm's investment decisions under uncertainty; results point to a negative uncertainty-investment relationship for constrained firms
Danilov, V. I., Lambert-Mogiliansky, A., & Vergopoulos, V. (2018). Dynamic consistency of expected utility under non-classical (quantum) uncertainty. Theory and Decision, 84, 645-670.	E	th - model	non-classical (quantum) uncertainty: the concept of quantum lottery	Quantum cognition in decision making; we develop an expected utility theory in a context of non-classical (quantum) uncertainty; interesting applications in behavioral economics as we illustrate in an example of persuasion
Das, D., & Kumar, S. B. (2018). International economic policy uncertainty and stock prices revisited: Multiple and Partial wavelet approach. Economics Letters, 164, 100-108.	E	emp	Economic Policy Uncertainty (EPU)	introduces a new dimension to the relationship between Economic Policy Uncertainty (EPU) and Stock Prices (SP); the combined effect of DEPU and US EPU is more significant for developed market's SP
Di Maggio, M., Kermani, A., Ramcharan, R., Yao, V., & Yu, E. (2022). The pass-through of uncertainty shocks to households. Journal of Financial Economics, 145(1), 85-104.	E	emp	the impact of uncertainty, as measured by idiosyncratic stock market volatility; Constructing a new county-level uncertainty shock	Increased firm-level uncertainty reduces total compensation; local uncertainty shocks reduce county-level durable consumption
Feess, E., Schildberg-Hörisch, H., Schramm, M., & Wohlschlegel, A. (2018). The impact of fine size and uncertainty on punishment and deterrence: Theory and evidence from the laboratory. Journal of Economic Behavior & Organization, 149, 58-73.	E	lab - expmnts	if there is uncertainty on a potential violator's guilt; case of legal uncertainty (probability)	Increasing punishment is typically considered first choice to boost deterrence of unwarranted behavior such as false financial statements; in case of legal uncertainty, the deterrent effect of higher fines is far less pronounced than if the punishment probability was exogenous
Fleurbaey, M. (2018). Welfare economics, risk and uncertainty. Canadian Journal of Economics/Revue canadienne d'économique, 51(1), 5-40.	E	th - lit rev	Social decisions in risky contexts; ambiguity; shocks	This paper reviews the welfare economics of risk and uncertainty - (1) Should social decisions be more or less risk averse than the average person? (2) Should we try to avoid large catastrophes more than frequent but limited harms with similar expected impact? (3) Should social decisions be ambiguity averse or stick to the expected utility canon
Frankel, A., & Kamenica, E. (2019). Quantifying information and uncertainty. American Economic Review, 109(10), 3650-80.	E	th - model	uncertainty implicit in a given belief; a measure of uncertainty is valid if it corresponds to expected utility loss from not knowing the state in some decision problem	ways to measure the amount of information generated by a piece of news and the amount of uncertainty implicit in a given belief
Friedenberg, A. (2019). Bargaining Under Strategic Uncertainty: The Role of Second-Order Optimism. Econometrica, 87(6), 1835-1865.	E	th - model	uncertainty about payoffs or feasible actions; direct forms of strategic uncertainty--that is, uncertainty about the opponent's play; Bargainers face uncertainty only after surprise moves	bargainers may reach delayed agreements even in environments where there is no uncertainty about payoffs or feasible actions; source of delay is second-order optimism
Galasso, V. (2022). The cost of political uncertainty: Evidence from Catalonia. Journal of Economic Behavior & Organization, 201, 250-259.	E	emp - fin mkts, event studies	Nationalist demands for more autonomy or independence create uncertainty; political uncertainty	use two empirical methodologies to evaluate the costs of the uncertainty associated with the Catalan-Spanish negotiation for the Catalan Statute

Gilboa, I., Minardi, S., & Samuelson, L. (2020). Theories and cases in decisions under uncertainty. Games and Economic Behavior, 123, 22-40.	E	th - model	beliefs over a set of theories describing the data generating process, given by decision weights; a "black swan" which is considered a surprise by all theories would shift the weight to case-based reasoning	present and axiomatize a model combining and generalizing theory-based and analogy-based reasoning in decision under uncertainty; the learning process continually adjusts the balance between case-based and theory-based reasoning
Gul, F., & Pesendorfer, W. (2020). Calibrated uncertainty. Journal of Economic Theory, 188, 105016.	E	th - axioms	Agents combine this uncertainty perception with their uncertainty attitude to form a complete ranking of bets	describes the shared likelihood assessments of decision makers with diverse ambiguity attitudes; characterize a new measure of comparative ambiguity aversion
Hahn, J., Jang, W. W., & Kim, S. (2017). Risk aversion, uncertainty, and monetary policy in zero lower bound environments. Economics Letters, 156, 118-122.	E	emp	a lax monetary policy decreases both risk aversion and uncertainty; shocks	We find that the empirical link between monetary policy, risk aversion, and uncertainty found in Bekaert et al. (2013) persists even in the postcrisis period
Halac, M., Lipnowski, E., & Rappoport, D. (2021). Rank uncertainty in organizations. American Economic Review, 111(3), 757-86.	E	th - model	leverages rank uncertainty to address strategic uncertainty; informed only of a ranking distribution and his own bonus	A principal incentivizes a team of agents to work by privately offering them bonuses contingent on team success.
Hayashi, T., & Lombardi, M. (2019). Fair social decision under uncertainty and belief disagreements. Economic Theory, 67, 775-816.	E	th - model	uncertainty considerations into social decision making [beliefs?]	how to integrate both inequality and uncertainty considerations into social decision making; simultaneous aggregation of utilities and beliefs
Hoey, J., MacKinnon, N. J., & Schröder, T. (2021). Denotative and connotative management of uncertainty: A computational dual-process model. Judgment and Decision Making, 16(2), 505-550.	E	math model (process)	the uncertainty or unpredictability of the situation	Agents constructed according to this unified model are motivated by a combination of affective alignment (intuitive) and decision theoretic reasoning (deliberative), trading the two off as a function of the uncertainty or unpredictability of the situation; trades off motivation, action, beliefs and utility.
Hu, G. X., Pan, J., Wang, J., & Zhu, H. (2022). Premium for heightened uncertainty: Explaining pre-announcement market returns. Journal of Financial Economics, 145(3), 909-936.	E	emp	a two-risk model with the uncertainty about the magnitude of the impending news' market impact as an additional risk; VIX--a gauge of impact uncertainty by our model	link the pre-announcement return directly to the accumulation of heightened uncertainty and its later resolution prior to the announcement
Ilut, C., Valchev, R., & Vincent, N. (2020). Paralyzed by fear: Rigid and discrete pricing under demand uncertainty. Econometrica, 88(5), 1899-1938.	E	th - quant model	firms' Knightian uncertainty about their competitive environment; uncertainty about the relationship between aggregate and industry-level inflation; nominal shocks	propose a new theory of price rigidity based on firms' Knightian uncertainty about their competitive environment; firms learn about the shape of their demand function from past observations of quantities sold
Im, H. J., Park, H., & Zhao, G. (2017). Uncertainty and the value of cash holdings. Economics Letters, 155, 43-48.	E	th ?	a firm facing higher uncertainty [? variance] has a higher value of cash	This effect is attributed to the increased value of the option to wait and see as well as the aggravated financial constraints and mitigated agency conflicts.
Jang, W. W. (2020). Risk aversion, uncertainty, and monetary policy: Structural vector autoregressions identified with high-frequency external instruments. Economics Letters, 186, 108675.	E	emp	MP shocks; asset proce changes	models to examine the monetary policy (MP) effects on risk aversion, uncertainty, and inflation
Jeon, J. (2022). Learning and investment under demand uncertainty in container shipping. The RAND Journal of Economics, 53(1), 226-259.	E	math model	demand uncertainty; firms are uncertain about the true parameters in the underlying process for demand, and form and revise their beliefs using available information	the role of demand uncertainty in explaining cyclical investment fluctuations in the container shipping industry

