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FROM HUNCH TO ANALYSIS: RISK MANAGEMENT IN TIERED DISPUTE RESOLUTION PROCESSES

Troy L. Harris*

ABSTRACT

The dispute resolution is process is filled with risk that decision-makers must identify, analyze, and manage. Risks can include unclear and conflicting objectives and uncertainties regarding strategic alternatives. While many litigators are adept at identifying these risks, systematic analysis and management of them is not typically part of lawyers' education or training. And yet there is a rich body of management scholarship devoted to risk analysis and decision-making based upon multiple criteria. This article brings the insights of this management literature to bear upon a phenomenon commonly found in relational contracting, the "tiered" dispute resolution process. The article demonstrates that one form of multi-criteria decision-making, simple additive weighting ("SAW") is a powerful tool for decision-makers to analyze the risks inherent in tiered dispute resolution processes.

I. INTRODUCTION

Many decisions in dispute resolution are based on hunches, not risk management principles.[1] Proper risk management consists of three distinct steps: (1) risk identification; (2) risk analysis; and (3) risk response.[2] Lawyers excel at risk identification (step 1) but

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[1] *See* Michaela Keet, *Litigation Risk Assessment: A Tool to Enhance Negotiation*, 19 CARDOZO J. CONFLICT RESOL. 17, 17 (2017).

[2] *The Three Phases of Risk Analysis: Risk Management Basics*, VECTOR SOLUTIONS (June 20, 2019),

are much less adept at analyzing risks in a disciplined and systematic way (step 2) before responding to the risk (step 3).[3] Imagine the following scenario: a client is negotiating a contract with counterparty when they reach the "dispute resolution" section. The client asks lawyer whether to propose court litigation or arbitration. One realistic response is: "[c]ourt litigation has generalist decision-makers." [Step 1, risk identification]. "Disputes under this contract are likely to be technical and beyond the ken of the average judge or jury." [Step 2, risk analysis]. "So, we suggest you propose arbitration." [Step 3, risk response]. Another, equally realistic response is: "[t]here is no right of appeal in arbitration, even if the arbitrator gets the law wrong." [Step 1, risk identification]. "The substantive provisions of this contract favor our side, so we want to make sure they are enforced." [Step 2, risk analysis]. "So, we recommend court litigation." [Step 3, risk response]. In both situations, the response to risk involved is premised upon risk analysis that is little more than a hunch about the client's objectives and the uncertainties that may affect realization of those objectives.[4]

In moving from hunch to analysis, risk management literature has much to add to the legal literature.[5] This article bridges that gap by applying risk management concepts to dispute resolution processes. Specifically, it begins with the International Organization for Standardization ("ISO") definition of "risk," ("effect of uncertainty on objectives") which can be used in a variety of contexts to manage a vast range of risk types.[6] The article applies the ISO definition in one specific context—dispute resolution—to identify potential risks associated with the different stages in tiered dispute resolution processes. Briefly stated, tiered step dispute resolution processes require parties to engage in preliminary types of dispute resolution before resorting to a final and binding process.[7] Thus, when a dispute arises, the contract may require a period of negotiation between parties; if the dispute remains unresolved, the contract may require parties to engage in mediation; only after an attempt at mediation has failed may parties resort to a final and

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https://www.vectorsolutions.com/resources/blogs/three-phases-risk-assessment-risk-management-basics.

[3] Kevin Johnson & Zane Swanson, *Quantifying Legal Risk: A Method for Managing Legal Risk*, 9 MGMT. ACCT. Q. 22, 23 (2007).

[4] *See generally* VECTOR SOLUTIONS, *supra* note 2.

[5] *See generally* Keet, *supra* note 1, at 18.

[6] *International Standard 31000: 2018(n) Risk Management—Guidelines, 3.1 Risk,* ISO (2018), https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en.

[7] *See, e.g.*, Joshua Karton, *Multi-Tier Dispute Resolution Agreements in Canadian Law and Practice: Interpreting, Enforcing, and Escaping*, 3 CAN. J. COM. ARB. 81, 82 (2022).

binding process such as litigation or arbitration.[8] At each stage, there are multiple criteria that counsel must analyze to make decisions about how to respond to identified risks.[9]

What is needed, in the language of the management literature, is a "multi criteria decision making" ("MCDM") method.[10] Scholars have applied MCDM methods to many different fields, including manufacturing systems, tourism management, and construction as well as project management.[11] Although the literature identifies many types of MCDM methods, this article applies one such method, "simple additive weighting" ("SAW"), to analyze relevant risks and formulate meaningful responses in the context of dispute resolution.[12]

Part II of this article elaborates on the complexity of the problem to be solved, identifying the myriad of potential objectives and uncertainties involved in tiered dispute resolution processes, using construction disputes as an example. Part III briefly surveys existing legal and risk management literature, identifying important gaps that leave the complexities identified in Part II unaddressed. Part IV uses a series of hypotheticals to show how decision-makers in construction disputes can use SAW to account for complexities of analyzing risk at various stages of the dispute resolution process. Part V concludes that, while admittedly imperfect, SAW provides a comparatively advantageous method for resolving construction disputes and is therefore an important tool for managing risks associated with dispute resolution processes in general.

II. COMPLEXITIES IN MOVING FROM HUNCH TO ANALYSIS

Tiered dispute provisions are common in commercial contracts, particularly long-term relational contracts where parties' achievement of their initial objectives going into the relationship requires ongoing cooperation.[13] The nature of relational contracts,

[8] *Id.*; *see also* Robert Dobbins, *The Layered Dispute Resolution Clause: From Boilerplate to Business Opportunity*, 1 HASTINGS BUS. L.J., 159 (2005).
[9] *See* Abbas Mardani et al., *Multiple Criteria Decision-Making Techniques and Their Applications—A Review of the Literature from 2000 to 2014*, 28 ECON. RSCH.-EKONOMSKA ISTRAŽIVANJA 516, 522 (2015).
[10] *Id.* at 516–17.
[11] *Id.* at 522.
[12] *Id.*
[13] Ian Macneil coined the term "relational contract," which has since spawned extensive scholarly literature. *See* Ian Macneil, *The Many Futures of Contract*, 47 S. CAL. L. REV. 691 (1974); *accord* George Baker et al., *Relational Contracts and the Theory of the Firm*, 117 Q. J. ECON. 39 (2002); Paul J. Gudel, *Relational Contract Theory and the Concept of*

combined with a tiered dispute resolution process, means disputants' objectives are not always easily defined and may—and likely do—change depending upon a myriad of factors, including issues in the dispute and the stage of the dispute resolution process.[14] For example, in the early days of a joint venture, establishing a good working relationship with one's joint venture partner may be a more important objective than achieving the maximum financial result in a relatively minor dispute. Perhaps in no other industry has the use of tiered dispute resolution provisions reached a higher level of development than in the construction industry. However, the analysis is equally applicable to other industries in which relational contracts are common, as well as more generally in the field of dispute resolution.[15]

It is a truism that construction is a risk-filled business due to the large number of variables potentially affecting a project's profitability including weather, subsurface conditions, labor productivity, materials costs, and technological challenges, to name only a few.[16] Resolving disputes on construction projects also involves risk.[17] As previously noted, ISO 31000 defines "risk" as the "effect of uncertainty on objectives."[18] This definition captures the fact that risk can be either positive or negative.[19] To take an obvious example: a fixed-price construction contract simultaneously responds positively to the effect of price increase

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Exchange, 46 BUFFALO L. REV. 763 (1998); Charles J. Goetz & Robert E. Scott, *Principles of Relational* Contracts, 67 VA. L. REV. 1089 (1981).

[14] *See generally* Macneil, *supra* note 13; Karton, *supra* note 7, at 81.

[15] *See* Karton, *supra* note 7, at 83.

[16] *See generally* Subham Sharma & Ashok Kumar Gupta, *Risk Identification and Management in Construction Projects: Literature Review*, 5 INT'L J. HUMS., ARTS & SOC. SCIS. 224 (2019).

[17] *See id.*

[18] ISO, *supra* note 6; *accord*, Edmundas Kazimieras Zavadskas et al., *Risk Assessment of Construction Projects*, J. CIV. ENG'G & MGMT. 33, 33 ("Object risk can be defined as an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective, such as time, cost, quality.") (citation omitted). Other definitions are possible as well. *See, e.g.*, Dongyou Tong & Yueming Wang, *Summary of Application of Fuzzy Mathematics in Construction Project Management*, 9 WORLD J. ENG'G & TECH. 407, 408 (2021) ("Risk refers to the uncertainty between the purpose of production and the results of labor, which has objectivity, universality, inevitability, identifiability, controllability, loss, uncertainty, and sociality. For construction project management, risk refers to the possible uncertain factors that may affect the realization of project goals."); Osman Taylan et al., *Construction Projects Selection and Risk Assessment by Fuzzy AHP and Fuzzy TOPSIS Methodologies*, 17 APPLIED SOFT COMPUTING 105, 105 (2014) ("risks are threats to project success").

[19] ISO, *supra* note 6.

uncertainty on an owner's cost-minimization objective by establishing a "ceiling" price, and responds negatively to the effect of price decrease uncertainty on that objective by establishing a "floor" price. All the "commercial" terms of construction contracts, and most of the "legal" terms, can be analyzed in the same way.

Under the ISO definition, risk exists only with respect to objectives.[20] If discovering a unicorn on the construction site is not an objective for anyone, then there is no risk associated with that objective, and the effect on any uncertainty surrounding the potential discovery of a unicorn is irrelevant. In the context of dispute resolution, a non-exclusive list of parties' possible objectives includes the following:

- Gathering intelligence about the other side's positions and their relative strengths and weaknesses;
- Testing one's own theories of the case;
- Settling the dispute;
- Delaying the inevitable;
- Satisfying a condition precedent to the next step in the process;
- Looking good to the arbitrator or judge;
- Creating a bargaining chip to be used in other negotiations;
- Putting pressure on the other side;
- Selling one's version of events internally or to others on "your" side (e.g., lenders, insurers, and sureties);
- Avoiding delay in completion of the project;
- Avoiding an increase in the cost of the project;
- Obtaining extra compensation;
- Obtaining an extension of time

Settling the dispute at hand is only one of many possible objectives when engaging in a dispute resolution process.[21] Adding to the complexity of the situation, in the case of a tiered dispute resolution process, is that a party's objectives may change,

[20] *Id.*

[21] For help in determining objectives, *see generally* Kenneth T. Chestek, *Thinking in Circles: Using OODA to Sharpen Legal Analysis*, 20 WYO. L. REV. 323, 327–28 (2020) (arguing for application of "Observe, Orient, Decide, Act" method of decision-making for case analysis and strategy selection where good decisions depend upon observing by "detect[ing] the problem to be solved," orienting by "gather[ing] relevant data needed to solve the problem," deciding by "process[ing] the data, leading to a conclusion," and acting by "implement[ing] the answer which results from the [decision] process").

depending upon the tier.[22] That is, the objectives in a negotiation may be very different from those in a mediation or arbitration.[23]

Depending upon the tier of the dispute resolution process under consideration and the parties' objectives, there may be a wide variety of uncertainties whose effect on the objectives must be analyzed. For our purposes, a non-exhaustive list of uncertainties that create risk in the dispute resolution process may include the following:

- Factual or proof-based uncertainties;
- Legal uncertainties;
- Human uncertainties including:
    - Counsel's abilities and experience
    - Arbitrator or judge's predilections, abilities, experience
    - Witness credibility
- Economic uncertainties including:
    - Cost of litigation/arbitration
    - Access to capital or litigation funding

So, if the problem to be solved is substituting meaningful risk analysis for hunches, the first step is to frame risk in ISO terms ("the effect of uncertainty on objectives") before finding a method to analyze the effect of multiple uncertainties on multiple objectives.[24] This is the solution examined in Part IV, but first it is necessary to see why the existing legal and management literature on risk in dispute resolution is insufficient for the task.

