

AEP 50 Uncertainty Initiative



2024 TRB Annual Meeting - Meeting
Jan 8 10:15-11:15

[Link to Slides](#)



<https://www.trbtravelforecasting.org/uncertainty>

Emergency Procedures for Marriott Marquis

In an emergency:

Step 1: **Call 911**

Step 2: In the Marriott Marquis, call Security at **202-824-9667**, or dial 59677 on the nearest house phone.

We recommend you add this number to your contact list now, so you won't need to look for it later.

Have an exit plan. Please take a moment to familiarize yourself with the route to the nearest exit from this room.

If an alarm sounds, please end your event immediately and evacuate the building. The escalators located in the center of each floor can be used to access the main lobby and exits. Additional stairs are located behind the elevators at each end of the main hallway on each level.

In case of evacuation, attendees should gather on the lawn of the Apple Store, across the street from the main entrance to the Convention Center.

TRB Code of Conduct

Summary:

All forms of discrimination, harassment, and bullying are prohibited in any NASEM activity.

Any violation of this policy should be reported and could result in the **removal of an individual** from current NASEM activities and a **ban on participation** in future activities.

Information contained in a complaint is kept **confidential**, and information is revealed only on a need-to-know basis.

Harassment reporting # 202-253-3865 available Jan 8-19

TRB Office of Human Resources 202-334-3400 or hrservicecenter@nas.edu

<https://onlinepubs.trb.org/onlinepubs/dva/2023CHAIR/CodeofConduct.pdf>

Agenda

1. Welcome / Introductions
2. NCHRP 08-154 study: Guidance for Agencies to Incorporate Uncertainty into Long-Range Transportation Planning - **Naomi Stein**
3. Uncertainty terminology / focus of initiative
4. 2024 Goals and Activities

Introductions

- Name
- Affiliation
- Interest and/or Recent and Planned Activities related to Transportation Uncertainty

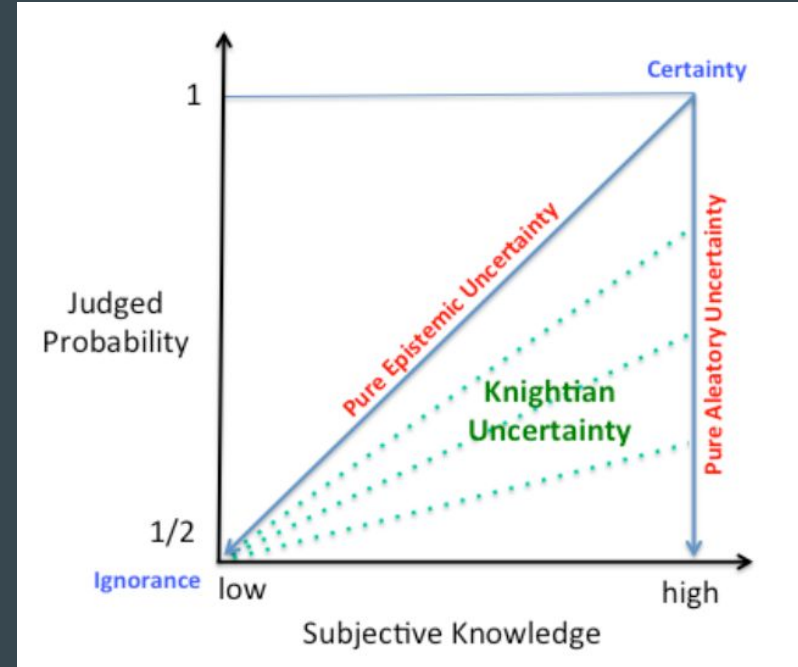
NCHRP 08-154 study:
**Guidance for Agencies to Incorporate
Uncertainty into Long-Range Transportation
Planning**

Terminology

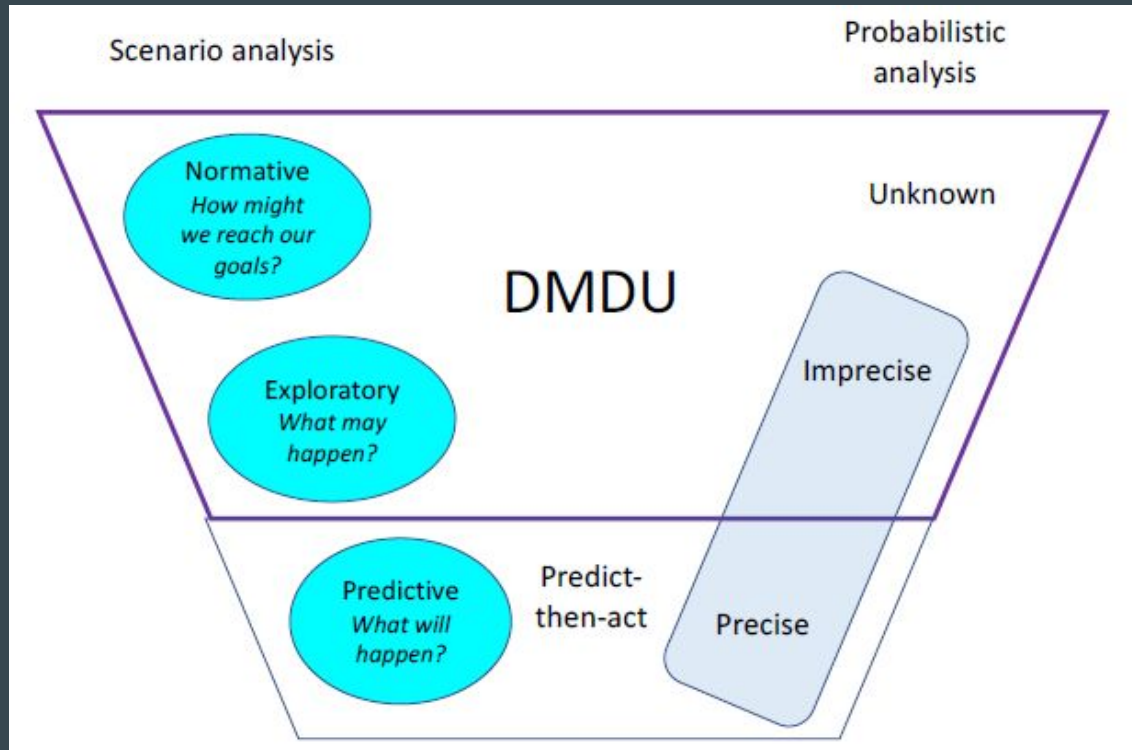
- Types of uncertainty
- Responses to uncertainty
- Uncertainty initiative goal