Juanchich, M., Gourdon-Kanhukamwe, A., & Sirota, M. (2017). “I am uncertain” vs “It is uncertain”. How linguistic markers of the uncertainty source affect uncertainty communication. Judgment and Decision Making, 12(5), 445-465.	E	emp	Two psychological sources of uncertainty - : external uncertainty is seen as stemming from properties of the world, whereas internal uncertainty is seen as stemming from lack of knowledge; discuss how these findings inform our understanding of subjective uncertainty and uncertainty communication theories	The apparent source of uncertainty can be conveyed through linguistic markers, such as the pronoun of probability phrases (e.g., I am uncertain vs. It is uncertain)
Kishishita, D. (2020). (Not) delegating decisions to experts: The effect of uncertainty. Journal of Economic Theory, 190, 105117.	E	th - model	the effect of the uncertainty regarding preference heterogeneity among experts; the type of uncertainty: an increase in risk and in ambiguity (i.e., Knightian uncertainty)	a dynamic delegation model in which a principal can replace the agent to whom to delegate over time; with higher ambiguity rather than risk being a source of the delegation to non-experts
Kuzmics, C. (2017). Abraham Wald's complete class theorem and Knightian uncertainty. Games and Economic Behavior, 104, 666-673.	E	th - model	decision making under Knightian uncertainty (or ambiguity); statistical decision making	A Waldian may then have preferences over acts that are not in agreement with subjective expected utility but always chooses as if she was a subjective expected utility maximizer
Lensman, T., & Troshkin, M. (2022). Implications of uncertainty for optimal policies. Journal of Economic Theory, 199, 105206.	E	math model	ambiguity and private idiosyncratic shocks	optimal fiscal policy in macro public finance environments with heterogeneous agents… ambiguity implies that it is optimal to periodically reform policies… implying a meaningful role for government provision of insurance
Lleras, J. S., Piermont, E., & Svoboda, R. (2019). Asymmetric gain–loss reference dependence and attitudes toward uncertainty. Economic Theory, 68(3), 669-699.	E	th - model	attitudes toward uncertainty	characterizes a model of reference dependence, where a state-contingent contract (act) is evaluated by its expected value and its expected gain-loss utility; that loss aversion and reference dependence are equivalent to max-min and concave expected utility
Luo, Y., Nie, J., & Wang, H. (2022). Ignorance, pervasive uncertainty, and household finance. Journal of Economic Theory, 199, 105204.	E	math model	how the two types of uncertainty due to ignorance, parameter and model uncertainty	jointly affect strategic consumption-portfolio rules, precautionary savings, and welfare… to evaluate both marginal and total welfare costs of ignorance-induced uncertainty and show they are significant for plausible parameter values.
Luo, Y., Perrigne, I., & Vuong, Q. (2018). Auctions with ex post uncertainty. The RAND Journal of Economics, 49(3), 574-593.	E	th - model auction	Uncertainty about ex post realized values (as risk)	auction environment; develop a structural framework to analyze auction data subject to ex post uncertainty as a pure risk
Luttmer, E. F., & Samwick, A. A. (2018). The welfare cost of perceived policy uncertainty: evidence from social security. American Economic Review, 108(2), 275-307.	E	emp- survey	Policy uncertainty; risk premium	to measure the degree of perceived policy uncertainty in Social Security benefits and to estimate the impact of this uncertainty on individual welfare; on average individuals are willing to forgo 6 percent of the benefits they are supposed to get under current law to remove the policy uncertainty
Martínez-Marquina, A., Niederle, M., & Vespa, E. (2019). Failures in contingent reasoning: The role of uncertainty. American Economic Review, 109(10), 3437-3474.	E	experimnt	an environment with one state of known value to one with multiple possible values = the value of the state is uncertain	propose a new channel to account for the difficulties of individuals with contingent reasoning: the presence of uncertainty; this lack of certainty, or the loss of the Power of Certainty, impedes payoff maximization and that it accounts for a substantial portion of the difficulties with contingent reasoning

McGranaghan, C., & Otto, S. G. (2022). Choice uncertainty and the endowment effect. Journal of Risk and Uncertainty, 65(1), 83-104.	E	experimnt	the role of choice uncertainty; compelling evidence concerning trade uncertainty in the literature	experimentally test for the role of choice uncertainty in generating "endowment effects"; suggests that value uncertainty continues to play a role in generating valuation asymmetries even after relevant product uncertainty has been resolved
Meissner, T., & Pfeiffer, P. (2022). Measuring preferences over the temporal resolution of consumption uncertainty. Journal of Economic Theory, 200, 105379.	E	experimnt	consumption uncertainty	Timing premia measure how much consumption people are willing to forgo to resolve all consumption uncertainty immediately; subjects forgo around 5% of their total consumption to resolve all uncertainty immediately
Montesano, A. (2019). On some aspects of decision theory under uncertainty: rationality, price-probabilities and the Dutch book argument. Theory and Decision, 87(1), 57-85.	E	th - models	Choice under uncertainty; the reservation prices of bets on events and their subjective probabilities	The first approach can determine how a rational decision-maker must choose; the second one how a real decisionmaker behaves; and the third one how decision-makers are represented in the general economic theory
Müller, S., & Rau, H. A. (2019). Decisions under uncertainty in social contexts. Games and Economic Behavior, 116, 73-95.	E	th + exprmnt	decision-making in risky and social environments	results contribute to the basic understanding of the underlying motives of social incentives in firms, private households' saving decisions, employees' career-track choices or charitable giving under uncertainty
Niu, Y., Zhou, L., & Zou, Z. (2019). A model of capacity choice under Knightian uncertainty. Economics Letters, 174, 189-194.	E	th - model	Knightian uncertainty	paper introduces Knightian uncertainty into the standard model of capacity choice and investigates its impact on the firm's expansion decision; Under Knightian uncertainty, the firm's expansion decision is shown to be more conservative
Ok, E. A., & Savochkin, A. (2022). Believing in forecasts, uncertainty, and rational expectations. Economic Theory, 1-25.	E	th model	uncertainty where one is exogenously given information about the unknown states as a "suggested prior"	(as in weather forecasts, betting odds provided by bookmakers, success likelihoods provided by medical doctors, estimates given by financial analysts); o understand when a decision maker would adopt the suggested prior as her own subjective beliefs, yielding fully to the power of suggestion
Palm-Forster, L. H., & Suter, J. F. (2022). Experimental evidence of common pool resource use in the presence of uncertainty. Journal of Economic Behavior & Organization, 194, 139-160.	E	lab - expmnts	the impact of different types of threshold uncertainty; an uncertain threshold with a known probabilitydistribution of possible thresholds (risk), and an uncertain threshold with an unknown probability distribution (ambiguity)	Tipping points can occur in many complex environmental systems and often produce abrupt and irreversible change; threshold uncertainty (both risk and ambiguity) tends to increase common pool resource use; encouraging communication is likely to improve CPR management
Polisson, M., Quah, J. K. H., & Renou, L. (2020). Revealed preferences over risk and uncertainty. American Economic Review, 110(6), 1782-1820.	E	th - method + emp testg	risk and uncertainty [?]	testing the consistency of budgetary choice data with models of choice under risk and under uncertainty; using data collected from several recent portfolio choice experiments
Quiggin, J. (2022). Production under uncertainty and choice under uncertainty in the emergence of generalized expected utility theory. Theory and Decision, 92(3-4), 717-729.	E	th - comparisn	the theory of choice under uncertainty; the analysis of applied problems such as those involving production under uncertainty	stimulated by applications of expected utility theory such as the Sandmo model of production under uncertainty

Rehse, D., Riordan, R., Rottke, N., & Zietz, J. (2019). The effects of uncertainty on market liquidity: Evidence from Hurricane Sandy. Journal of Financial Economics, 134(2), 318-332.	E	emp	unprecedented strength, scale, and nature of the storm, the potential damages of a landfall near the Greater New York area were unpredictable and therefore uncertain	test the effects of uncertainty on market liquidity using Hurricane Sandy as a natural experiment; s confirm theory on the detrimental effects of uncertainty on market functioning
Rholes, R., & Petersen, L. (2021). Should central banks communicate uncertainty in their projections?. Journal of Economic Behavior & Organization, 183, 320-341.	E	emp - comms	density forecasts lead to larger forecast errors, greater uncertainty about own forecasts	provides original empirical evidence on the emerging practice by central banks of communicating uncertainty in their inflation projections; compare the effects of point and density projections; , our results suggest that communicating uncertainty through density projections reduces the efficacy of inflation point projections
Schaal, E. (2017). Uncertainty and unemployment. Econometrica, 85(6), 1675-1721.	E	emp + expermnts	time-varying idiosyncratic volatility	studies the impact of time-varying idiosyncratic risk at the establishment level on unemployment fluctuations over 1972-2009; uncertainty alone is not sufficient to explain the magnitude and persistence of unemployment during that episode
Schneider, C. R., Freeman, A. L., Spiegelhalter, D., & van der Linden, S. (2022). The effects of communicating scientific uncertainty on trust and decision making in a public health context. Judgment and Decision Making, 17(4), 849-882.	E	expemtl studies	the inherent scientific uncertainty--especially about the underlying quality of the evidence	Little is known about the effects that such scientific uncertainty has on people's judgments of the information = public health crises highlight the need to communicate scientific information; people react more strongly to cues of low quality of evidence than they do to high quality of evidence compared to no cue.
Schröder, D., & Gilboa Freedman, G. (2020). Decision making under uncertainty: the relation between economic preferences and psychological personality traits. Theory and Decision, 89(1), 61-83.	E	emp	individuals' attitudes towards uncertainty; the economic concept of ambiguity aversion as well as the personality trait of ambiguity intolerance	Both economists and psychologists are interested in understanding decision making under uncertainty; contrasts five economic preference parameters and six psychological personality traits that are commonly used to study individuals' attitudes towards uncertainty
Sohn, J. Y., & Wu, W. (2022). Reciprocity with uncertainty about others. Games and Economic Behavior, 136, 299-324.	E	lab - games	the uncertainty of psychological motivation; subject to incomplete information; the psychological motivations are known and unknown among the players	study many well-known games
Straub, L., & Ulbricht, R. (2019). Endogenous second moments: A unified approach to fluctuations in risk, dispersion, and uncertainty. Journal of Economic Theory, 183, 625-660.	E	th - model	second moments--such as cross-sectional dispersions, risk, volatility, or uncertainty; to study endogenous fluctuations	provide theoretical results that characterize second moments of transformed random variables when the underlying fundamentals are subject to distributional shifts that affect their means, but not their variances; The mechanism can account for a significant share of the empirical cyclicality patterns, without exogenous shocks to volatilities
Strausz, R. (2017). A theory of crowdfunding: A mechanism design approach with demand uncertainty and moral hazard. American Economic Review, 107(6), 1430-1476.	E	th	Under aggregate demand uncertainty	Crowdfunding provides innovation in enabling entrepreneurs to contract with consumers before investment; Efficiency is sustainable only if expected returns exceed an agency cost associated with the entrepreneurial incentive problems; By reducing demand uncertainty, crowdfunding promotes welfare
Sung, J. (2022). Optimal contracting under mean-volatility joint ambiguity uncertainties. Economic Theory, 74(2), 593-642.	E	math model	mean-volatility joint ambiguity uncertainties; ambiguity aversion	a continuous-time principal-agent problem; outcome-sharing rule is for uncertainty sharing