III. GAPS IN THE EXISTING LITERATURE

Legal scholars have notably worked to identify uncertainties in dispute resolution processes, but, with some exceptions, insufficient attention has been given to quantitative methods of analysis developed by risk management scholars as well as the accompanying complexities that arise when a party has multiple objectives. On the other hand, the existing risk management literature contains very sophisticated quantitative methods of analysis of various types of risk but suffers from inadequate appreciation of the uncertainties inherent in the dispute resolution process. And yet, meaningful management of risk in dispute resolution requires the insights of both legal and risk management scholars.[25]

[22] *See* Karton, *supra* note 7, at 129.
[23] *Id.*
[24] ISO, *supra* note 6.
[25] *See generally infra* Part IV.

A. GAPS IN THE LEGAL LITERATURE

There is a dearth of alternative dispute resolution (ADR) literature discussing tiered dispute resolution processes under relational contracts. Although there is a growing body of ADR literature taking account of risk management and other concepts typically associated with business management,[26] the literature pays scant attention to the fact that a party's objectives at any given point in a tiered dispute resolution process may be conflicting and subject to a wide variety of uncertainties—the very definition of "risk" under ISO 31000.[27]

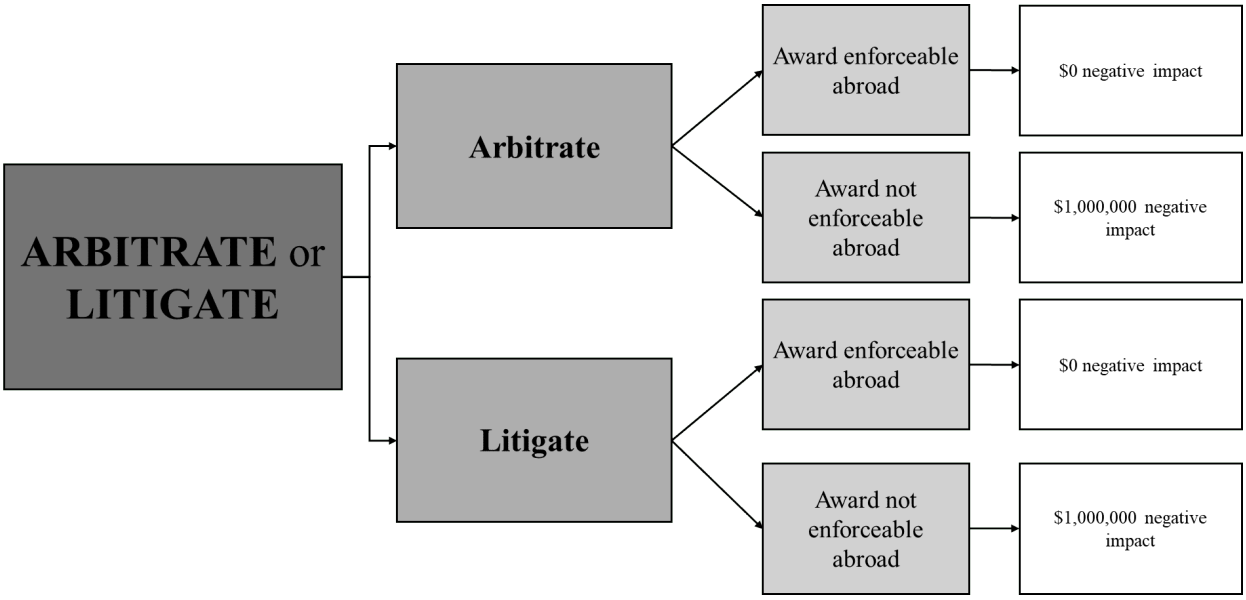
One important method of risk analysis that has received attention in the dispute resolution literature is the decision tree, which can be useful to analyze the potential effect of multiple uncertainties upon a single objective.[28] Indeed, one prominent international law firm is now marketing its "Decision Analysis"

[26] *See, e.g.*, Benjamin Davies, *Arbitral Analytics: How Moneyball Based Litigation/Judicial Analytics Can be Used to Predict Arbitration Claims and Outcomes*, 22 PEPP. DISP. RESOL. L.J. 321 (2022) (analyzing Federal Industry Regulatory Authority (FINRA) arbitration awards); Chestek, *supra* note 21; MARJORIE CORMAN AARON, RISK & RIGOR: A LAWYER'S GUIDE TO DECISION TREES FOR ASSESSING CASES AND ADVISING CLIENTS (2019) (advocating for the use of decision trees to analyze litigation risk); Keet, *supra* note 1, at 17 (illustrating use of litigation risk assessment to inform one's Best Alternative To a Negotiated Agreement (BATNA)); Garrick Apollon, *The Intersection between Legal Risk Management and Dispute Resolution in the Commercial Context*, 15 PEPP. DISP. RESOL. L.J. 267 (2015) (noting the potential for ADR techniques to inform legal risk management analysis); Marc B. Victor, *Decision Tree Analysis: A Means of Reducing Litigation Uncertainty and Facilitating Good Settlements*, 31 GA. ST. U. L. REV. 715 (2014) (applying decision tree analysis to account for multiple uncertainties in case valuation); Michael O'Reilly, *Commercial Litigation and Arbitration Risk Assessment Techniques*, 72 ARBIT. 1 (2006) (describing quantitative litigation risk assessment using author's proprietary software program).

[27] *See* ISO, *supra* note 6.

[28] *See, e.g.*, AARON, *supra* note 26, at 2 (explaining the "tree structure is the case map" by allowing "the client to see where the lawyer's discussion of motions, issues, liability theories, and damages ranges fit on that map, on the various paths to an outcome," comparing this to a tour guide who may "describe a winding and treacherous road ahead, but the prospective rider will consider the journey more carefully if he sees it mapped on the terrain").

service which uses the decision tree method to value cases.[29] However, the decision tree method is equally applicable to assess the effect of multiple uncertainties upon other objectives besides valuing a case. For example, when the only objective is to maximize the likelihood that the final decision of the dispute resolution process is enforceable where the losing party has assets and there are two alternatives from which to choose (e.g., litigation and arbitration), decision tree analysis makes perfect sense. If parties are from different countries and, therefore, enforcement of the final decision (arbitration award or court judgment) might take place outside the country where the decision is made, analysis of the risk associated with choosing one process over the other requires analysis of the effect of the uncertainties associated with each alternative upon the objective of obtaining an enforceable decision. In this situation, the decision tree for a valid $1,000,000 claim would look something like the following:



[29] *Inside Arbitration: Decision Analysis - Putting legal risk in the language of the boardroom*, HERBERT SMITH FREEHILLS LLP (Mar. 15, 2023), https://www.lexology.com/library/detail.aspx?g=15c29954-3ea5-4d4f-bfb4-7e9bf903c89e ("In our largest decision tree to date, we modelled a $1.3 billion insurance claim with over 20,000 potential outcomes. The client's management boards found the model very helpful to support settlement strategy discussions and asked us to maintain it as the case developed.").

This above example assumes that the claim is valid and can be proven so. The enforceability of the ultimate decision outside the jurisdiction where the decision is rendered is the only uncertainty being analyzed. Experts in international commercial arbitration will recognize that the arbitration award will likely be subject to the New York Convention and, therefore, be enforceable as a matter of right in most countries (hence the 90% probability).[30] However, the possibility always exists (expressed here as a 10% probability) the arbitrator will either (1) fail to render an enforceable award; (2) the place of enforcement is not a signatory to the New York Convention; (3) the court where enforcement is sought misapplies the law; or (4) things do not go as expected for some other reason. On the other hand, enforcement of a U.S. court judgment abroad "depends upon the internal laws of the foreign country and international comity."[31] Given the willingness of a court in China may be very different from that of a court in Canada to enforce a U.S. court judgment, one could reasonably conclude there is a much lower probability (20%) a court judgment will be enforceable outside the U.S. and a much higher (80%) probability it will not:

	Risk Cost	***Probability***	**TOTAL**
Arbitrate	$1,000,000	10%	$100,000
Litigate	$1,000,000	80%	$800,000

Multiplying the probability of not achieving the desired objective (enforceability of the decision) by the economic impact of not achieving the desired objective shows the risk associated with arbitration is substantially lower than the risk associated with litigation in this hypothetical. To those already familiar with international arbitration, the above calculation is almost intuitive. However, this (ostensibly) quantitative analysis cannot eliminate the subjective, qualitative valuation of the probability of each outcome. Indeed, in the absence of reliable data about enforcement outcomes in different jurisdictions, the assignment of 10%, 90%, 20%, and 80% probabilities is not only subjective but also speculative and

[30] *See Status: Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, 1958) (the "New York Convention")*, UNCITRAL, https://uncitral.un.org/en/texts/arbitration/conventions/foreign_arbitral_awards/status2 (last visited Mar. 9, 2024) (listing contracting states to New York Convention).

[31] *Enforcement of Judgments*, U.S DEPT. OF STATE (last visited Jan. 12, 2024), https://travel.state.gov/content/travel/en/legal/travel-legal-considerations/internl-judicial-asst/Enforcement-of-Judges.html.

arbitrary. While leading legal information providers currently offer litigation analysis services to help predict outcomes of court litigation in the United States,[32] there is no similarly robust data set for arbitration and related court proceedings on a global scale that would permit such probabilities to be valued quantitatively on a routine basis.

As useful as decision tree analysis may be for analyzing some risks, it is limited. Where there are multiple objectives, the analysis becomes much more complicated, and decision tree analysis becomes cumbersome if not altogether unworkable. To fully analyze risk in such cases, the effect of multiple uncertainties upon multiple objectives must be evaluated. Risk management literature contains more sophisticated tools for such analysis, but that literature has its own shortcomings.[33]

B. GAPS IN THE RISK MANAGEMENT LITERATURE

Risk management issues arise in every type of human activity. One might think legal risk management literature would be a likely place to find analysis of risk in dispute resolution; however, the literature of legal risk management generally focuses on activities other than dispute resolution.[34] More promising is the construction management literature, with dozens of scholarly journals devoted solely to the subject,[35] and the highly-influential Project Management Book of Knowledge ("PMBOK") published by the Project Management Institute ("PMI").[36] The PMBOK has an entire chapter devoted to project risk management,[37] and PMI offers

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[32] *See, e.g.*, *Litigation Analytics*, WESTLAW EDGE, https://legal.thomsonreuters.com/en/products/westlaw-edge/litigation-analytics (last visited Mar. 9, 2024).

[33] See generally infra Part III(B).

[34] *See, e.g.*, Johnson & Swanson, *supra* note 3, at 22.

[35] *See Journals in the field of Construction Management*, ASS'N RSCH. CONSTR. MGMT. (last visited Jan. 12, 2024), https://www.arcom.ac.uk/res-journals.php.