Dimensions of Uncertainty

Uncertainty Dimension	Epistemic (subjective)	Aleatory (inherent)
Source	Lacking complete knowledge	Stochasticity
Reducing / Handling	Improve knowledge of the system	Improve information of the distributions and possible outcomes



Types of Analyses



State of the practice: predict-then-act

- Best estimate forecasts
 - Single point predictions
 - Small number of most likely scenarios
 - Expected values of outcomes (risk analysis)
- Uncertainty handling: seek and destroy (or leave out)
 - Improve knowledge in models, input data to reduce epistemic uncertainty
 - Define distributions of aleatory variability
 - Leave out if uncertainty leads to no clear optimal solution or breaks down the process
 - Autonomous vehicles
 - Work from home behavior

Decision Making Under Deep Uncertainty

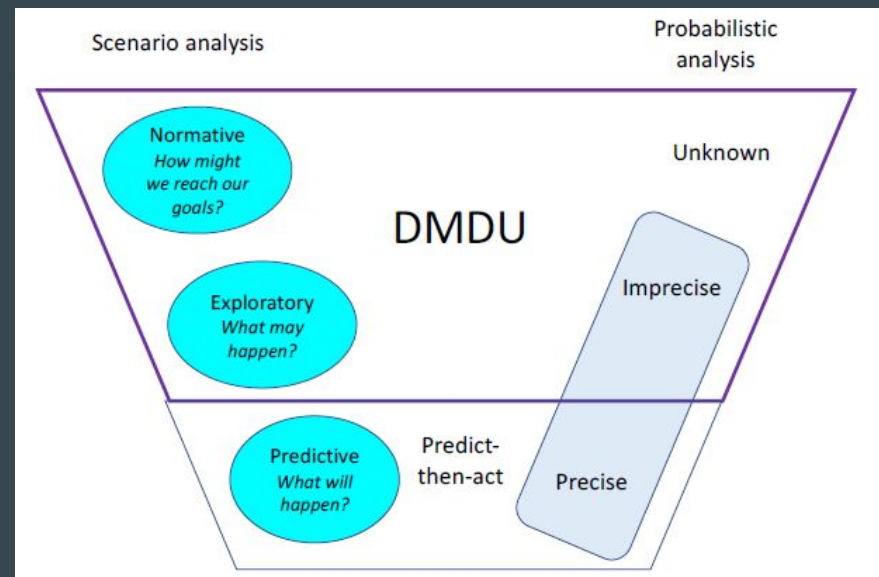
- **Robust Decision Making** (RDM) framework: hedge, shape, adapt
- Working within existing forecast uncertainties to **stress test strategies**
- **Still valuable to reduce** epistemic and aleatory uncertainty in context of decision makers, but **not primary to predict the future accurately**

Table 3.1. XLRM factors employed in DMDU analyses

X: Uncertainties	L: Policy Levers
What uncertain factors outside decision makers' control affect their ability to pursue their goals?	What actions might decision makers take to pursue their goals?
R: Relationships	M: Performance measures
How might policy levers (L) and uncertainties (X) be related to decision makers' goals (M)?	What are decision makers trying to achieve?

Proposed Refinement to Uncertainty Initiative Purpose

- Focus on advancing **Decision Making Under Deep Uncertainty** practices
- Promote analysis using:
 - **Normative scenarios** - given a set of goals, what circumstances bring those about?
 - **Exploratory scenarios** - range of possible outcomes without assertions of likelihood
- Promote applications of **Robust Decision Making**
- **Rename initiative to DMDU**



Uncertain

Robust Decision Making

Exploratory
Modeling

Exploratory
Scenario
Analysis

Normative
Scenario
Analysis

Monte Carlo
Simulation

Sensitivity
Testing

Risk Analysis

Risk
Mitigation

Scenario
Planning

Forecasting
Accuracy

Forecasting

Predictive
Scenario
Analysis

Certain

Quantitative

Qualitative

Activities / Goals for 2024

- Advance DMDU practices
 - DMDU Book Club
 - Zephyr Learning Session on Uncertainty
 - Innovations 2025?
- Maintain existing tools
 - Community support for TMIP-EMAT
- Promote new research
 - Call for papers to demonstrate / advance Robust Decision Making in transportation planning