Alfasi, Y. (2022). We only know that we don't know: attachment patterns and psychological coping during the COVID-19 pandemic–the mediation role of intolerance of uncertainty. The Journal of Social Psychology, 1-20.	P	surveys	uncertainty about the future (from Covid) ; intolerance of uncertainty	Attachment, intolerance of uncertainty, social support; The global outbreak of the COVID-19 pandemic created sudden changes in many areas of daily life and increased uncertainty about the future; findings underscore the adverse psychological effects of uncertain situations, especially for individuals with a fragile foundation of interpersonal support, thus emphasizing the need for action to reduce uncertainty, especially in times of emergency
Allritz, M., McEwen, E. S., & Call, J. (2021). Chimpanzees (Pan troglodytes) show subtle signs of uncertainty when choices are more difficult. Cognition, 214, 104766.	P	animal lab - expermnts	that feelings of uncertainty, like other emotions, can be studied in nonhuman animals	Humans can tell when they find a task difficult. Subtle uncertainty behaviors like changes in motor speed and muscle tension precede and affect these experiences. Theories of animal metacognition likewise stress the importance of endogenous signals of uncertainty as cues that motivate metacognitive behaviors
Alquist, J. L., Baumeister, R. F., Tice, D. M., & Core, T. J. (2020). What you don't know can hurt you: Uncertainty impairs executive function. Frontiers in Psychology, 11, 576001.	P	exprmnts	situational uncertainty; uncertain situations (not knowing whether they would have to give a speech later, Studies 1-2; uncertain about how to complete a task, Study 3)	uncertainty, executive function, self-regulation, self-control; Uncertainty impaired performance even more than certainty of negative outcomes; potential explanation for this effect of uncertainty on executive function is that uncertainty is a cue for conserving effort
Anderson, E. C., Carleton, R. N., Diefenbach, M., & Han, P. K. (2019). The relationship between uncertainty and affect. Frontiers in psychology, 10, 2504.	P	th - analysis	We suggest that people have a propensity to simulate negative outcomes, which result in a propensity toward negative affective responses to uncertainty; uncertainty tolerance	uncertainty, affect, uncertainty tolerance, emotion, risk, simulation; Uncertainty and affect are fundamental and interrelated aspects of the human condition
Au, E. W. (2017). Seeing the forest and not the trees: When impact uncertainty heightens causal complexity. International Journal of Psychology, 52(3), 256-260.	P	expermnt	face uncertainty regarding the extent to which actions will make a difference (i.e. impact uncertainty).	Uncertainty, Outcome control, Perceived control, Causal complexity; This study attempts to isolate the effects of experiencing uncertainty on people's cognitive processes; isolates the effects of impact uncertainty from outcome control
Aven, T. (2021). Further reflections on EFSA's work on uncertainty in scientific assessments. Journal of Risk Research, 24(5), 553-561.	P	th - perspectv	concerning uncertainty analysis in scientific assessments; represent and describe uncertainties, which is based on a betting type of interpretation	European Food Safety Authority, risk; questions relate to the fundamentals of uncertainty analysis —what it actually is and can do, the link between uncertainty analysis and risk, and how the uncertainties should be best communicated; the EFSA understanding and use of probabilities to represent and describe uncertainties, which is based on a betting type of interpretation, is unfortunate and should be replaced by a more suitable approach
Baik, S., Davis, A. L., & Morgan, M. G. (2019). Illustration of a method to incorporate preference uncertainty in benefit–cost analysis. Risk Analysis, 39(11), 2359-2368.	P	emp - data	typically only consider uncertainty about cost estimates and physical states of the world, whereas uncertainty about individual preferences, thus the benefit of policy intervention, is ignored; uncertainty about preferences into benefit–cost analysis using societal preference intervals, which are ranges of values over which it is unclear whether society as a whole should accept or reject an option	Benefit-cost analysis, preference uncertainty, societal decision making; This illustrative example shows that uncertainty in individual preferences, when aggregated to form societal preference intervals, can substantially change society's decision; a discussion of where preference uncertainty comes from, how it might be reduced, and why incorporating unresolved preference uncertainty into benefit–cost analyses can be important

Benjamin, D. M., & Budescu, D. V. (2018). The role of type and source of uncertainty on the processing of climate models projections. Frontiers in Psychology, 9, 403.	P	expermnts	projections: (1) precise, but conflicting; (2) imprecise, but agreeing, and (3) hybrid that were both conflicting and imprecise; participants were sensitive to uncertainty between sources, but not to uncertainty about which model was used	sources of uncertainty, conflict, imprecision, climate change, global warming; We examine how different sources of uncertainty affect people's interpretation of, and reaction to, information about climate change by presenting participants forecasts from multiple experts; goal was to determine which underlying factors of information sets drive perceptions of uncertainty in consistent, predictable ways
Breakwell, G. M., & Jaspal, R. (2021). Identity change, uncertainty and mistrust in relation to fear and risk of COVID-19. Journal of Risk Research, 24(3-4), 335-351.	P	emp - survey	levels of feeling afraid, uncertainty about self-protection; perceived own risk of COVID-19	The COVID-19 pandemic produced threats not only to physical and psychological health but also to the very fabric of family, work and social life; Fostering greater general trust in science and scientists, though difficult, will be valuable, particularly in encouraging public acceptance
Burgess, A. (2018). Individualization revisited: global family developments, uncertainty and risk. Journal of risk research, 21(1), 83-95.	P	th - commntry	risk; focusing upon the uncertainty created by disembedding. The uncertainty that follows from individualization; the construction of risk as a means of embodying and managing uncertainty	appreciating the work of Ulrich Beck, this article introduces and rearticulates his concept of individualization for an audience beyond those engaged with sociological theory
Carvalho, E. M. D., & Rolla, G. (2020). An enactive-ecological approach to information and uncertainty. Frontiers in Psychology, 11, 588.	P	th w/ emp review	the idea of information as a minimization of uncertainty as presented by Shannon; that learning to perceive covariant information is a matter of minimizing uncertainty through skilled performance.	We argue that the agent's cognitive system conveys information for acting in an environment by minimizing uncertainty about how to achieve intended goals in that environment
De Groot, K., & Thurik, R. (2018). Disentangling risk and uncertainty: When risk-taking measures are not about risk. Frontiers in psychology, 9, 2194.	P	th - commntry	distinction between uncertainty and risk from the viewpoint of several scientific disciplines and reports how many studies wrongfully employ the DOSPERT scale and BART as risk-taking measures	Many studies claim to measure decision-making under risk by employing the Domain-Specific Risk-Taking (DOSPERT) scale, a self-report measure, or the Balloon Analogue Risk Task (BART), a behavioural task. However, these tasks do not measure decision-making under risk but decisionmaking under uncertainty; We believe this is vital as research has shown that people's attitudes, behaviour, and brain activity differ between both concepts, indicating that confusing the concepts may lead researchers to erroneous conclusions
Deiglmayr, A., Stern, E., & Schubert, R. (2019). Beliefs in "brilliance" and belonging uncertainty in male and female STEM students. Frontiers in psychology, 10, 1114.	P	emp - survey	belonging uncertainty	we investigated field-specific ability beliefs as well as belonging uncertainty in a sample of n = 1294 male and female university students from five STEM fields (Mathematics, Physics, Computer Science, Electrical Engineering, and Mechanical Engineering) at a prestigious technical university in Switzerland
Delatorre, P., León, C., Salguero, A., Palomo-Duarte, M., & Gervás, P. (2018). Confronting a paradox: A new perspective of the impact of uncertainty in suspense. Frontiers in Psychology, 9, 1392.	P	expermnt	while many authors affirm that uncertainty is essential to evoke suspense, others limit or reject its influence	Suspense is a key narrative issue in terms of emotional gratifications. Reactions in response to this type of entertainment are positively related to enjoyment; Due to this need to contrast the effects of the uncertainty in order to compute a general model for automatic storytelling systems, we conducted an experiment measuring suspense experienced by a group of subjects that read a story