[36] *See generally* PROJECT MANAGEMENT INSTITUTE, A GUIDE TO THE PROJECT MANAGEMENT INSTITUTE BOOK OF KNOWLEDGE (6th ed. 2017); *What is the PMBOK Guide?*, PROJECT MGMT. INST. (last visited Jan. 23, 2024) https://www.pmi.org/pmbok-guide-standards/foundational/pmbok/about ("[The PMBOK] is a guide to the Project Management Body of Knowledge" that provides "good practice for most projects most of the time").

[37] *See* PROJECT MANAGEMENT INSTITUTE, *supra* note 36, at ch.11. Other important guides to construction risk management include the following: Royal Institution of Chartered Surveyors, *Management of Risk*, RICS (2015), https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/black-

training programs in construction risk management specifically.[38] Thanks to this sustained academic and professional attention, the broad categories of risk attendant to the construction process are well recognized. According to one review of the construction project management literature, the top ten construction risks are the following:[39]

1. Unavailability of funds
2. Design errors and poor engineering
3. Poor site management
4. Contractual risks
5. Legal and regulatory changes
6. Severe environmental conditions
7. Change in inflation rate
8. Natural disaster
9. Inadequate safety measures
10. Change in project scope

Much like economic analysis of markets, the analysis of risk in construction can involve highly sophisticated mathematical tools.[40] However, like the economic analysis of markets, some high-level, relatively simple approaches are available to analyze risk in construction.

One tool that helps identify, analyze, and respond to construction risk is the "risk register" or "early warning register," which is not only a familiar construction management tool, but also a contractual requirement under some form agreements.[41] Risk analysis in this context is often "qualitative" because there is insufficient data available to quantify these risks in any meaningful

book/management-of-risk; *Papers published by the Society*, SOC'Y CONSTR. L. UK, https://www.scl.org.uk/papers (last visited Jan. 12, 2024).

[38] *See Contract and Risk Management in the Built Environment*, PROJECT MGMT. INST., https://www.pmi.org/certifications/construction/contract-and-risk-management (last visited Oct. 6, 2023).

[39] Sharma & Gupta, *supra* note 16, at 229.

[40] *See, e.g.*, Tong & Wang, *supra* note 18 (reviewing literature applying fuzzy mathematics in construction project management); Kajal Chatterjee et al., *A Hybrid MCDM Technique for Risk Management in Construction Projects*, 10 SYMMETRY 1 (2018) (applying analytical network process and multi-attributive border approximation area comparison methods to multi-criteria decision-making process); Taylan et al., *supra* note 19 (applying multi-criteria decision-making methods to project selection problems).

[41] *See* MICHAEL A. ROWLINSON, A PRACTICAL GUIDE TO THE NEC3 ENGINEERING AND CONSTRUCTION CONTRACT 40–42 (2011).

sense, although notable exceptions exist.[42] The risk register functions with a high level of generality and does not require risks associated with disputes to be included.[43] But an even more basic problem with risk registers (for purposes of analyzing risk in the dispute resolution process) is that they are meant to be shared between the contractor and owner as a means of managing risks to the project objectives, not either party's business objectives.[44] Thus, the Institution of Civil Engineers' "NEC3" family of contracts defines a risk register as:

> A register of the risks which are listed in the Contract Data and the risks which the Project Manager or the Contractor has notified as an early warning matter. It includes a description of the risk and a description of the actions which are to be taken to avoid or reduce the risk.[45]

This approach leaves it to parties to define relevant risks, which are typically core project risks (e.g., labor and materials costs; subsurface conditions, and schedule impacts), not risks associated with the resolution of disputes.[46]

Somewhat surprisingly, absent from most discussions of construction risk management are risks associated with the dispute resolution process—risk registers rarely extend to the dispute resolution provisions of construction contracts. The risk associated with disputes on construction projects have not received sustained attention and analysis in the same way other core functions in the

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[42] *See, e.g.*, Ming-Fung Francis Siu et al., *A Data-Driven Approach to Identify-Quantify-Analyse Construction Risk for Hong Kong NEC Projects*, 24 J. CIV. ENG'G & MGMT. 592 (2018) (using a combination of text mining analysis of a sample of NEC risk registers and decision tree analysis to identify and quantify project risk).

[43] *See* ROWLINSON, *supra* note 41, at 41, 43 (describing the "[NEC] Risk Register [as] require[ing] only two pieces of information" including "what the risk is or might be" as well as "what actions are to be taken to avoid or reduce the risk," further noting that "[M]any users of the Risk Registers do not grasp that the purpose of this document is to manage risks to time, cost and quality matters that will affect the outcome of the project. It is not a tool to manage business risk for either party.").

[44] *Id.* at 42.

[45] NEC3 Engineering and Construction Contract, Core Clause 11.2(14) (2005); *see also* NEC4 Engineering and Construction Contract, Core Clause 11.2(8) (2017) (noting "The Early Warning Register is a register of matters which are listed in the Contract Data for inclusion and notified by the Project Manager or the Contractor as early warning matters. It includes a description of the matter and the way in which the effects of the matter are to be avoided or reduced.").

[46] *See* NEC3 Engineering and Construction Contract, *supra* note 45.

construction process have, such as scheduling.[47] When risk associated with dispute resolution appears in the construction management literature at all, it is frequently lumped in with "legal risk" in construction,[48] or "documents and information risk."[49] Indeed, the dispute resolution provision's sobriquet "midnight clause" reflects the fact that dispute resolution is often an afterthought considered only once other risk-allocation provisions have been used.[50] This is curious because the efficacy of contract provisions allocating risks inherent in the construction process ultimately depends, at least in part, upon the efficacy of the dispute resolution process, which is itself fraught with risk. Stated differently, the most carefully crafted performance guarantees, indemnifications, force majeure, differing site condition clause, and other contractual provisions depend upon enforceability for their efficacy through either informal (e.g., reputational) or formal (i.e., adjudicative) means. Nevertheless, the connection between risks associated with the "substantive" portions of the construction contract and risks associated with the contract's dispute resolution provisions is usually implicit at best in the construction risk management literature.[51]

While generally appreciating the complexity, and resulting incommensurability, of construction disputes, the construction management literature addressing risks in dispute resolution has important limitations. First, the literature tends to assume parties share the objective of resolving the dispute, albeit to each party's own best advantage.[52] As already suggested, this is not always the

[47] *See, e.g.*, Shahryar Monghasemi et al., *A Novel Multi Criteria Decision Making Model for Optimizing Time–Cost–Quality Trade-Off Problems in Construction Projects*, 42 EXPERT SYS. WITH APPLICATIONS 3089, 3089 (2015).
[48] Chatterjee et al., *supra* note 40, at 15.
[49] Zavadskas et al., *supra* note 18, at 35.
[50] *See* Patrick G. Jones, *The Midnight Clause: From Darkness to Daylight*, HENNING MEDIATION & ARB. SERV. INC. (Apr. 2014), https://pgjonesadr.com/wp-content/uploads/2016/05/Midnight-Clause-From-Darkness-to-Daylight-April-2014PGJ-ADR-Website.pdf ("[The midnight clause] refers to the dispute resolution clause, and in particular the arbitration clause, because all too often it is addressed at the end of the contract negotiations (and many times after midnight) as more of less an 'afterthought' with very little consideration given to the consequences.").
[51] *See* Zavadskas et al., *supra* note 18, at 33.
[52] *See* Ghada M. Gad et al., *Analytical Framework for the Choice of Dispute Resolution Methods in International Construction Projects Based on Risk Factors*, 3 J. LEGAL AFF. & DISP. RESOL. ENG'G & CONSTR. 79, 82 (2011); *see also* Aryo Faghih & Reza Akhavian, *A Game-Theory Approach to Construction Dispute Resolution through Mediation*, 11 J. LEGAL AFF. & DISP. RESOL. ENG'G & CONSTR. 1, 1 (2019).

case because parties' objectives, and the uncertainties attending those objectives, typically change at various stages (e.g., negotiation, mediation, and arbitration) of construction dispute resolution.[53] Second, there is often little appreciation for legal doctrines that govern construction disputes even though those doctrines help define realistic objectives that disputants consider.[54] Third, even highly-sophisticated mathematical analyses of decision-making processes rely upon assumptions that facts are as objectively verifiable as numbers, ignoring the reality that facts within dispute resolution must be established within the limits of a particular process (e.g., negotiation, mediation, arbitration, or litigation) and, most importantly, in the face of imponderables such as witness credibility.[55] Even if, in truth, the stoplight was red, proving so is quite another matter. Some witnesses are excellent liars and can convincingly testify the light was green, while other witnesses, for a variety of reasons, may be unconvincing even when telling the truth. Mathematical models take account of none of these factors, opting for an assume-a-can-opener approach to proof problems that serve as inputs into the equations.

IV. BRIDGING THE GAP: SIMPLE ADDITIVE WEIGHTING IN INTERNATIONAL CONSTRUCTION DISPUTE RESOLUTION

The essential insight of risk management, as applied to dispute resolution, is that managing a dispute involves numerous objectives, uncertainties, and decision-points at which parties must assess both their objectives and the attendant uncertainties.[56] The dispute resolution processes commonly found in the construction industry, including negotiation, initial decision makers ("IDMs"), dispute resolution boards ("DRBs"), mediation, and arbitration can be subjected to risk analysis in the same way as the risk of differing site conditions, labor and material price escalation, or any other construction risks.[57] Most construction disputes do not move from

[53] Gad et al., *supra* note 52, at 81.
[54] *See* Ahmad Alozn & Abdulla Galadari, *Can Machines Replace the Human Brain? A Review of Litigation Outcome Prediction Methods for Construction Disputes*, 74–75 (New Persp. Constr. L. Int'l Conf., 2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2902470.
[55] *See* Islam Hassan El-adaway, Construction Dispute Mitigation Through Multi-Agent Based Simulation and Risk Management Modeling 1, 24 (2008) (Ph.D. dissertation, Iowa State University) (on file with author). *See generally* DAVID ARDITI & ONUR BEHZAT TOKDEMIR, USING CASE-BASED REASONING TO PREDICT THE OUTCOME OF CONSTRUCTION LITIGATION, COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING 385–393 (1999).
[56] *See* Chatterjee et al., *supra* note 41, at 33.
[57] Gad et al., *supra* note 52, at 81.

the "claim" stage to arbitration or litigation without first passing through one or more preliminary processes.[58] In an important sense though, these preliminary steps are taken in the shadow of whatever the final and binding dispute resolution process may be.[59] Stated differently, the likelihood of finally resolving a dispute at any preliminary stage is colored by the participants' estimate of success if the dispute goes all the way to arbitration or litigation.[60] Conversely, the arbitration process is colored by steps that have gone before.[61] It therefore makes sense to apply the simple additive weight ("SAW") analysis to the risk associated with each such process.[62]

A. A SAW ANALYSIS OF RISK PROCEEDS IN SEVEN STEPS

Step 1: Define the objectives in relation to the different uncertainties to be measured.[63] These are represented by the letter "o."

Step 2: Identify the uncertainties to be measured.[64] These are represented by the letter "u."

Step 3: Score the uncertainties in terms of the objectives on a scale from 1–9 ("1" is the least likely to achieve the criterion/objective, "5" is neutral, and "9" is the most likely to achieve the objective).[65] These scores are represented by the letter "s."