Deng, X., Gao, B., & Li, G. (2019). The effects of dynamic work environments on entrepreneurs' humble leader behaviors: Based on uncertainty reduction theory. Frontiers in psychology, 10, 2732.	P	emp - data / survey	uncertainty reduction theory, intolerance of uncertainty	dynamic work environments, humble leader behaviors, feedback-seeking behavior, uncertainty reduction theory, intolerance of uncertainty
Dewitt, S. H., Fenton, N. E., Liefgreen, A., & Lagnado, D. A. (2020). Propensities and second order uncertainty: a modified taxi cab problem. Frontiers in Psychology, 11, 503233.	P	lab - expermnt	solvers are told the witness's ability to judge cab color is 80%. In reality, there is likely to be some uncertainty around this estimate (perhaps we tested the witness and they were correct 4/5 times), known as second-order uncertainty (i.e., a distribution)	The study of people's ability to engage in causal probabilistic reasoning has typically used fixed-point estimates for key figures; While some participants responded normatively, the majority self-reported 'assuming' one of the probabilities was a certainty
Dieckmann, N. F., Gregory, R., Peters, E., & Hartman, R. (2017). Seeing what you want to see: How imprecise uncertainty ranges enhance motivated reasoning. Risk analysis, 37(3), 471-486.	P	lab - expermnts	we consider a novel criterion for evaluating representations of uncertainty ranges, namely, the extent to which a representation enhances motivated reasoning	risk communication, uncertainty; we show that perceptions of the distribution underlying ambiguous numerical ranges are affected by the motivations and worldviews of end users; suggest that analysts and communicators explicitly consider the potential for motivated evaluation when evaluating uncertainty displays
Faraji-Rad, A., & Pham, M. T. (2017). Uncertainty increases the reliance on affect in decisions. Journal of Consumer Research, 44(1), 1-21.	P	expermnts	the priming of uncertainty (vs. certainty) consistently increases the effects of a variety of affective inputs on consumers' judgments and decisions; negative and positive uncertainty increase the influence of affect in decisions	uncertainty, emotions and decision making, reliance on affect, self threat; How do psychological states of uncertainty influence the way people make decisions? the increased reliance on affect under uncertainty is distinct from a general reliance on heuristic or peripheral cues (study 6). The phenomenon may be due to uncertainty threatening the self, thereby encouraging a reliance on inputs that are closer to the self and have high subjective validity
Felsman, P., Gunawardena, S., & Seifert, C. M. (2020). Improv experience promotes divergent thinking, uncertainty tolerance, and affective well-being. Thinking Skills and Creativity, 35, 100632.	P	expermnt	uncertainty tolerance survey measure	Improvisation, Creativity, Uncertainty tolerance; This paper follows an experimental method from previous research linking improvisation training to improvements in divergent thinking in the laboratory (Lewis & Lovatt, 2013), and includes an additional dependent variable, uncertainty tolerance, which has been broadly implicated in anxiety and depression
Fernández, E., Gómez-Santillán, C., Rangel-Valdez, N., & Cruz-Reyes, L. (2022). Group Multi-Objective Optimization Under Imprecision and Uncertainty Using a Novel Interval Outranking Approach. Group Decision and Negotiation, 31(5), 945-994.	P	th - optimztn problms	imperfect information (imprecision, uncertainty, ill-definition, arbitrariness); Imperfect knowledge is modeled here using a novel interval-based outranking approach	This paper deals with group multi-objective optimization problems with imperfect information; We propose two different methods that are appropriate for decision structures in the form of teams and committees. In these structures, there is a special actor (the so-called Supra Decision Maker, (SDM) with authority for creating an aggregation of the group members' preferences, beliefs,and levels of conservatism, and for taking the final collective decision
Fleischhut, N., Artinger, F. M., Olschewski, S., & Hertwig, R. (2022). Not all uncertainty is treated equally: Information search under social and nonsocial uncertainty. Journal of Behavioral Decision Making, 35(2), e2250.	P	lab - expermnts	The social world is often portrayed as being less predictable and more uncertain than the nonsocial world; social uncertainty; When evaluating risks based on outcomes alone	cognitive tools such as social projection and norm-based expectation may help people to predict others' behaviors in the social world and thus serve as a substitute for information search

Frings, C., Merz, S., & Hommel, B. (2019). The impact of stimulus uncertainty on attentional control. Cognition, 183, 208-212.	P	lab - expermnts	manipulated whether stimulus congruency was predictable or random	Curiosity, Stimulus uncertainty, Attentional distribution; We argue that stimulus uncertainty induces a cognitive state that can be linked to a concept that has been formerly described as 'curiosity' – a state that motivates the agent to reduce the uncertainty by exploring it; The impact of uncertainty on attentional control should not be considered a leakage but rather an investment into possible future opportunities
Gesser-Edelsburg, A., & Shir-Raz, Y. (2018). Communicating risk for issues that involve 'uncertainty bias': what can the Israeli case of water fluoridation teach us?. Journal of Risk Research, 21(4), 395-416.	P	emp - doc study	uncertainty regarding its efficacy and safety; coin the term 'uncertainty bias,' in which policy-makers do exactly what they accuse laypeople of doing, framing uncertainty in biased terms	water fluoridation is a controversial issue in public health; the uncertainty paradox describes situations in which uncertainty is acknowledged, but the role of science is framed as providing certainty
Gloy, K., Herrmann, M., & Fehr, T. (2020). Decision making under uncertainty in a quasi realistic binary decision task–An fMRI study. Brain and Cognition, 140, 105549.	P	fMRI study	A binary decision task with quasi realistic context and stimuli was created to investigate neural processing of certain and uncertain decision making [?]	While basic neural processing principles in uncertain and certain contexts were comparable, the direct contrast revealed activation foci in middle cingulate and in frontal and parietal areas
Han, P. K., Gutheil, C., Hutchinson, R. N., & LaChance, J. A. (2021). Cause or effect? The role of prognostic uncertainty in the fear of cancer recurrence. Frontiers in Psychology, 11, 626038.	P	emp - intervws	that prognostic uncertainty; prognostic uncertainty is both a cause and an effect of FCR—a fear-inducing stimulus and a hope-sustaining response	Fear of cancer recurrence (FCR) is an important cause of suffering for cancer survivors, and both empirical evidence and theoretical models suggest that prognostic uncertainty plays a causal role in its development; most participants acknowledged fundamental limits to both the certainty and value of prognostic information, and engaged in various strategies aimed not at reducing but constructing and maintaining prognostic uncertainty as a means of sustaining hope
Hartner-Tiefenthaler, M., Roetzer, K., Bottaro, G., & Peschl, M. F. (2018). When relational and epistemological uncertainty act as driving forces in collaborative knowledge creation processes among university students. Thinking Skills and Creativity, 28, 21-40.	P	emp - diary entries	relational uncertainty (i.e., the subjective feeling of being unsure with regard to social interactions) and epistemological uncertainty (i.e., the subjective feeling of being unsure about the content, process or outcome of a task)	Uncertainty, Collaborative learning, Knowledge creation, Higher education; analyze relational uncertainty and epistemological uncertainty as well as their interrelations and development over time in collaborative learning processes; Experiencing the overcoming of relational uncertainty enables deeper engagement in epistemological uncertainty, which turned out to have a positive impact on the outcome of the knowledge creation process
Herbstritt, M., & Franke, M. (2019). Complex probability expressions & higher-order uncertainty: Compositional semantics, probabilistic pragmatics & experimental data. Cognition, 186, 50-71.	P	expermnt	the use and interpretation of simple probability expressions (such as possible or likely) and complex ones (such as possibly likely or certainly possible) in situations of higher order uncertainty, i.e., where speakers may be uncertain about the probability of a chance event	The data is used to critically assess a probabilistic pragmatics model in the vein of Rational Speech Act approaches
Höhne, E., & Zander, L. (2019). Sources of male and female students' belonging uncertainty in the computer sciences. Frontiers in psychology, 10, 1740.	P	emp - survey	Belonging uncertainty, defined as the general concern about the quality of one's social relationships in an academic setting	belonging uncertainty, ability-related stereotypes, social identity, minority students, higher education, STEM; we examined three potential sources of belonging uncertainty; findings imply an expanded view of the theoretical concept of belonging uncertainty that goes beyond mere concerns of social connectedness
Holzworth, R. J., Stewart, T. R., & Mumpower, J. L. (2018). Detection and selection decisions with conditional feedback: Interaction of task uncertainty and base rate. Journal of Behavioral Decision Making, 31(4), 508-521.	P	experimnt	task uncertainty	Effects of task uncertainty on decision thresholds in a multiple cue decision task were examined under two types of feedback; Task uncertainty had detrimental effects on both judgment and decision making, and interacted with effects of feedback and base rate.