Step 4: Normalize the scores according to the following formula:[66]

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[58] *Id.* at 82.
[59] *Id.*
[60] *Id.* at 81.
[61] *Id.*
[62] Although other MCDM methods are available, SAW is simple enough for the average lawyer to use. *See* Mardani et al., *supra* note 9, at 550. Other methods, such as TOPSIS (i.e., Technique for Order Preference by Similarity to Ideal Solution), are not for the faint of heart. *See* Zavadskas et al., *supra* note 18, at 38 ("The TOPSIS method is one of the best described mathematically and not simple for practical using.").
[63] *See generally* Alireza Afshari et al., *Simple Additive Weighting Approach to Personnel Selection Problem*, 1 INT'L J. INNOVATION, MGMT & TECH. 511, 512–14 (2010) (outlining steps for SAW analysis).
[64] *Id.* at 512.
[65] *See* G. O. Odu, *Weighting Methods for Multi-Criterion Decision Making Technique*, 23(8) J. APPLIED SCI. & ENV'T MGMT 1449, 1451 ("The use of ordinal scale (1 - 9) is adopted to help in determining the preference value of one criterion against the other.")
[66] *See* Afshari et al., *supra* note 63, at 514.

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

Here, "*u*" = uncertainty 1, 2, 3, etc.;
"*o*" = objective 1, 2, 3, etc.; and
"s_o^*"= maximum number of "s" in the column of "o."

Step 5: Assign weights ("*w*") to the objectives.[67] The sum must equal "1."

Step 6: Sum the normalized,[68] weighted scores according to the following formula[69] to arrive at the overall ranking ("*R*") of each uncertainty with respect to the objectives:

$$R_u = \sum n_{uo} w_o$$

Step 7: Sort the sums from Step 6 in descending order to rank the uncertainties from best to worst.[70]

1. NEGOTIATION EXAMPLE

Suppose a Contractor has a dispute with an Owner over a claim for additional compensation on a differing site condition claim. Assume the contract requires negotiation between parties but does not specify exactly whom from each side should be required to negotiate. The SAW analysis, combined with the ISO definition of risk, can help inform that decision.[71]

i. STEP 1: DEFINE THE OBJECTIVES

Because a risk exists only with respect to an objective, analyzing the risk associated with the uncertainty of whom to send

[67] *Id.*
[68] *See* Natalja Kosareva et al., *Statistical Analysis of MCDM Data Normalization Methods Using Monte Carlo Approach: The Case of Ternary Estimates Matrix*, 52 ECON. COMPUTATION & ECON. CYBERNETICS STUD. & RSCH 159 (2018) (noting there are different ways to normalize data). To keep the math simple, this author has used the "Max" normalization technique, which is frequently used in this type of analysis. *See* Nazanin Vafaei et al.*, Assessing Normalization Techniques for Simple Additive Weighting Method*, 199 PROCEDIA COMPUT. SCI. 1229 (2022).
[69] Afshari et al., *supra* note 63, at 514.
[70] *Id.* at 513.
[71] *See generally* Mardani et al., *supra* note 9.

to the negotiation begins with identifying the objectives of the negotiation.[72] There is inevitably a degree of subjectivity in defining the objectives, but "brainstorming" is a recognized and common technique for doing so.[73] As the tools of artificial intelligence (AI) become ever more sophisticated, it is possible that AI, too, could be used to define objectives in particular situations.

Three credible objectives could include the following: (1) to obtain information about the Owner's defenses and any potential counterclaims; (2) to increase the Owner's current settlement offer; and (3) to disclose no bad facts the Owner does not already know.[74]

ii. STEP 2: IDENTIFY THE UNCERTAINTIES

One important uncertainty is who should take the lead in negotiating on the Contractor's behalf. Assume the available candidates (each, an "uncertainty," in ISO terms) include the Contractor's CEO, Project Executive, and Site Superintendent, and each must be assessed for their respective strengths and weaknesses. The CEO, for example, has the "big picture" view of the dispute and how it affects the Contractor's business, but the CEO may have little to no familiarity with the facts giving rise to the dispute. At the other extreme is the Site Superintendent who may be intimately familiar with the facts—both favorable and unfavorable—but no real appreciation for how resolution of this dispute may affect the Contractor's business (e.g., reputational risk). In between is the Project Executive, who has a general familiarity with the relevant facts and some sense of potentially larger implications. In short, the background and interests of each candidate introduce uncertainty of one kind or another in relation to the stated objectives.

iii. STEP 3: SCORE THE UNCERTAINTIES

Score the uncertainties on a scale from 1 to 9 where 1 is the least likely to achieve the objective, 5 is neutral, and 9 is the most likely to achieve the objective. As with defining the objectives of the negotiation, there is inevitably a degree of subjectivity in scoring the uncertainties:

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[72] *See* ISO, *supra* note 6.
[73] *See* Lyons & Skitmore, *Project Risk Management in the Queensland Engineering Construction Industry: A Survey,* 22 INT'L J. PROJECT MGMT. 51, 60 (2004).
[74] Chestek, *supra* note 21, at 327–28.

TABLE 1(A): SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **CEO**	$s_{u101} = 2$	$s_{u102} = 8$	$s_{u103} = 9$
u_2 = **Project Executive**	$s_{u201} = 4$	$s_{u202} = 6$	$s_{u203} = 5$
u_3 = **Site Superintendent**	$s_{u301} = 9$	$s_{u302} = 2$	$s_{u303} = 1$

This is perhaps the most important, and most easily manipulated, step in the process. It requires a candid assessment of each uncertainty under consideration, which is inevitably qualitative and subjective. Again, however, "brainstorming" among those familiar with both the facts and personalities involved can help avoid confirmation bias and make the scoring more meaningful.[75]

The scoring in this hypothetical necessarily depends upon assumptions that may not be valid in all situations. For example, it assumes the CEO, as a relative stranger to the dispute, is unlikely to know enough about the details to ask the hard, fact-specific questions that will reveal new information about the Owner's potential defenses or counterclaims. By contrast, the Project Executive and, to an even greater degree, the Site Superintendent, should be better positioned to ask such questions and to identify any weaknesses in the Owner's responses.

However, with respect to increasing the Owner's current settlement offer, the situation could easily be the reverse. The CEO, less personally invested in the merits of this dispute, may well be better at convincing the Owner it is not worth the time and money each side will spend to find out which side a judge or arbitrator believes. The Site Superintendent, at the other extreme, likely has much more baggage in relation to this claim and therefore may be so full of vinegar due to the perceived injustice of the Owner's position that he or she is incapable of finding the honey necessary to increase the Owner's settlement offer. Again, the Project Executive falls somewhere in between, according to his or her

[75] *See* Lyons & Skitmore, *supra* note 73, at 60.

relative investment in the dispute.

Finally, danger that the CEO will disclose bad facts the Owner does not already know is assumed to be minimal because the CEO knows very little about the specific dispute. On the other hand, the Site Superintendent likely knows many bad facts and, if not carefully prepared in advance, may inadvertently disclose some of them in the heat of the moment.

iv. STEP 4: NORMALIZE THE SCORES

Normalize (*n*) the scores according to the following formula:[76]

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

Again, *u* = uncertainty 1, 2, and 3; *o* = objective 1, 2, and 3; and s_o^*= maximum number of s in the column of o.[77] Thus, after imputing scores from the previous table into the formula, the results show the following:

TABLE 1(B): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **CEO**	n_{u1o1} = 2/9 = 0.22	n_{u1o2} = 8/8 = 1.00	n_{u1o3} = 9/9 = 1.00
u_2 = **Project Executive**	n_{u2o1} = 4/9 = 0.44	n_{u2o2} = 6/8 = 0.75	n_{u2o3} = 5/9 = 0.56
u_3 = **Site Superintendent**	n_{u3o1} = 9/9 = 1.00	n_{u3o2} = 2/8 =0.25	n_{u3o3} = 1/9 = 0.11

[76] Afshari et al., *supra* note 63, at 514.
[77] *Id.*

v. STEP 5: ASSIGN WEIGHTS TO THE OBJECTIVES

The sum must equal "1."[78] Assume that increasing the Owner's current settlement offer is twice as important as either of the other two objectives, which have the same weight as each other:[79]

TABLE 1(C): WEIGHTS OF THE OBJECTIVES

To obtain information about the Owner's defenses and any potential counterclaims	To increase the Owner's current settlement offer	To disclose no bad facts the Owner does not already know
$w_{o1} = 0.25$	$w_{o2} = 0.50$	$w_{o3} = 0.25$

This, too, is a crucial (and easily manipulated) step in the process that requires a candid discussion among the members of the Contractor's negotiating team.

vi. STEP 6: SUM THE SCORES

Sum the normalized, weighted scores according to the following formula:[80]

$$R_u = \sum n_{uo} w_o$$

TABLE 1(D): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **CEO**	(0.22 x 0.25) + (1.00 x 0.50) + (1.00 x 0.25) = 0.81
u_2 = **Project Executive**	(0.44 x 0.25) + (0.75 x 0.50) + (0.56 x 0.25) = 0.63
u_3 = **Site Superintendent**	(1.00 x 0.25) + (0.25 x 0.50) + (0.11 x 0.25) = 0.41

[78] *Id. See generally* Zavadskas et al., *supra* note 18, at 39–40 (using COPRAS-G objective weighting method to determine attributes values at intervals, the sum of said attribute values equaling "1").
[79] *See* El-adaway, *supra* note 565 at 3, 11–12.
[80] *Id.*; Afshari et al., *supra* note 63, at 514.

vii. STEP 7: RANK THE UNCERTAINTIES

Sort the sums from Step 6 in descending order to rank the alternatives from best to worst:[81]

TABLE 1(E): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **CEO**	0.81	1
u_2 = **Project Executive**	0.63	2
u_3 = **Site Superintendent**	0.41	3

If the objective of increasing the Owner's current settlement offer is twice as important as either of the other objectives, and if the CEO scores higher than the other two candidates with respect to that objective, it is unsurprising the CEO ranks first among the alternatives. But, if one changes the weighting of the objectives, the rankings also change.[82] For example, if the Contractor's team believes it is unlikely the Owner will increase its current settlement offer, it may be reasonable to assign less weight to that objective.[83] Depending upon their perceptions about the strengths and weaknesses of the two sides' cases, the Contractor's team might conclude the more important objectives are obtaining information about the Owner's defenses and potential counterclaims rather than disclosing bad facts the Contractor knows about its own position.[84] If so, the weights in Step 5 could look like the following:

TABLE 1(F): WEIGHTS OF THE OBJECTIVES

To obtain information about the Owner's defenses and any potential counterclaims	To increase the Owner's current settlement offer	To disclose no bad facts the Owner does not already know
$w_{o1} = 0.50$	$w_{o2} = 0.10$	$w_{o3} = 0.40$

Re-running the calculations in Step 6, then, yields the following

[81] *Id.*
[82] *Id.*
[83] *Id.*
[84] *Id.*

results:

TABLE 1(G): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **CEO**	(0.22 x 0.50) + (1.00 x 0.10) + (1.00 x 0.40) = 0.61
u_2 = **Project Executive**	(0.44 x 0.50) + (0.75 x 0.10) + (0.56 x 0.4) = 0.52
u_3 = **Site Superintendent**	(1.00 x 0.50) + (0.25 x 0.10) + (0.11 x 0.40) = 0.57

Assigning different weights to the objectives changes the ultimate rankings in Step 7:

TABLE 1(H): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **CEO**	0.61	1
u_3 = **Site Superintendent**	0.57	2
u_2 = **Project Executive**	0.52	3

In this second scenario, the CEO remains the best alternative, although the gap between the CEO and the second-best alternative is considerably smaller: 0.04 in the second scenario versus 0.18 in the first scenario. Additionally, the second-best alternative is now the Site Superintendent rather than the Project Executive.

2. INITIAL DECISION MAKER (IDM) EXAMPLE

Assume the same facts as in the negotiation example above, except the contract calls for submission of any dispute to an initial decision maker ("IDM").[85] There really is no decision whether to submit the dispute to an IDM because failure to do so may bar the claim altogether.[86] In addition, assume the Contractor's three

[85] *See supra* Part IV(A)(1). For more information on IDMs generally, *see Construction Industry Initial Decision Maker (IDM) Procedures*, AM. ARB. ASS'N (Mar. 1, 2020), https://www.adr.org/sites/default/files/Construction_Initial_Decision_Maker_Procedures.pdf.

[86] AM. INST. ARCHITECTS, *A201 General Conditions of the Contract for Construction* § 15.2.1 (2017) (2017) ("Except for those Claims excluded

objectives remain the same.[87] Unlike the negotiation example, assume the decision at hand is how much supporting information should be provided to the IDM. The varying amounts of information are the uncertainties demanding evaluation in relation to the stated objectives. Applying a SAW analysis to the effect of different alternatives could look something like the following:[88]

i. STEP 1: DEFINE THE OBJECTIVES

First, objectives must be defined to the IDM, such as: (1) obtaining information about the Owner's defenses and any potential counterclaims; (2) increasing the Owner's current settlement offer; and (3) disclosing no bad facts the Owner does not already know. As noted, these are the same objectives as in the negotiation example above.[89]

ii. STEP 2: IDENTIFY THE UNCERTAINTIES

Three plausible alternatives that may have an effect on the objectives include: (1) providing no new information, (2) providing only information that benefits the Contractor's case, and (3) providing all relevant information known to the Contractor.[90]

iii. STEP 3: SCORE THE UNCERTAINTIES

Score the alternatives on a scale from 1 to 9, where 1 is the least likely to achieve the objective, 5 is neutral, and 9 is the most likely to achieve the objective.

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by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation [or binding resolution] of any Claim.").

[87] *See supra* Part IV(A)(1)(i).

[88] *See supra* Part IV(A) outlining the seven steps to apply in the SAW method.

[89] *See supra* Part IV(A)(1)(i).

[90] *See supra* Part IV(A)(1)(ii); *see also* Zavadskas et al., *supra* note 18, at 33 (citing Samuel B. Graves & Jeffrey L. Ringuest, *Probabilistic Dominance Criteria for Comparing Uncertain Alternatives: A Tutorial*, 37 OMEGA INT'L J. MGMT. SCI. 346, 346–57 (2007) (describing how alternative outcomes involve distinct uncertainties and how use of probabilistic dominance criteria aids in SAW risk assessment)).

TABLE 2(A): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **No new information**	$s_{u1o1} = 5$	$s_{u1o2} = 5$	$s_{u1o3} = 10$
u_2 = **Only beneficial information**	$s_{u2o1} = 2$	$s_{u2o2} = 5$	$s_{u2o3} = 2$
u_3 = **All relevant information**	$s_{u3o1} = 8$	$s_{u3o2} = 5$	$s_{u3o3} = 1$

With respect to the Contractor's first objective (gathering information about the strengths and weaknesses of the Owner's case for denying compensation), the Contractor's counsel could reasonably believe that providing no new information is essentially neutral (score of 5), that providing only information that benefits the Contractor's case is likely to bias the IDM against the Contractor and therefore have a negative effect (score of 2) and providing all relevant information the Contractor may induce the IDM to request similarly-detailed information from the Owner, thereby allowing a positive effect on the objective (score of 8).

If the Contractor's counsel reasonably believes the IDM will not grant the Contractor's request for additional compensation regardless of the amount of new information the Contractor provides, then the likely (neutral) effect on the Contractor's second objective (getting more compensation) is the same in each scenario (score of 5). Finally, with respect to the Contractor's third objective (not divulging too much information the Contractor has about the strengths and weaknesses of its own case), not providing any new information has an obviously positive effect (score of 9). The Contractor's counsel could reasonably believe providing only new information that helps its case may induce the IDM, on its own initiative, or at the prompting of the Owner, to request additional (unfavorable) information from the Contractor, which would have a negative effect on the objective (score of 2). Providing all relevant information has a self-evidently negative effect on the objective (score of 1).

iv. STEP 4: NORMALIZE THE SCORES

Normalize the scores according to the following formula:[91]

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

TABLE 2(B): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **No new information**	n_{u1o1} = 5/8 = 0.63	n_{u1o2} = 5/5 = 1.00	n_{u1o3} = 10/10 = 1.00
u_2 = **Only beneficial information**	n_{u2o1} = 2/8 = 0.25	n_{u2o2} = 5/5 = 1.00	n_{u2o3} = 2/10 = 0.20
u_3 = **All relevant information**	n_{u3o1} = 8/8 = 1.00	n_{u3o2} = 5/5 = 1.00	n_{u3o3} = 1/10 = 0.10

v. STEP 5: ASSIGN WEIGHTS TO THE OBJECTIVES

As previously noted, when assigning weights (*w*) to the objectives, the sum must equal "1."[92] As with the negotiation example, assume initially that increasing the Owner's current settlement offer is twice as important as either of the other two objectives, which have the same weight as each other:

[91] *See supra* Part IV(A) discussing the elements of this formula. *See generally* Afshari et al., *supra* note 63, at 514.
[92] *See supra* Part IV(A)(1)(v).

TABLE 2(C): NORMALIZED SCORES OF THE UNCERTAINTIES

To obtain information about the Owner's defenses and any potential counterclaims	To increase the Owner's current settlement offer	To disclose no bad facts the Owner does not already know
$w_{o1} = 0.25$	$w_{o2} = 0.50$	$w_{o3} = 0.25$

vi. STEP 6: SUM THE SCORES

Sum the normalized, weighted scores according to the following formula:[93]

$$R_u = \sum n_{uo} w_o$$

TABLE 2(D): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **No new information**	(0.63 x 0.25) + (1.00 x 0.50) + (1.00 x 0.25) = 0.91
u_2 = **Only beneficial information**	(0.25 x 0.25) + (1.00 x 0.50) + (0.20 x 0.25) = 0.61
u_3 = **All relevant information**	(1.00 x 0.25) + (1.00 x 0.50) + (0.10 x 0.25) = 0.78

vii. STEP 7: RANK THE UNCERTAINTIES

Sort the sums from Step 6 in descending order to rank the alternatives, or, uncertainties from best to worst:[94]

[93] El-adaway, *supra* note 55, at 3, 11–12; Afshari et al., *supra* note 63, at 514.
[94] *Id.*

TABLE 2(E): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **No new information**	0.91	1
u_3 = **All relevant information**	0.78	2
u_2 = **Only beneficial information**	0.61	3

Again, if one changes the weighting of the objectives, the rankings also change.[95] Thus, if the Contractor's team believes it is unlikely the Owner will increase its current settlement offer, it may be reasonable to assign much less weight to that objective. Depending upon their perceptions about the strengths and weaknesses of the two sides' cases, the Contractor's teammates might conclude more important objectives include obtaining information regarding the Owner's defenses and potential counterclaims, and not disclosing bad facts the Contractor knows about its own position. If so, the weights in Step 5 could look like the following:[96]

TABLE 2(F): WEIGHTS OF THE OBJECTIVES

To obtain information about the Owner's defenses and any potential counterclaims	To increase the Owner's current settlement offer	To disclose no bad facts the Owner does not already know
$w_{o1} = 0.50$	$w_{o2} = 0.10$	$w_{o3} = 0.40$

Re-running the calculations in Step 6, then, yields the following results:[97]

[95] *See supra* Part IV(A)(1)(vii).
[96] *Cf. supra* Part IV(A)(2)(v); *see also* Afshari et al., *supra* note 63, at 514.
[97] *See supra* Part IV(A)(2)(vi); Vafaei et al., *supra* note 68, at 1232.

TABLE 2(G): SUM OF THE UNCERTAINTIES' SCORES

u_1 = **No new information**	(0.63 x 0.50) + (1.00 x 0.10) + (1.00 x 0.40) = 0.82
u_2 = **Only beneficial information**	(0.25 x 0.50) + (1.00 x 0.10) + (0.20 x 0.40) = 0.31
u_3 = **All relevant information**	(1.00 x 0.50) + (1.00 x 0.10) + (0.10 x 0.40) = 0.64

In this hypothetical, assigning different weights to the objectives does not change the ultimate rankings in Step 7:

TABLE 2(H): RANKS OF THE UNCERTAINTIES

	Rank	**Sum**
u_1 = **No new information**	1	0.82
u_3 = **All relevant information**	2	0.64
u_2 = **Only beneficial information**	3	0.31

Thus, even with differently weighted objectives, the estimated effect of providing different levels of new information indicate that providing no new information is more likely to achieve the Contractor's objectives than either providing all relevant information or only new information that helps the Contractor's case. Interestingly, providing only beneficial information is the least attractive alternative in both weightings of the three objectives.[98]

3. DISPUTE RESOLUTION BOARD (DRB) EXAMPLE

Dispute resolution boards ("DRBs") are a common feature of large infrastructure projects.[99] DRBs typically involve a standing panel of industry experts (both legal and technical) involved from the beginning of the project to help monitor progress and provide recommendations as disputes arise so parties can resolve their

[98] *See supra* Part IV(A)(2)(i) outlining the objectives.
[99] *See* Peter Chapman, *Dispute Boards on Major Infrastructure Projects*, 162 MGMT., PROCUREMENT, & L. 7,7 (2009).

differences short of litigation or arbitration.[100] The American Arbitration Association ("AAA") has three documents relevant to the use of DRBs.[101] The *AAA Dispute Resolution Board Guide Specification* ("AAA Specification") is to be incorporated into the construction contract itself and outlines the agreement between the Owner and the Contractor to establish a DRB for the work under the contract.[102] The *AAA Dispute Resolution Board Operating Procedures* ("Schedule A" to the Specification) provides a framework for the DRB to receive progress reports and conduct site visits so it can become familiar with the progress of the work and learn of any current or potential disputes.[103] The *AAA Dispute Resolution Board Hearing Rules and Procedures* (the "AAA Rules and Procedures," which are "Schedule B" to the Specification), establish a process for the DRB to take evidence and make recommendations for resolving specific disputes submitted to it.[104] The International Chamber of Commerce and the Dispute Resolution Board Foundation have promulgated other well-recognized DRB procedures.[105]

Although the DRB process results in a non-binding recommendation, that process can begin to look like the arbitration process—including the holding of a preliminary conference,[106] information exchange,[107] and a hearing.[108] This resemblance has implications for counsel because the DRB process presents both dangers and opportunities.[109] One danger is the DRB will make an