Jensen, J. D., Pokharel, M., Scherr, C. L., King, A. J., Brown, N., & Jones, C. (2017). Communicating uncertain science to the public: How amount and source of uncertainty impact fatalism, backlash, and overload. Risk Analysis, 37(1), 40-51.	P	lab - expermnt	Public dissemination of scientific research often focuses on the finding (e.g., nanobombs kill lung cancer) rather than the uncertainty/limitations (e.g., in mice).	an experiment where they read a manipulated news report about cancer research (a) that contained either low or high uncertainty (b) that was attributed to the scientists responsible for the research (disclosure condition) or an unaffiliated scientist (dueling condition)
Kelling, N. K., Sauer, P. C., Gold, S., & Seuring, S. (2021). The role of institutional uncertainty for social sustainability of companies and supply chains. Journal of Business Ethics, 173, 813-833.	P	case study	the notion of institutional uncertainty to empirically analyse the challenges associated with establishing social sustainability	Institutional uncertainty, Supply chains, Social sustainability; Global sourcing largely occurs from so-called emerging markets and developing economies; providing an in-depth exploration of institutional uncertainty's drivers and barriers within an upstream SC setting
Kim, S., Sodian, B., & Proust, J. (2020). 12-and 24-month-old infants' search behavior under informational uncertainty. Frontiers in psychology, 11, 566.	P	lab - expmnts	varying degree of informational uncertainty. An object was hidden in one of three possible locations and probabilistic information about the hiding location was manipulated across trials	Infants register and react to informational uncertainty in the environment. They also form expectations about the probability of future events as well as update the expectation according to changes in the environment; present research investigated 12- and 24-month-old infants' searching behaviors under varying degree of informational uncertainty
Krüger, M., & Hermsdörfer, J. (2019). Target uncertainty during motor decision-making: The time course of movement variability reveals the effect of different sources of uncertainty on the control of reaching movements. Frontiers in Psychology, 10, 41. (correction)	P	lab - expermnts	level of target uncertainty; the source and level of reach target uncertainty at movement onset were manipulated ('no uncertainty', 'extrinsic uncertainty', and 'intrinsic uncertainty')	Empirical studies on motor decision-making suggest that the kinematics of goal-directed reaching movements are sensitive to the level of target uncertainty during movement planning; the source of uncertainty as a relevant factor influencing the process of motor decision-making has not been sufficiently considered; both the level and source of uncertainty have a significant effect on the processing of potential action plans during motor decision nmaking
Lamba, A., Frank, M. J., & FeldmanHall, O. (2020). Anxiety impedes adaptive social learning under uncertainty. Psychological science, 31(5), 592-603.	P	lab - expmnts (games)	social uncertainty, which is especially noisy and ambiguous.	Individuals exhibiting less tolerance for uncertainty, such as those with anxiety, may have greater difficulty learning in uncertain social contexts and therefore provide an ideal test population to probe learning dynamics under uncertainty
Lauriola, M., Mosca, O., Trentini, C., Foschi, R., Tambelli, R., & Carleton, R. N. (2018). The intolerance of uncertainty inventory: Validity and comparison of scoring methods to assess individuals screening positive for anxiety and depression. Frontiers in psychology, 9, 388.	P	emp - survey	evaluated the construct validity of the Intolerance of Uncertainty Inventory, a two-part scale separately assessing a unitary Intolerance of Uncertainty disposition to consider uncertainties to be unacceptable and threatening, and the consequences of such disposition	intolerance of uncertainty, Intolerance of Uncertainty Inventory; Intolerance of Uncertainty is a fundamental transdiagnostic personality construct hierarchically organized with a core general factor underlying diverse clinical manifestations; Part A was a reliable and valid transdiagnostic measure of Intolerance of Uncertainty. The Part B was arguably more useful for assessing clinical manifestations of Intolerance of Uncertainty for specific disorders
Lauriola, M., Tomai, M., Palma, R., La Spina, G., Foglia, A., Panetta, C., ... & Pontone, S. (2019). Intolerance of uncertainty and anxiety-related dispositions predict pain during upper endoscopy. Frontiers in Psychology, 10, 1112.	P	study - med	intolerance of uncertainty	intolerance of uncertainty, anxiety-sensitivity, procedural anxiety, pain catastrophizing; IU assessed before endoscopy predicted situational pain catastrophizing (PC) and self-reported pain after endoscopy through procedure related worries
Lawrie, S. I., Eom, K., Moza, D., Gavreliuc, A., & Kim, H. S. (2020). Cultural variability in the association between age and well-being: The role of uncertainty avoidance. Psychological Science, 31(1), 51-64.	P	emp - database	tested whether the relationship between age and well-being is moderated by uncertainty avoidance, a cultural dimension dealing with society's tolerance for ambiguity	Past research has found a mixed relationship between age and subjective well-being; we found that older age was associated with lower well-being in countries higher in uncertainty avoidance but not in countries lower in uncertainty avoidance

Leuker, C., Pachur, T., Hertwig, R., & Pleskac, T. J. (2018). Exploiting risk–reward structures in decision making under uncertainty. Cognition, 175, 186-200.	P	experimnts	uncertainty—that is, in situations where the probabilities of obtaining a payoff are unknown or at least difficult to ascertain	One solution to this problem is to infer the probability from the magnitude of the potential payoff and thus exploit the inverse relationship between payoffs and probabilities that occurs in many domains in the environment. Here, we investigated how the mind may implement such a solution: (1) Do people learn about risk–reward relationships from the environment—and if so, how? (2) How do learned risk–reward relationships impact preferences in decision-making under uncertainty?
Leuteritz, J. P., Navarro, J., & Berger, R. (2017). How knowledge worker teams deal effectively with task uncertainty: the impact of transformational leadership and group development. Frontiers in psychology, 8, 1339.	P	emp - survey	2 aspects of task uncertainty; a task uncertainty measurement that refers to unstable demands from outside the team; reduce unclarity of goals	The purpose of this paper is to clarify how leadership is able to improve team effectiveness, by means of its influence on group processes (i.e., increasing group development) and on the group task (i.e., decreasing task uncertainty); This paper contributes to understanding how knowledge worker teams deal effectively with task uncertainty and confirms the importance of group development in this context
Li, J., Xia, Y., Cheng, X., & Li, S. (2020). Fear of uncertainty makes you more anxious? Effect of intolerance of uncertainty on college students' social anxiety: A moderated mediation model. Frontiers in Psychology, 11, 565107.	P	emp - surveys	intolerance of uncertainty (IU),	This study investigated the relationships among intolerance of uncertainty (IU), social anxiety (SA), rumination, and pessimistic explanatory style (PES) in a sample of college students; Rumination partially mediated the relationship between IU and SA
Lian, H., Li, J. K., Du, C., Wu, W., Xia, Y., & Lee, C. (2022). Disaster or opportunity? How COVID-19-associated changes in environmental uncertainty and job insecurity relate to organizational identification and performance. Journal of Applied Psychology, 107(5), 693.	P	emp - model test	a model of how and why COVID19-associated uncertainty affects employee work outcomes; uncertainty as either internal (job insecurity) or external (perceived environmental uncertainty) to the organization	The coronavirus disease 2019 (COVID-19) pandemic continues to create tremendous uncertainty in workplaces; findings complement existing theoretical views that uncertainty typically leads to poor performance by inducing anxiety,
Liyanage, I., Walker, T., & Shokouhi, H. (2021). Are we thinking critically about critical thinking? Uncovering uncertainties in internationalised higher education. Thinking Skills and Creativity, 39, 100762.	P	emp - reflections	uncertainties about critical thinking in higher ed	We use reflections of a group of academic advisors who work with local and international students at a large university in Australia to uncover uncertainties about CT in HE and the need for more nuanced approaches to the strengths and needs of students irrespective of being members of reductive cohorts
Lofstedt, R., & Bouder, F. (2021). Evidence-based uncertainty analysis: What should we now do in Europe? A view point. Journal of Risk Research, 24(5), 521-540.	P	viewpoint	communication of scientific uncertainties; discuss some of the problems associated with communicating uncertainties	transparency, European Food Safety Authority; There has been a great deal of discussion regarding both the communication of scientific uncertainties associated with regulatory decisions
Lofstedt, R., McLoughlin, M., & Osman, M. (2021). Uncertainty analysis: results from an empirical pilot study. A research note. Journal of Risk Research, 24(5), 606-616.	P	res note	to achieve more transparency is to describe the underlying uncertainties within EFSA's scientific opinions	uncertainty analysis, European Food Safety Authority, transparency; public actually want to know more about the details of the scientific uncertainties associated with a certain risk topic or a scientific opinion or would they prefer to know less about these uncertainties?

Lu, L., Huang, H., Wei, J., & Xu, J. (2020). Safety Regulations and the Uncertainty of Work-Related Road Accident Loss: The Triple Identity of Chinese Local Governments Under Principal–Agent Framework. Risk analysis, 40(6), 1168-1182.	P	emp - data	a new approach based on self-organized criticality theory is proposed to measure the uncertainty of road accident loss; managerial implications by linking the results of risk assessment to decision making for risk management.	risk assessment, safety regulation, uncertainty of accident loss; This study examines how government safety regulations affect the uncertainty of work-related road accident loss (UWRAL) by considering the multi-identity of local governments; detailed safety work planning (SWP), high safety supervision intensity (SSI), and safety information transparency (SIT)
M. Isaksen, B. G., & McNaught, K. R. (2019). Uncertainty handling in estimative intelligence–challenges and requirements from both analyst and consumer perspectives. Journal of Risk Research, 22(5), 643-657.	P	intervws	uncertainty as subjective or 'estimative' probabilities and an associated level of confidence; respondents found it difficult or challenging to conceptualize uncertainty analytically	Uncertainty, intelligence, military, communication, framework; assessments of events and activities relating to military, terrorist and hybrid adversaries and the intentions of foreign governments, are made every day, usually involving subjective or 'estimative' probabilities and an associated level of confidence; recommendations to improve the process of uncertainty and risk communication in this important and consequential application area = a differentiated approach vs stndztn
Maguire, P., Moser, P., Maguire, R., & Keane, M. T. (2018). Why the conjunction effect is rarely a fallacy: How learning influences uncertainty and the conjunction rule. Frontiers in psychology, 9, 1011.	P	expermnts	Scenarios which have been engineered to produce the so-called conjunction 'fallacy' (e.g., Tverksy and Kahneman, 1983) often imply subjective uncertainty and hence the possibility of learning; surprise	randomness deficiency, surprise, subjective uncertainty, subjective likelihood; explore the relationship between learning and the conjunction fallacy. The interpretation of the conjunction effect as a fallacy assumes that all observers share the same knowledge; when people hear descriptions of real world situations, they are likely to assume that learning is possible, and that subjective rather than objective uncertainty applies
McDowell, M., & Kause, A. (2021). Communicating uncertainties about the effects of medical interventions using different display formats. Risk Analysis, 41(12), 2220-2239.	P	lab - expermnt	Communicating uncertainties in scientific evidence is important to accurately reflect scientific knowledge	present study examined how a point estimate, imprecise estimate, conflicting estimates, or a statement about the lack of evidence about treatment effects, influenced participant's responses to communications about medical evidence; For each type of uncertainty, we adapted three display formats to communicate the information: tables, bar graphs, and icon arrays.
Meder, B., Fleischhut, N., Krumnau, N. C., & Waldmann, M. R. (2019). How should autonomous cars drive? A preference for defaults in moral judgments under risk and uncertainty. Risk analysis, 39(2), 295-314.	P	emp - surveys, exprmnt	in critical traffic situations when consequences are only probabilistically known (a situation of risk) or even unknown (a situation of uncertainty); Each action could lead to a collision with another road user, with some known or unknown likelihood	This paper contributes to understanding how knowledge worker teams deal effectively with task uncertainty and confirms the importance of group development in this context; Av decisions as morally acceptable; findings highlight the importance of investigating moral judgments under risk and uncertainty in order to develop policies that are societally acceptable
Michelle Driedger, S., Maier, R., & Jardine, C. (2021). 'Damned if you do, and damned if you don't': communicating about uncertainty and evolving science during the H1N1 influenza pandemic. Journal of Risk Research, 24(5), 574-592.	P	emp - intervws	the inherent uncertainty of a real-time pandemic	The inherent uncertainty of a real-time pandemic was also a difficult concept to communicate to a public with little prior experience of such an event; While transparent communication was intended to build trust, resulting confusion fueled a loss of confidence in health officials; This study investigates the dissonances between the ideals and reality of communication during pH1N1 based on analyses oftwo data sources

Montiel, I., Christmann, P., & Zink, T. (2019). The effect of sustainability standard uncertainty on certification decisions of firms in emerging economies. Journal of Business Ethics, 154, 667-681.	P	emp - data	the uncertainties associated with competing standards and the effect of these uncertainties on standard certification decisions are especially large for firms in emerging economies; three distinct sources of sustainability standard uncertainty: (i) diversity of customer requirements, (ii) dynamism of customer requirements, and (iii) the unpredictability of the future evolution of standard	Global governance, Voluntary sustainability standards, Sustainability standard uncertainty; the recent proliferation of competing and overlapping global sustainability standards that have been developed by various stakeholders with different agendas,creates uncertainties for firms that likely reduce their propensity to adopt any standard
Nakayachi, K., Johnson, B. B., & Koketsu, K. (2018). Effects of acknowledging uncertainty about earthquake risk estimates on San Francisco bay area residents' beliefs, attitudes, and intentions. Risk Analysis, 38(4), 666-679.	P	expermnt	uncertainty in risk estimates; manipulated such a scientific uncertainty message, accompanied by probabilities (20%, 70%, implicit ['will occur'] 100%) and time periods (10 or 30 years) in major (≥ magnitude 8) earthquake risk estimates	test here the risk communication proposition that explicit expert acknowledgment of uncertainty in risk estimates can enhance trust and other reactions; uncertainty acknowledgment increased belief that these specific experts were more honest and open, and led to statistically (but not substantively) significant increases in trust; results imply that both theoretical arguments for positive effects, and practitioners' potential concerns for negative effects, of uncertainty expression may have been overblown
Neil, M., Fenton, N., Osman, M., & Lagnado, D. (2021). Causality, the critical but often ignored component guiding us through a world of uncertainties in risk assessment. Journal of Risk Research, 24(5), 617-621.	P	th - analysis	The idea of uncertainty analyses, which typically involves quantification, is to protect practitioners and consumers from drawing unsubstantiated conclusions from scientific assessments of risk.	present guidance documents that specify how uncertainty can be quantified without any explicit reference to a principled framework or methodological approach that can quantify, and, from this, communicate uncertainties; use recent guidance from the European Food Standards Authority on uncertainty analyses and the communication
Osman, M. (2021). Making a meal out of uncertainty. Journal of Risk Research, 24(5), 541-544.	P	commntry	scientific uncertainty; comms	uncertainty, science, transparency, European Food Safety Authority; to echo and perhaps even amplify the sentiments of the lead article, which in essence recommends a cautionary approach to two issues: rolling out uncertainty analysis procedures across other European agencies, and making scientific uncertainties transparent for public consumption
Osman, M., Ayton, P., Bouder, F., Pidgeon, N., & Lofstedt, R. (2021). Evidence based uncertainty: what is needed now?. Journal of Risk Research, 24(5), 622-628.	P	th - commntry	evaluate whether stakeholders and consumers actually understand EFSA's various uncertainty measures	briefs about the working of European Food Safety Authority; an important first step to inject transparency into the broader risk assessment process
Padilla, L. M., Powell, M., Kay, M., & Hullman, J. (2021). Uncertain about uncertainty: How qualitative expressions of forecaster confidence impact decision-making with uncertainty visualizations. Frontiers in Psychology, 11, 579267.	P	expermnts	distinction between direct quantitative uncertainty and indirect qualitative uncertainty = Direct quantitative uncertainty describes uncertainty about facts, numbers, and hypotheses that can be communicated in absolute quantitative forms such as probability distributions or confidence intervals. Indirect qualitative uncertainty describes the quality of knowledge concerning how effectively facts, numbers, or hypotheses represent reality, such as evidence confidence scales	uncertainty, visualization, cognition, direct uncertainty, indirect uncertainty, aleatory, quantile dot plots, decision-making; When forecasting events, multiple types of uncertainty are often inherently present in the modeling process. Various uncertainty typologies exist, and each type of uncertainty has different implications a scientist might want to convey; we seek to understand if individuals can integrate indirect uncertainty about how 'good' a model is (operationalized as a qualitative expression of forecaster confidence) with quantified uncertainty in a prediction (operationalized as a quantile dot plot visualization of a predicted distribution); recommend that forecasters present qualitative expressions of model confidence whenever possible alongside quantified uncertainty

Peng, S., Xuan, B., & Li, P. (2020). Fearful faces modulate cognitive control under varying levels of uncertainty: an event-related potential study. Brain and Cognition, 141, 105550.	P	lab - fMRI	The task incorporated different ratios of face orientation to quantify uncertainty	Cognitive control can reduce uncertainty, but few studies have investigated temporal dynamics of the flexible allocation of resources under varying levels of uncertainty; These results suggest that emotion and uncertainty interacted in the frontal cortex during both early and late stages, while no interaction existed in the parietal cortex during the late stage; The interference of fearful faces is lessened by increasing cognitive control under high uncertainty in the frontal cortex
Perrykkad, K., Lawson, R. P., Jamadar, S., & Hohwy, J. (2021). The effect of uncertainty on prediction error in the action perception loop. Cognition, 210, 104598.	P	experment	ability to infer agency is particularly challenging under conditions of uncertainty; use a novel, temporally-sensitive, behavioural proxy for prediction error to show that it is minimised most quickly when volatility is high and when participants report agency	Agency, Prediction error, Action-perception loop, Uncertainty; Among all their sensations, agents need to distinguish between those caused by themselves and those caused by external causes.
Piccolo, M., Milos, G. F., Bluemel, S., Schumacher, S., Mueller-Pfeiffer, C., Fried, M., ... & Martin-Soelch, C. (2019). Behavioral responses to uncertainty in weight-restored anorexia nervosa–preliminary results. Frontiers in Psychology, 10, 2492.	P	lab - games	decision-making under conditions of uncertainty; Intolerance of uncertainty (IU) was assessed via a decision-making task, the wheel of fortune	Impaired decision-making under conditions of uncertainty seems to contribute to the expression and maintenance of anorexia nervosa (AN), but it is not clear whether this impairment is a disease state that would remit with treatment; findings support a change in decision-making under uncertainty with successful weight rehabilitation in AN
Posten, A. C., & Mussweiler, T. (2017). That certain something! Focusing on similarities reduces judgmentaluncertainty. Cognition, 165, 121-125.	P	expermnts	Comparative thinking is an efficient cognitive strategy that reduces judgmental uncertainty	Similarity, Comparison, Judgment, Uncertainty; Similarity-focused comparisons seem to facilitate information-transfer, which has been suggested to drive the uncertainty-reducing effect of comparisons. This implies that similarity focused comparisons reduce uncertainty more than dissimilarity-focused comparisons; suggest that similarity-focused comparisons reduce judgmental uncertainty through the mechanism of information-transfer
Rakow, T., Blackshaw, E., Pagel, C., & Spiegelhalter, D. S. (2018). Comparing what to what, on what scale? The impact of item comparisons and reference points in communicating risk and uncertainty. Journal of Behavioral Decision Making, 31(4), 547-561.	P	expermnts	communicating risk and uncertainty; risk model	By drawing on evaluability theory, we demonstrate how to enhance people's understanding of these complex data while also discouraging inappropriate comparisons, which has implications for communicating risk and uncertainty and for choice architecture design in a range of contexts
Rast III, D. E., Gaffney, A. M., & Yang, F. (2018). The effect of stereotype content on intergroup uncertainty and interactions. The Journal of Social Psychology, 158(6), 711-720.	P	emp -surveys	we demonstrate that warmth and competence differentially affect intergroup uncertainty	intergroup relations, stereotypes, organizational behavior, uncertainty
Reis, J., & Shortridge, J. (2020). Impact of uncertainty parameter distribution on robust decision making outcomes for climate change adaptation under deep uncertainty. Risk Analysis, 40(3), 494-511.	P	model testing	a wide range of future states; analysts necessarily choose probabilistic bounds and distributions for uncertain variables to support exploratory modeling.	Climate change, deep uncertainty; Deep uncertainty in future climatic and economic conditions complicates developing infrastructure designed to last several generations, such as water reservoirs. We take a water reservoir system in Ethiopia as our case study, and sample climatic parameters from uniform, normal, extended uniform, and extended normal distributions; we similarly sample two economic parameters