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[100] *See* Gad et al., *supra* note 52, at 81.
[101] *See AAA Dispute Resolution Board Guide Specifications*, AM. ARB. ASS'N 1, 1 (Dec. 1, 2000), https://www.adr.org/sites/default/files/document_repository/AAA%20Dispute%20Resolution%20Board%20Guide%20SPECIFICATIONS.pdf.
[102] *Id.*
[103] *AAA Dispute Resolution Board Operating Procedures*, AM. ARB. ASS'N 1, 3 (Dec. 1, 2000), https://adr.org/sites/default/files/AAA_Dispute_Resolution_Board_Operating_Procedures.pdf.
[104] *AAA Dispute Resolution Board Hearing Rules and Procedures*, AM. ARB. ASS'N 1, 4 (Dec. 1, 2000), https://www.adr.org/sites/default/files/AAA_Dispute_Resolution_Board_Hearing_Rules_and_Procedures.pdf.
[105] *See Dispute Board Rules*, INT'L CHAMBER OF COM. (May 15, 2017), https://www.acerislaw.com/wp-content/uploads/2020/06/icc-dispute-board-rules-english-version.pdf; *see also Dispute Board Manual: A Guide to Best Practices and Procedures*, DISP. RESOL. BD. FOUND. (Nov. 19, 2019), https://www.drb.org/dispute-board-manual.
[106] *See* AM. ARB. ASS'N, *supra* note 105, at 4, r. 6.0.
[107] *Id.* r. 7.0.
[108] *Id.* r. 8.0.
[109] *See* Chapman, *supra* note 99, at 10.

unfavorable recommendation that a later arbitration panel may find persuasive (if the contract permits disclosure of the recommendation).[110] One opportunity is to test arguments and theories counsel may wish to use if the dispute proceeds to arbitration.[111] Another opportunity is to learn more about the other side's case in advance of any arbitration.[112]

An important strategic consideration counsel must consider is how similar the DRB process should be to typical arbitration. For example, the AAA Rules and Procedures require each party to exchange documents on which the party intends to rely in in advance of the hearing,[113] and permits parties to be accompanied at the hearing by counsel or by an independent expert.[114] Parties therefore have these and other options to make the DRB hearing more or less like an arbitration hearing, depending upon how much information the party wishes to rely upon (and therefore make known to the other side) and whether to engage an expert for purposes of the DRB hearing.

i. WHETHER TO BRING AN EXPERT

Assume the Owner has indicated it will bring an expert, and thus the only decisions are (1) whether to engage an expert to participate in the DRB process, and (2) if the Contractor chooses to engage an expert, what type.[115] A full SAW analysis of the DRB process would include calculations for other options (e.g., documents to rely upon, attendance of counsel), which the Contractor would then analyze to arrive at the optimal combination of options.[116] Counsel's reflexive reaction to learning that the other side will bring an expert may be to bring its own. However, that decision should be based on the impact an expert will have upon specific objectives.

a. STEP 1: DEFINE THE OBJECTIVES

As in the previous examples, assume the Contractor's objectives are the following: (1) obtain information about the

[110] *Id.* at 9.
[111] *Id.* (noting parties will see the "swings and the roundabouts" as the DRB changes favor, thus allowing the parties to see which arguments were persuasive or not with the board).
[112] *Id.*
[113] *See* AM. ARB. ASS'N, *supra* note 104, at 4, r. 7.0.
[114] *Id.* at 6, r. 11 & 12.0.
[115] *Id.* at 4–6.
[116] *See supra* Part IV(A) discussing step 5 and the process of weighing the options in the SAW analysis.

Owner's defenses and any potential counterclaims, (2) increase the Owner's current settlement offer, and (3) disclose no bad facts the Owner does not already know.[117]

b. STEP 2: IDENTIFY THE UNCERTAINTIES

Here, the alternatives are simple: either (1) bring an expert (o_1), or (2) not (o_2).

c. STEP 3: SCORE THE UNCERTAINTIES

Score the alternatives on a scale from 1 to 9 where 1 is the least likely to achieve the objective, 5 is neutral, and 9 is the most likely to achieve the objective:

TABLE 3(A)(I): SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **Expert**	$s_{u1o1} = 7$	$s_{u1o2} = 7$	$s_{u1o3} = 3$
u_2 = **No Expert**	$s_{u2o1} = 3$	$s_{u2o2} = 3$	$s_{u2o3} = 7$

Having an expert available to help present the Contractor's case will have an overall positive effect on the first two objectives (gathering information about the Owner's case and getting more money, with a score of 7 on each). This is because the presence of the expert may help identify weaknesses in the Owner's case while focusing attention on the strengths of the Contractor's case. At the same time, bringing an expert may have a negative effect on the third objective (avoiding divulging information about the Contractor's case, with a score of 3) because focusing attention on the strengths of the Contractor's case may signal the Contractor's theory of the case in the event the dispute proceeds to arbitration. However, not bringing an expert could reasonably have the opposite effects on the same objectives.

[117] *See generally supra* Part IV(A)(1)(i).

d. STEP 4: NORMALIZE THE SCORES

Normalize the scores according to the following formula:[118]

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

TABLE 3(B)(I): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **Expert**	n_{u1o1} = 7/7 = 1.00	n_{u1o2} = 7/7 = 1.00	n_{u1o3} = 3/7 = 0.43
u_2 = **No Expert**	n_{u2o1} = 3/7 = 0.43	n_{u2o2} = 3/7 = 0.43	n_{u2o3} = 7/7 = 1.00

e. STEP 5: ASSIGN WEIGHTS TO THE OBJECTIVES

As noted, the sum must equal "1."[119] Assume that increasing the Owner's current settlement offer is twice as important as either of the other two objectives, which have the same weight as each other:[120]

TABLE 3(C)(I): WEIGHTS OF THE OBJECTIVES

o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
w_{o1} = 0.25	w_{o2} = 0.50	w_{o3} = 0.25

[118] *See supra* Part IV(A) discussing the elements of this formula; *see generally* Afshari et al., *supra* note 63, at 514.
[119] *See supra* Part IV(A)(1)(v).
[120] *See* El-adaway, *supra* note 55, at 3, 11–12.

f. STEP 6: SUM THE SCORES

Sum the normalized, weighted scores according to the following formula:[121]

$$R_u = \sum n_{uo} w_o$$

TABLE 3(D)(I): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **Expert**	(1.00 x 0.25) + (1.00 x 0.50) + (0.43 x 0.25) = 0.86
u_2 = **No Expert**	(0.43 x 0.25) + (0.43 x 0.50) + (1.00 x 0.25) = 0.58

g. STEP 7: RANK THE UNCERTAINTIES

Sort the sums from Step 6 in descending order to rank the uncertainties from best to worst:[122]

TABLE 3(E)(I): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **Expert**	0.86	1
u_2 = **No Expert**	0.58	2

The conclusion that using an expert in the DRB process is preferable to not doing so—and by a large margin—confirms the intuition of most counsel: in the arms race of dispute resolution, no one wants to have fewer weapons than the enemy. One may object the above analysis is skewed because of twin assumptions that (a) using an expert will be more likely to achieve the objective of increasing the Owner's current settlement offer and (b) that objective is twice as important as either of the other objectives. But even if the Contractor's team believes it is unlikely the Owner will increase its current settlement offer, and therefore it is reasonable to assign much less weight to that objective compared to the other two objectives, the conclusion remains the same: the Contractor is better off using an expert than not. To illustrate, as in the previous examples, assume the weights in Step 5 are the following:[123]

[121] *Id.*; Afshari et al., *supra* note 63, at 514.
[122] Afshari et al., *supra* note 63, at 514.
[123] *Id.*; *see supra* Part IV(A)(2)(vi).

TABLE 3(F)(I): WEIGHTS OF THE OBJECTIVES

o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
$w_{o1} = 0.50$	$w_{o2} = 0.10$	$w_{o3} = 0.40$

Re-running the calculations in Step 6, then, yields the following results:[124]

TABLE 3(G)(I): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **Expert**	(1.00 x 0.50) + (1.00 x 0.10) + (0.43 x 0.40) = 0.77
u_2 = **No Expert**	(0.43 x 0.50) + (0.43 x 0.10) + (1.00 x 0.40) = 0.66

In this hypothetical, assigning different weights to the objectives does not change the ultimate rankings in Step 7:

TABLE 3(H)(I): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **Expert**	0.77	1
u_2 = **No Expert**	0.66	2

Thus, even in a scenario in which the weight of the objectives is very different, the conclusion is that bringing an expert is a better alternative than not.

ii. WHAT TYPE OF EXPERT TO BRING

Even once the Contractor's team decides it should use an expert in the DRB process, it may not be immediately obvious what type of expert is best. If the dispute continues to a final and binding process (i.e., arbitration or court litigation), the Contractor will need to prove both liability (e.g., the site condition differed "materially" from what the contract documents indicated, in the case of a "Type

[124] *See* Vafaei et al., *supra* note 69, at 1229.

I" differing site conditions claim) and damages.[125] The damages could arise from an adverse effect on the Contractor's schedule, increased cost of doing the work called for in the contract, or both.[126]

a. STEP 1: DEFINE THE OBJECTIVES

Assume the Contractor's three objectives remain the same: (1) to obtain information about the Owner's defenses and any potential counterclaims; (2) to increase the Owner's current settlement offer; and (3) to disclose no bad facts the Owner does not already know.[127]

b. STEP 2: IDENTIFY THE UNCERTAINTIES

With respect to a hypothetical differing site conditions claim, a Geotechnical Expert (i_1) might be the best option for proving liability;[128] a scheduling expert (i_2) might be best for estimating damages.[129]

c. STEP 3: SCORE THE UNCERTAINTIES

Score the alternatives on a scale from 1 to 9 where one is the least likely to achieve the objective, 5 is neutral, and 9 is the most likely to achieve the objective:

[125] *See, e.g*, Richard J. Long & Andrew Avalon, *Differing Site Conditions: Types and Claims*, LONG INT'L (2023), https://www.long-intl.com/blog/differing-site-conditions-1/ ("For Type I . . . the Contractor must establish that the conditions encountered were physical, that the conditions were subsurface or latent, that they were encountered at the site, and that there was a material difference between the conditions encountered and the conditions indicated in the contract.").
[126] *See* Taylan et al., *supra* note 18, at 107.
[127] *See generally supra* Part IV(A)(1)(i).
[128] For the role of geotechnical engineering in the exploration of subsurface conditions on a proposed construction site, *see* 4 Philip L. Bruner & Patrick J. O'Connor, *Construction Law* § 14:17 (2023).
[129] *See* 5 Philip L. Bruner & Patrick J. O'Connor, *Construction Law* § 15:2 (2023) (describing the role of a scheduler in sequencing the activities on a construction project, including supply of labor, materials, and equipment).

TABLE 3(A)(II): SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **Geotechnical Expert**	$s_{u1o1} = 9$	$s_{u1o2} = 5$	$s_{u1o3} = 2$
u_2 = **Scheduling expert**	$s_{u2o1} = 2$	$s_{u2o2} = 6$	$s_{u2o3} = 8$

If the Geotechnical Expert is chosen, both the Contractor and the Owner may have to disclose information regarding the Owner's potential liability the other party has not yet seen. The Geotechnical Expert's score of 9 reflects a two-edged sword—scoring 9 with respect to objective o_1 but only 2 with respect to objective o_3. However, the Geotechnical Expert may have little to offer in terms of likely cost to the Contractor of the differing site condition (score of 5). On the other hand, the Scheduling Expert may have less to offer on the liability issue and more on the impact of the differing site condition.[130] This may result in the Contractor getting less information about the Owner's case (score of 2) but also avoiding disclosure of information about the Contractor's own case (score of 8).[131] Because the scheduler can help quantify the impact upon the Contractors of the differing site condition, such an expert is likely to help achieve the objective of increasing the Owner's current settlement offer (score of 6).

d. STEP 4: NORMALIZE THE SCORES

Normalize the scores according to the following formula:[132]

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

[130] *See* Taylan et al., *supra* note 18, at 107.
[131] *See generally* Paula Gerber & Bevan Mailman, *Construction Litigation: Can We Do It Better?*, 31 MONASH U. L. REV. 237, 256 (2005).
[132] *See supra* Part IV(A) discussing the elements of this formula; *see generally* Afshari et al., *supra* note 63, at 514.

TABLE 3(B)(II): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
u_1 = **Geotechnical Expert**	$n_{u1o1} = 9/9 = 1.00$	$n_{u1o2} = 5/6 = 0.83$	$n_{u1o3} = 2/8 = 0.25$
u_2 = **Scheduling expert**	$n_{u2o1} = 2/9 = 0.22$	$n_{u2o2} = 6/6 = 1.00$	$n_{u2o3} = 8/8 = 1.00$

e. STEP 5: ASSIGN WEIGHTS TO THE OBJECTIVES

Continue to assume that increasing the Owner's current settlement offer is twice as important as either of the other two objectives, which have the same weight as each other:[133]

TABLE 3(C)(II): WEIGHTS OF THE OBJECTIVES

o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
0.25	0.50	0.25

f. STEP 6: SUM THE SCORES

Sum the normalized, weighted scores according to the following formula:[134]

$$R_u = \sum n_{uo} w_o$$

[133] *See generally* El-adaway, *supra* note 55, at 12.
[134] *Id.* at 3, 11–12; Afshari et al., *supra* note 63, at 514.

TABLE 3(D)(II): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **Geotechnical Expert**	(1.00 x 0.25) + (0.83 x 0.50) + (0.25 x 0.25) = 0.73
u_2 = **Scheduling expert**	(0.22 x 0.25) + (1.00 x 0.50) + (1.00 x 0.25) = 0.81

g. STEP 7: RANK THE ALTERNATIVES

Sort the sums from Step 6 in descending order to rank the alternatives from best to worst:[135]

TABLE 3(E)(II): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_2 = **Scheduling expert**	0.81	1
u_1 = **Geotechnical Expert**	0.73	2

Somewhat counterintuitively, perhaps, the scheduler emerges as the preferred alternative in this scenario. This result is due in large part to the greater weight given to the objective j_2 and the expectation that choosing the scheduler will be more likely to achieve this objective than choosing the geotechnical expert. Obviously, as in previous examples, if one assigns different weights to the objectives, Step 5 changes accordingly:[136]

TABLE 3(F)(II): WEIGHTS OF THE OBJECTIVES

o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To disclose no bad facts the Owner does not already know
$w_{o1} = 0.50$	$w_{o2} = 0.10$	$w_{o3} = 0.40$

Re-running the calculations in Step 6, then, yields the following results:[137]

[135] Afshari et al., *supra* note 63, at 514.
[136] *See supra* Part IV(A)(1)(vii); Afshari et al., *supra* note 63, at 514.
[137] *See* Vafaei et al., *supra* note 68, at 1229.

TABLE 3(G)(II): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **Geotechnical Expert**	(1.00 x 0.50) + (0.83 x 0.10) + (0.25 x 0.40) = 0.68
u_2 = **Scheduling expert**	(0.22 x 0.50) + (1.00 x 0.10) + (1.00 x 0.40) = 0.61

This time, assigning different weights to the objectives changes the ultimate rankings in Step 7:

TABLE 3(H)(II): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **Geotechnical Expert**	0.68	1
u_2 = **Scheduling expert**	0.61	2

In this scenario, the Geotechnical Expert has the edge due to the different weights assigned to the objectives.[138] This exercise illustrates once again the importance of carefully considering the objectives to achieve and their relative importance.[139]

4. MEDIATION EXAMPLE

Assume the Contractor is preparing for a mediation of its differing site condition dispute with the Owner. The Contractor has certain decisions to make in preparing for the mediation, including who should take the lead in presenting the Contractor's position to the Mediator and the Owner's team.

i. STEP 1: DEFINE THE OBJECTIVES

Unlike the previous examples, assume the Contractor's objectives changed slightly and now are the following: (1) obtain information about the Owner's defenses and any potential counterclaims, (2) increase the Owner's current settlement offer, and (3) test the Contractor's theory of the case with a neutral third party.[140] Although the first two objectives remain the same as in the previous examples, the third changed from "disclose no bad facts

[138] *See generally* El-adaway, *supra* note 55, at 12, 60.
[139] *See* Vafaei et al., *supra* note 68, at 1229.
[140] *See generally supra* Part IV(A)(1)(i).

the Owner does not already know" to "testing the Contractor's theory of the case."

ii. STEP 2: IDENTIFY THE UNCERTAINTIES

As in the negotiation example, let us assume the candidates for taking the lead include the Contractor's CEO and Project Executive.[141] But as the dispute has entered the penultimate tier in the dispute resolution process, not only have the objectives changed, but the candidates also most likely to have a positive effect on achieving those objectives now include the Contractor's Lead Counsel. Again, each candidate has certain strengths and weaknesses: the CEO has the "big picture" view of the dispute and how it affects the Contractor's business, but no familiarity with the relevant facts; and the Project Executive is generally familiar with the facts and at least some sense of the larger implications for the Contractor's business. The Lead Counsel is presumably familiar with the facts and certainly familiar with the theory of case they intend to present in the arbitration or court proceedings (if it comes to that), but minimal appreciation for how the outcome of this dispute may affect the Contractor's business.

iii. STEP 3: SCORE THE CANDIDATES

Score the candidates on a scale from 1 to 9 where 1 is the least likely to achieve the objective, 5 is neutral, and 9 is the most likely to achieve the objective:

TABLE 4(A): SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To test the Contractor's theory of the case with a neutral third party
u_1 = **CEO**	$s_{u1o1} = 2$	$s_{u1o2} = 8$	$s_{u1o3} = 2$
u_2 = **Project Executive**	$s_{u2o1} = 4$	$s_{u2o2} = 6$	$s_{u2o3} = 5$
u_3 = **Lead Counsel**	$s_{u3o1} = 7$	$s_{u3o2} = 2$	$s_{u3o3} = 9$

[141] *See generally supra* Part IV(A)(1) describing the scenario and various candidates involved.

It may be reasonable to believe that, as in the negotiation example, the CEO will have a negligible effect on realizing the goal of obtaining information about the Owner's case (score of 2), but a positive effect on increasing the Owner's settlement offer (score of 8). The CEO will almost certainly have little to contribute by way of testing the Contractor's theory of the case (score of 2). The Project Executive's greater familiarity with the facts of the dispute may make them better than the CEO at ferreting out information about the Owner's case (score of 4) and testing the Contractor's theory of the case (score of 5, but probably not as effective as the CEO at increasing the Owner's current offer (score of 6). Finally, the Lead Counsel will likely be more effective at both learning more about the Owner's case (score of 7) and testing the Contractor's theory of the case (score of 9) than either the CEO or Project Executive. But the natural antipathy the Owner's team is likely to have toward the Contractor's Lead Counsel will probably make the Lead Counsel less effective at increasing the Owner's settlement offer than either the CEO or Project Executive (score of 2).

iv. STEP 4: NORMALIZE THE SCORES

Normalize the scores according to the following formula:[142]

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

TABLE 4(B): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To test the Contractor's theory of the case with a neutral third party
u_1 = **CEO**	n_{u1o1} =2/7=0.286	n_{u1o2} =8/8=1.000	n_{u1o3} =2/9=0.222
u_2 = **Project Executive**	n_{u2o1} =4/7=0.571	n_{u2o2} =6/8=0.75	n_{u2o3} =5/9=0.555
u_3 = **Lead Counsel**	n_{u3o1} =7/7=1.000	n_{u3o2} =2/8=0.25	n_{u3o3} =9/9=1.000

[142] *See supra* Part IV(A) discussing the elements of this formula; *see generally* Afshari et al., *supra* note 63, at 514.

v. STEP 5: ASSIGN WEIGHTS TO THE OBJECTIVES

The sum must equal "1."[143] Let us assume that increasing the Owner's current settlement offer is twice as important as either of the other two objectives, which have the same weight as each other:[144]

TABLE 4(C): WEIGHTS OF THE OBJECTIVES

o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To test the Contractor's theory of the case with a neutral third party
$w_{o1} = 0.25$	$w_{o2} = 0.50$	$w_{o3} = 0.25$

vi. STEP 6: SUM THE SCORES

Sum the normalized, weighted scores according to the following formula:[145]

$$R_u = \sum n_{uo} w_o$$

TABLE 4(D): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **CEO**	(0.29 x 0.25) + (1.00 x 0.50) + (0.22 x 0.25) = 0.63
u_2 = **Project Executive**	(0.57 x 0.25) + (0.75 x 0.50) + (0.56 x 0.25) = 0.66
u_3 = **Lead Counsel**	(1.00 x 0.25) + (0.25 x 0.50) + (1.00 x 0.25) = 0.625

vii. STEP 7: RANK THE ALTERNATIVES

Sort the sums from Step 6 in descending order to rank the alternatives from best to worst:[146]

[143] *See supra* Part IV(A)(1)(v).
[144] *See* El-adaway, *supra* note 55, at 3, 11–12.
[145] *Id.*; Afshari et al., *supra* note 63, at 514.
[146] Afshari et al., *supra* note 63, at 514.

TABLE 4(E): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_2 = **Project Executive**	0.66	1
u_1 = **CEO**	0.63	2 (tie)
u_3 = **Lead Counsel**	0.63	2 (tie)

Somewhat surprisingly, the Project Executive turns out to be the best alternative. Given that one of the objectives was testing the Contractor's theory of the case, one may expect the Lead Counsel to claim the top spot. Of course, the weighted scores are closely bunched, so no alternative is clearly better or worse than any other. But the fact that the weighted scores are so close highlights the fact that weighting of the objectives is a crucial factor in the calculation. If one treats the objectives of equal weight, the calculations change accordingly:

TABLE 4(F): WEIGHTS OF THE OBJECTIVES

o_1 = To obtain information about the Owner's defenses and any potential counterclaims	o_2 = To increase the Owner's current settlement offer	o_3 = To test the Contractor's theory of the case with a neutral third party
$w_{o1} = 0.33$	$w_{o2} = 0.33$	$w_{o3} = 0.33$

Re-running the calculations in Step 6, then, yields the following results:[147]

TABLE 4(G): SUMS OF THE UNCERTAINTIES' SCORES

u_1 = **CEO**	(0.29 x 0.33) + (1.00 x 0.33) + (0.22 x 0.33) = 0.50
u_2 = **Project Executive**	(0.57 x 0.33) + (0.75 x 0.33) + (0.56 x 0.33) = 0.62
u_3 = **Lead Counsel**	(1.00 x 0.33) + (0.25 x 0.33) + (1.00 x 0.33) = 0.74

Assigning different weights to the objectives changes the ultimate rankings in Step 7:

[147] *See* Vafaei et al., *supra* note 68, at 1229.