Røyksund, M., & Flage, R. (2019). When Is a Risk Assessment Deficient According to an Uncertainty-Based Risk Perspective?. Risk Analysis, 39(4), 761-776.	P	concptl + emp	a new definition of risk: 'the consequences of an activity with the associated uncertainty'; also been using 'deficient risk assessment' for some time as a basis for assigning nonconformities in audit reports	deficient risk assessment, uncertainty-based risk, conceptual analysis; there is a diversity in how the agency officials approach the risk assessments in audits. Hence, we argue that improving the conceptual clarity of what the authorities characterize as 'deficient' in relation to the uncertainty-based risk perspective may contribute to the development of supervisory practices
Rubin, M. (2018). Fear of self-annihilation and existential uncertainty as predictors of worldview defense: Comparing terror management and uncertainty theories. The Journal of Social Psychology, 158(3), 298-308.	P	emp -surveys	existential uncertainty	uncertainty theorists propose that thoughts of death trigger feelings of uncertainty that motivate worldview defense; fear of existential uncertainty showed no significant effects.
Rydmark, J., Kuylenstierna, J., & Tehler, H. (2021). Communicating uncertainty in risk descriptions: the consequences of presenting imprecise probabilities in time critical decision-making situations. Journal of Risk Research, 24(5), 629-644.	P	lab - expermnt	One important question concerning a risk description is to what extent it should contain information about the uncertainty surrounding an estimated probability for an event, for example, by using some form of probability range	The purpose was to make a first estimation regarding if presenting uncertainty in risk descriptions could be a problem in these kinds of situations. The results show that almost half of the participants delayed their decisions; These results indicate that communicating uncertainty in risk descriptions can be a problem in time critical decision-making situations
Sahlin, U., & Troffaes, M. C. (2021). A note on EFSA's ongoing efforts to increase transparency of uncertainty in scientific opinions. Journal of Risk Research, 24(5), 545-552.	P	th = comment	evidence based uncertainty; the need to develop better treatment and communication of uncertainty in risk analysis	there is need to distinguish different types of communication in the discussion and facilitate—not diminish—the description and communication of uncertainty between risk assessors and decisionmakers… European Food Safety Authority (EFSA).
Sawicki, V., & Agnew, C. R. (2021). Commitment strength versus commitment bolstering: Uncertainty undermines and promotes relationship success. The Journal of Social Psychology, 161(1), 47-62.	P	emp - studies w/ model	uncertainty as doubt; uncertainty can motivate uncertainty reduction achieved by acting in line with commitment	Little research has examined factors that might weaken or strengthen commitment effects on relationship outcomes. The current research integrates attitude strength and investment model perspectives to identify uncertainty as a new moderator of commitment's predictive ability; Whether uncertainty weakened or strengthened commitment's predictive power depends on an individual's focus (implication-focused or not) when making relationship judgments
Scheingraber, C., & Käser, M. A. (2019). The impact of portfolio location uncertainty on probabilistic seismic risk analysis. Risk Analysis, 39(3), 695-712.	P	case study	precise exposure locations are often unknown; location uncertainty has not been in the focus of a large amount of research; proportion of risk items with unknown coordinates on the variability of loss frequency estimations; spatial hazard variability, location uncertainty in isolation and in conjunction with ground motion uncertainty can induce significant variability to probabilistic loss results; uncertainty as variability	portfolio location uncertainty, probabilistic seismic risk analysis, spatial variability, uncertainty communication; Probabilistic seismic risk analysis is a well-established method in the insurance industry for modeling portfolio losses from earthquake events.

Schuster, S., & Degen, J. (2020). I know what you're probably going to say: Listener adaptation to variable use of uncertainty expressions. Cognition, 203, 104285.	P	expermnts	the domain of uncertainty expressions like might and probably	Pragmatic theories of utterance interpretation share the assumption that listeners reason about alternative utterances that a speaker could have produced, but didn't; we find 1) that listeners vary in their expectations about a generic speaker's use of uncertainty expressions; 2) that listeners rapidly update their expectations about the use of uncertainty expressions after brief exposure to a speaker with a specific usage of uncertainty expressions; and 3) that listeners' interpretations of uncertainty expressions change after being exposed to a specific speaker
Shakina, E., Gasparetto, T., & Barajas, A. (2020). Football fans' emotions: Uncertainty against brand perception. Frontiers in psychology, 11, 659.	P	emp - data	uncertainty over the outcomes (competitive matches)	This paper aims to inspect how emotions impact attendance at football matches, examining whether football fans prefer to watch highly competitive matches or matches between good teams with star-players; We look for the difference between the marginal contribution of the brand-team and the uncertainty of outcomes that might change under some conditions; the effect of a brand-team playing is relatively more important than the uncertainty of outcome
Shen, L., Hsee, C. K., & Talloen, J. H. (2019). The fun and function of uncertainty: Uncertain incentives reinforce repetition decisions. Journal of Consumer Research, 46(1), 69-81.	P	expermnts	: individuals repeat a behavior more if its incentive is uncertain than if it is certain; the effect arises (a) only if the uncertainty is resolved immediately and not if the resolution of uncertainty is delayed	uncertainty, repetition decisions, reference dependent preferences, incentives; This research studies repetition decisions—namely, whether to repeat a behavior (e.g., a purchase) after receiving an incentive (e.g., a discount).; results support a resolution- as-reward account and cast doubt on other explanations such a reference-dependent preferences
Shou, Y., & Olney, J. (2021). Attitudes toward risk and uncertainty: The role of subjective knowledge and affect. Journal of Behavioral Decision Making, 34(3), 393-404.	P	lab - studies	an unsystematic mix of both perceived uncertainty and risk (as loss)	An individual's attitude toward risk is often measured by their behavioral tendency in risky situations; studies were carried out to examine the extent to which participants perceive behavioral tendency items as entailing uncertainty or risk (as loss) and how behavioral tendency can be influenced by prior knowledge; uncertainty and risk in the items appeared to influence behavioral tendency significantly via emotional responses to the items
Singh, V., Schiebener, J., Müller, S. M., Liebherr, M., Brand, M., & Buelow, M. T. (2020). Country and sex differences in decision making under uncertainty and risk. Frontiers in Psychology, 486.	P	lab - expermnts	differences during the uncertainty and risk phases of the iowa gambling task (IGT); uncertainty vs risk (high vs low variance decks of cards)	Whether males and females differ in decision-making remains highly debatable; confirmed the male-advantage on the IGT across the three countries
Sleesman, D. J., & Conlon, D. E. (2017). Encouraging prosocial decisions: The role of fairness salience and uncertainty. Journal of Behavioral Decision Making, 30(2), 502-515.	P	emp - expermnt + data	elucidate the complex role of uncertainty in prosocial decisions [?] in that it has a negative effect while also serving to strengthen the positive effect of fairness salience	Although the decision to engage in prosocial behavior has received research attention, the literature offers a limited understanding of fairness and uncertainty as antecedents
Smithson, M., Priest, D., Shou, Y., & Newell, B. R. (2019). Ambiguity and conflict aversion when uncertainty is in the outcomes. Frontiers in psychology, 10, 539.	P	expermnts	ambiguity in outcomes has been neglected	report two studies where judges do encounter ambiguity in the sampled outcomes and find evidence that ambiguity aversion is not less than when judges are given a range of outcomes without reference to ambiguous outcomes themselves; pessimism, in turn, may be due to the judges' uncertainty about how the chance of a desirable outcome from an ambiguous or conflictive alternative compares with an equivalent risky alternative

Stewart, B. D., Gulzaib, F., & Morris, D. S. (2019). Bridging political divides: Perceived threat and uncertainty avoidance help explain the relationship between political ideology and immigrant attitudes within diverse intergroup contexts. Frontiers in Psychology, 10, 1236.	P	experimnt	the Uncertainty-Threat Model to intergroup relations, which predicts that more dispositional, perceived-threat and uncertainty avoidance	The political divide between liberals and conservatives has become quite large and stable, and there appear to be many reasons for disagreements on a wide range of issues.
Tang, C., Ma, H., Naumann, S. E., & Xing, Z. (2020). Perceived work uncertainty and creativity during the covid-19 pandemic: The roles of Zhongyong and creative self-efficacy. Frontiers in psychology, 11, 596232.	P	emp - survey	in this study, work stress is assessed by the perceived work uncertainty brought on by the COVID-19 pandemic	perceived work uncertainty, employee creativity, COVID-19; low levels of Zhongyong are better for employee creativity in an uncertain context such as the COVID-19 pandemic
Terashima, Y., & Takai, J. (2018). Effects of relational uncertainty in heightening national identification and reactive approach motivation of Japanese. International Journal of Psychology, 53, 37-45.	P	experimnts	relational uncertainty	This study investigated whether relational uncertainty poses uncertainty threat, which causes compensatory behaviours among Japanese; confirmed that participants exhibited compensatory reactions to reduce aversive feelings due to it; concluded that the effect of uncertainty on compensatory behaviour is influenced by cultural priming
Tong, J., Feiler, D., & Ivantsova, A. (2018). Good choice, bad judgment: How choice under uncertainty generates overoptimism. Psychological science, 29(2), 254-265.	P	expermnts	uncertainty about the values of alternatives	We examine a fundamental feature of choice under uncertainty: Overestimating an alternative makes one more likely to choose it; results illustrate how readily overoptimism emerges as a result of statistical naïveté, even in the absence of a desire to justify one's decision after the choice
Tracey, M. W., & Hutchinson, A. (2018). Uncertainty, agency and motivation in graduate design students. Thinking Skills and Creativity, 29, 196-202.	P	qual study - reflctns	For designers, the ability to engage with uncertainty in the design process can be positioned as a threshold concept in a transformation curriculum; students experience uncertainty as an influence on personal agency;	Uncertainty, Design education, Design thinking; many find uncertainty provokes complex, ambivalent emotional responses; and, students identify both internal and external strategies for managing uncertainty
Tsubota, T., & Horita, M. (2022). What Forms the Trajectory of Social Reforms? The Roles of Decision Rules and Communication under Epistemic Uncertainty. Group Decision and Negotiation, 31(1), 187-212.	P	th model + sim	epistemic uncertainty	Uncertainty, Communication, Veto power; explains how decision rules and communication jointly affect collective outcomes in a small community under epistemic uncertainty
Vazquez, M., McIlroy-Young, B., Steel, D., Giang, A., & Öberg, G. (2021). Exploring Scientists' Values by Analyzing How They Frame Nature and Uncertainty. Risk Analysis, 41(11), 2094-2111.	P	emp - content analysis	uncertainty as risk (in nature); environmental risks	scientists have positioned themselves for and against the construction of a wastewater treatment plant in a debate framed as purely technical. This study explores the link between the scientists' positions in the debate and the way they, in their scientific publications, portray nature and environmental risks; e found that scientists against treatment predominantly frame nature as tolerant, up to a limit, to disturbances and potential risks, and they seem to embrace a view of science as capable of reducing uncertainties

Visschers, V. H. (2017). Judgments under uncertainty: evaluations of univocal, ambiguous and conflicting probability information. Journal of Risk Research, 20(2), 237-255.	P	lab - expermnts	a probability of a risk, but also an uncertainty around this probability; uncertainty that arises through a lack of knowledge (i.e. ambiguity) is distinguished from uncertainty that results from conflicting knowledge on the hazard's probability of occurring	uncertainty information, ambiguity avoidance, conflict avoidance, decision making; Relatively little is known about how people evaluate univocal, ambiguous and conflicting information about the riskiness or effectiveness of a problem; Respondents mainly appeared conflict averse and were only ambiguity averse when the information included both numerical and verbal descriptions of the uncertainty
Vosgerau, J., & Peer, E. (2019). Extreme malleability of preferences: Absolute preference sign changes under uncertainty. Journal of Behavioral Decision Making, 32(1), 38-46.	P	experimnts	uncertainty as gambles; to simultaneous risk aversion and risk seeking for the same risky prospect, suggesting that, at least in the domain of risky decisions, consumers' preferences are indeed malleable and construed	If respondents value a prospect positively in 1 condition but negatively in a different condition, preferences cannot be considered stable. Such absolute preference sign changes are possible under uncertainty
Walters, D. J., & Hershfield, H. E. (2020). Consumers make different inferences and choices when product uncertainty is attributed to forgetting rather than ignorance. Journal of Consumer Research, 47(1), 56-78.	P	lab - expermnts	When a consumer realizes that information relevant to a consumption decision is missing, such uncertainty can be attributed to ignorance (i.e., the information has never been observed and is unknown) or to memory failure (i.e., the information has been observed and is forgotten)	Across six experiments in the lab and in the field, we find that when uncertainty is attributed to ignorance, consumers often make inferences about unknown attributes based on existing correlational evidence; when uncertainty is attributed to memory failure, consumers tend to ignore such existing correlational evidence and instead make inferences about forgotten attributes that tend to be positively correlated with known attributes
Windschitl, P. D., Miller, J. E., Park, I., Rule, S., Clary, A., & Smith, A. R. (2022). The desirability bias in predictions under aleatory and epistemic uncertainty. Cognition, 229, 105254.	P	expermnts	uncertainty was both aleatory (stochastic) and epistemic (evidence for possible outcomes of similar vs not strength)	Desirability bias, Wishful thinking, Optimism, Uncertainty, Prediction; The findings broaden the generalizability of the desirability bias in predictions, yet they also reveal boundaries to an account of how stochasticity might provide affordances for optimistically biased predictions
Wu, D., Yu, L., Yang, T., Cottrell, R., Peng, S., Guo, W., & Jiang, S. (2020). The impacts of uncertainty stress on mental disorders of Chinese college students: Evidence from a nationwide study. Frontiers in psychology, 11, 243.	P	survey	uncertainty stress; perceived uncertainty stress	uncertainty stress, study stress, life stress, mental disorders; examine the relationships between the types of stress and students' mental health, to distinguish the effects of stressors on mental health problems, and to explore the important role of uncertainty stress on the development of mental disorders
Yang, Y., Gu, Y., & Galak, J. (2017). When it could have been worse, it gets better: How favorable uncertainty resolution slows hedonic adaptation. Journal of Consumer Research, 43(5), 747-768.	P	expermnts	mere possibility of a negative experience	hedonic adaptation, happiness, uncertainty, favorable uncertainty resolution; the current research proposes that exposing consumers to the mere possibility of negative experiences occurring in a consumption sequence increases consumers' happiness with those experiences over time; s driven by hedonic responses as a result of favorable uncertainty resolution
Yoon, S., McClean, S. T., Chawla, N., Kim, J. K., Koopman, J., Rosen, C. C., ... & McCarthy, J. M. (2021). Working through an "infodemic": The impact of COVID-19 news consumption on employee uncertainty and work behaviors. Journal of Applied Psychology, 106(4), 501.	P	data - survey	Uncertainty is a defining feature of the COVID-19 pandemic; consuming news information during crises—which tends to be distressing, constantly evolving, and inconsistent—will be positively related to uncertainty	covid-19, creativity, uncertainty reduction theory; because uncertainty is an aversive state, uncertainty reduction theory (URT) holds that employees try to manage it by obtaining information; study reveals important theoretical and practical implications regarding information consumption during a crisis
Zaman, J., Vanpaemel, W., Aelbrecht, C., Tuerlinckx, F., & Vlaeyen, J. W. S. (2017). Biased pain reports through vicarious information: A computational approach to investigate the role of uncertainty. Cognition, 169, 54-60.	P	lab - experimnt	induced uncertainty by manipulating the variation of the vicarious information; manipulated vicarious information about upcoming heat pain and found evidence for uncertainty-induced hyperalgesia; presented eight fictitious ratings of previous participants prior the delivery of electrocutaneous pain	Expectations about an impeding pain stimulus strongly shape its perception, yet the degree that uncertainty might affect perception is far less understood; pain ratings were biased towards the average vicarious information, ignoring the degree of uncertainty

Zheng, Y., Graham, L., Farh, J. L., & Huang, X. (2021). The impact of authoritarian leadership on ethical voice: A moderated mediation model of felt uncertainty and leader benevolence. Journal of Business Ethics, 170, 133-146.	P	emp - survey	Drawing upon uncertainty management theory, we found that authoritarian leadership was negatively related to employee ethical voice through increased levels of felt uncertainty	authoritarian leadership, felt uncertainty, ethical voice; n a sample of 522 police officers and staff in an English police force, we investigated the role of authoritarian leadership in reducing the levels of employee ethical voice; when authoritarian leaders simultaneously exhibit benevolence, they are less likely to cause feelings of uncertainty