TABLE 4(H): RANKS OF THE UNCERTAINTIES

	Sum	Rank
u_3 = **Lead Counsel**	0.74	1
u_2 = **Project Executive**	0.62	2
u_1 = **CEO**	0.50	3

The objectives being of equal weight vaults the Lead Counsel from third position to first, with the Project Executive continuing as a preferable alternative to the CEO.

5. ARBITRATION EXAMPLE

Arbitration as a final and binding process is qualitatively different from the other preliminary stages of a tiered dispute resolution process.[148] Because there are generally no appeals from arbitral awards and extremely limited grounds on which awards may be set aside, the choice of arbitrator is of paramount importance to the parties.[149] Stated differently, it is fraught with risk. As with the other risk analyses, the starting point is defining a party's objectives in the process.[150] If a party knows its case is weak, its main objective may be to delay the day of reckoning. On the other hand, if its case is strong, its main objective may be to win the whole case. In many cases, however, there will be multiple claims on both sides, some stronger than others. As a result, there may be multiple objectives and multiple uncertainties potentially affecting each objective.

For the sake of simplicity, assume the dispute involves multiple claims by the Contractor against the Owner for additional compensation for work the Contractor performed that is arguably outside the scope of the construction contract. Assume further the Owner believes they have a strong legal case (i.e., understanding the contract under its governing law), the Contractor believes they have a strong factual case (i.e., claiming unfair treatment), and the parties'

[148] *See* RESTATEMENT (THIRD) U.S. LAW OF INT'L COMM. ARB. § 1.1(c) (defining arbitration)
[149] *See International Dispute Resolution Procedures*, INT'L CTR. FOR DISPUTE RESOL. 33 (Mar. 1, 2021), https://www.icdr.org/sites/default/files/document_repository/ICDR_Rules_1.pdf?utm_source=icdr-website&utm_medium=rules-page&utm_campaign=rules-intl-update-1mar (defining the time, form, and effect of the award).
[150] *See* Chestek, *supra* note 21, at 327–28; *supra* Part IV(A)(1)(i) defining objectives.

dispute resolution provision contemplates three arbitrators (each party appoints one and the party-appointed arbitrators appoint the third).

i. STEP 1: DEFINE THE OBJECTIVES

Assume the Contractor's arbitration objectives are the following: (1) maximize additional compensation; (2) receive compensation as quickly as possible; and (3) focus the tribunal chair's attention on the facts rather than the contract and applicable law.

ii. STEP 2: IDENTIFY THE UNCERTAINTIES

When selecting an arbitrator, a party typically considers several candidates.[151] Each candidate represents various of uncertainties.[152] These uncertainties can include the candidate's predisposition (i.e., whether they tend to favor the Contractor or the Owner), their availability, and their credibility with potential co-arbitrators.[153] One could break down each bundle and individual subject uncertainty separately into a SAW analysis. For example, consider each of the three arbitrator candidates. It may be reasonable to believe that Candidate 1 dispositively favors the Contractor's position, is readily available, and has relatively little experience as an arbitrator. By contrast, Candidate 2 may have no predisposition to favor either side, is also readily available, and has a good but limited reputation as an arbitrator. While in private practice, Candidate 3 mainly represented Owners, but has been a full-time arbitrator and well-respected neutral for many years. However, Candidate 3 has limited short-term availability.

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[151] *See, e.g.*, Sarah R. Cole, *Arbitrator Diversity: Can It Be Achieved?*, 98 WASH. U. L. REV. 965, 970 (2020) (clarifying how in many arbitrations, parties receive arbitrator list, eliminate unsuitable candidates, and rank remainder).

[152] *See generally* Patrick Koppenburg, *Statistical Biases in Measurements with Multiple Candidates*, ARXIV 1, 7–8 (2017) (illustrating how multiple candidates present statistical uncertainties, yet using models to measure signal yields reduces uncertainty in selecting best candidate); *cf. How to Select and Arbitrator*, INT'L CT. SETTLEMENT INV. DISPUTS., https://icsid.worldbank.org/node/20541 (last visited Jan. 14, 2024).

[153] *See* William W. Park, *Arbitrator Integrity: The Transient and the Permanent*, 46 SAN DIEGO L. REV. 629, 632, 635, 658 (2009) (reporting challenge of finding objective arbitrators in light of competency and availability considerations, highlighting importance of arbitrator credibility).

iii. STEP 3: SCORE THE UNCERTAINTIES

Given the foregoing assumptions, score the candidates on a scale from 1 to 9 where 1 is the least likely to achieve the objective, 5 is neutral, and 9 is the most likely to achieve the objective:

TABLE 5(A): SCORES OF THE UNCERTAINTIES

	O_1 = To maximize additional compensation	O_2 = To receive compensation as quickly as possible	O_3 = To focus the tribunal chair's attention on the facts rather than the contract and applicable law
u_1 = **Candidate 1**	$s_{u1o1} = 9$	$s_{u1o2} = 9$	$s_{u1o3} = 1$
u_2 = **Candidate 2**	$s_{u2o1} = 5$	$s_{u2o2} = 9$	$s_{u2o3} = 5$
u_3 = **Candidate 3**	$s_{u3o1} = 5$	$s_{u3o2} = 2$	$s_{u3o3} = 9$

iv. STEP 4: NORMALIZE THE SCORES

Normalize the scores using the following formula:[154]

$$n_{uo} = \frac{s_{uo}}{s_o^*}$$

[154] *See supra* Part IV(A) discussing the elements of this formula; *see generally* Afshari et al., *supra* note 63, at 514.

TABLE 5(B): NORMALIZED SCORES OF THE UNCERTAINTIES

	o_1 = To maximize additional compensation	o_2 = To receive compensation as quickly as possible	o_3 = To focus the tribunal chair's attention on the facts rather than the contract and applicable law
u_1 = **Candidate 1**	$n_{u1o1} = 9/9 = 1.00$	$n_{u1o2} = 9/9 = 1.00$	$n_{u1o3} = 1/9 = 0.11$
u_2 = **Candidate 2**	$n_{u2o1} = 5/9 = 0.56$	$n_{u2o2} = 9/9 = 1.00$	$n_{u2o3} = 5/9 = 0.56$
u_3 = **Candidate 3**	$n_{u3o1} = 5/9 = 0.56$	$n_{u3o2} = 2/9 = 0.22$	$n_{u3o3} = 9/9 = 1.00$

v. STEP 5: ASSIGN WEIGHTS TO THE OBJECTIVES

The sum must equal "1."[155] Assume that focusing the tribunal chair on the facts, rather than the law, ensures the Contractor's meritocratic success and is therefore doubly important as the other two equally important objectives:

TABLE 5(C): WEIGHTS OF THE OBJECTIVES

o_1 = To maximize additional compensation	o_2 = To receive compensation as quickly as possible	o_3 = To focus the tribunal chair's attention on the facts rather than the contract and applicable law
0.25	0.25	0.50

vi. STEP 6: SUM THE SCORES

Sum the normalized, weighted scores using the following formula:[156]

$$R_u = \sum n_{uo} w_o$$

[155] *See supra* Part IV(A)(1)(v).
[156] *See* El-adaway, *supra* note 55, at 3, 11–12; Afshari et al., *supra* note 63, at 514.

TABLE 5(D): SUMS OF THE UNCERTAINTIES' SCORE

u_1 = **Candidate 1**	(1.00 x 0.25) + (1.00 x 0.25) + (0.11 x 0.50) = 0.56
u_2 = **Candidate 2**	(0.56 x 0.25) + (1.00 x 0.25) + (0.56 x 0.5) = 0.67
u_3 = **Candidate 3**	(0.56 x 0.25) + (0.22 x 0.25) + (1.00 x 0.50) = 0.70

vii. STEP 7: RANK THE ALTERNATIVES

Sort Step 6's sums in descending order to rank the alternatives from best to worst:[157]

TABLE 5(E): RANKS OF THE UNCERTAINTIES

	Sum	**Rank**
u_1 = **Candidate 3**	0.70	1
u_2 = **Candidate 2**	0.67	2
u_3 = **Candidate 1**	0.56	3

One of this analysis's most interesting conclusions is that Candidate 3, despite scoring below the other two candidates on the first two objectives, emerges as the preferred alternative due to the third objective's relative importance. This has important strategic implications in a three-member tribunal.[158] If a single arbitrator makes up the tribunal, this objective would drop and the relative significance of the other two objectives would increase.[159]

V. CONCLUSION

> *We have not succeeded in answering all our problems—indeed, we sometimes feel we have not completely answered any of them. The answers we*

[157] Afshari et al., *supra* note 63, at 514.
[158] *See generally* Park, *supra* note 153, at 691–92 (detailing how reasonable arbitrators on three-member tribunals may disagree, emphasizing the importance of robust risk assessments in arbitrator selection to enhance the likelihood of obtaining favorable awards).
[159] *Cf. id.* at 691–92 (characterizing probable likelihood of factual disagreements amongst reasonable arbitrators on three-member tribunal).

> *have found have only served to raise a whole set of new questions. In some ways, we are as confused as ever, but we are confused on a higher level, and about more important things*.[160]

It may be tempting to assume using the ISO "risk" definition and the SAW available alternatives analysis in considering a party's objectives only complicates dispute resolution decision making.[161] After all, scoring individual alternatives based on objectives and weighting objectives both represent inherently subjective assumptions, despite the resulting mathematics' sophistication.[162] Nevertheless, this analysis supports at least three meaningful conclusions. First, subjectivity exists in any decision-making process with complex uncertainties and competing objectives, whether it relies on a hunch or a systematic approach.[163] Second, techniques such as brainstorming can reduce subjectivity in assumption-based decisions.[164] One advantage of the systematic analysis presented here is it exposes the assumptions behind decisions, unlike decisions-by-hunch.[165] Once they are exposed, one can refine, question, or abandon assumptions.[166] In fact, counterintuitive rankings in the above analyses suggest that hunches often rely on flawed assumptions. Third, clearly defining (and appropriately reevaluating) objectives at each dispute resolution stage, is important because definitions and weighting often determine outcomes when evaluating uncertainty effects.[167]

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[160] EARL C. KELLEY, THE WORKSHOP WAY OF LEARNING 2 (Harper & Bros., 8th ed. 1951).
[161] *See* ISO, *supra* note 6 (defining "risk" as "effect of uncertainty on objectives"); *see also* Afshari et al., *supra* note 63, at 512 (describing SAW's use as a multi-attribute decision technique based on weighted averages of uncertain alternatives, with each evaluation score determined by multiplying its scaled attribute value by the decision maker's assigned weights and summing these products).
[162] *See* Zavadskas et al., *supra* note 18, at 41 (recounting how scoring attributes in risk assessments involves subjectivity related to personal "knowledge, experience, and intuition").
[163] *See id.* at 41.
[164] *See* Lyons & Skitmore, *supra* note 73, at 60 (expressing that brainstorming sessions can reduce confirmation bias and improve scoring relevance).
[165] *See id.*
[166] *Id.*
[167] *See* Afshari et al., *supra* note 63, at 514–15 (using criteria-based scores to rank "best" personnel from highest to lowest weight, which is subject to subsequent evaluation by risk-assessor).