Individual Emergency Response and Recovery: A Learning Experience from Hurricane Maria

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Puerto Rico's experience with Hurricane Maria unveiled severe vulnerabilities. While the island's infrastructure was devastated, citizens were holding the reigns of their wellbeing for a while, deciding upon the best ways to keep themselves and their families alive in conditions of extreme uncertainty and stress. Inspired by this, in this investigation, we aim to develop a tool, an information system, to guide individual decision-making (DM) through the aftermath of a hurricane disaster.

Approach / Methodology

(1) Gathered individuals' reactions towards Hurricane Maria through a survey. The survey measured levels of worry about several categories (ex. residence, utilities, etc.) at 4 time-points during the aftermath.

(2) Designed a prescriptive model that monitors individuals' wellness during a hurricane. It is an adaptation of a classic inventory model.

(3) Created a list of detrimental events and prescriptive actions during a hurricane. Matched every event to a level of worry and time-point from the survey.
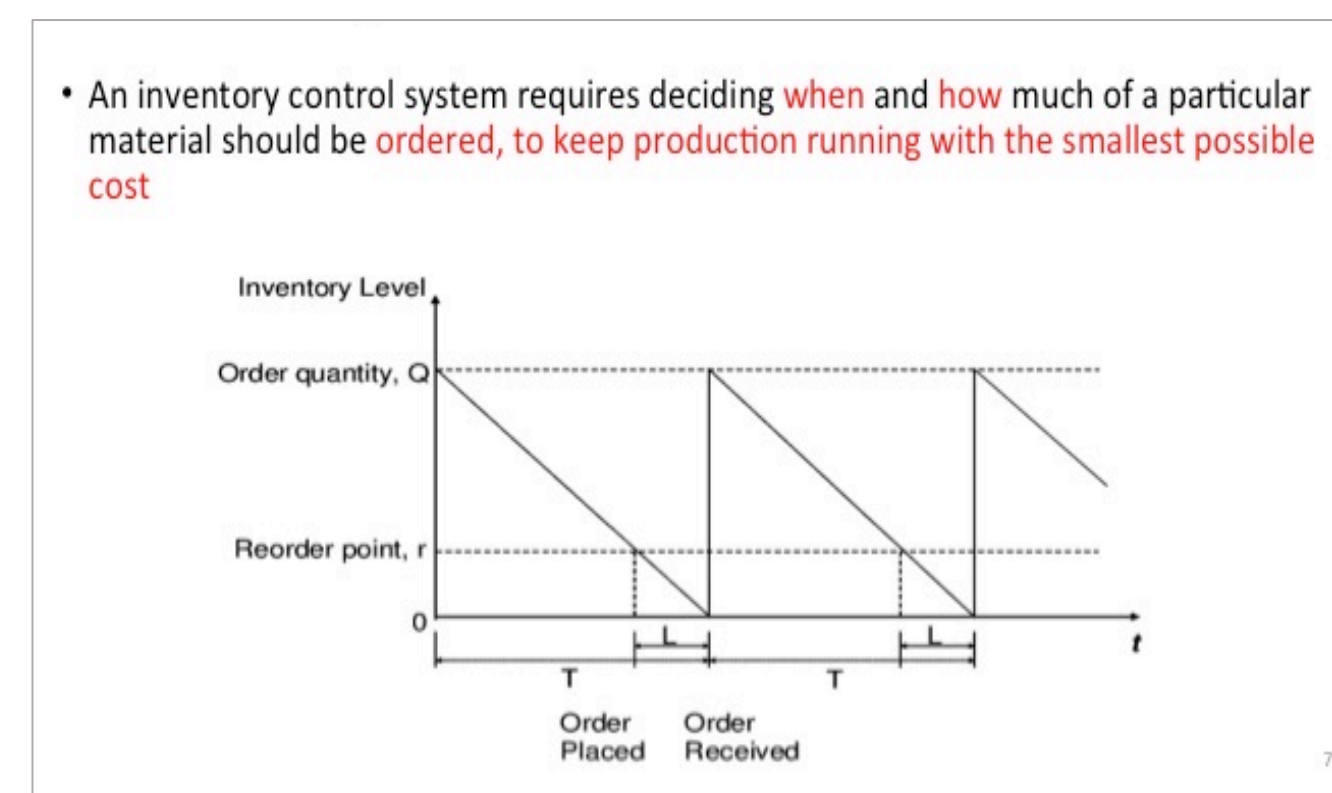
(4) Prototyped the model in Microsoft PowerApps.

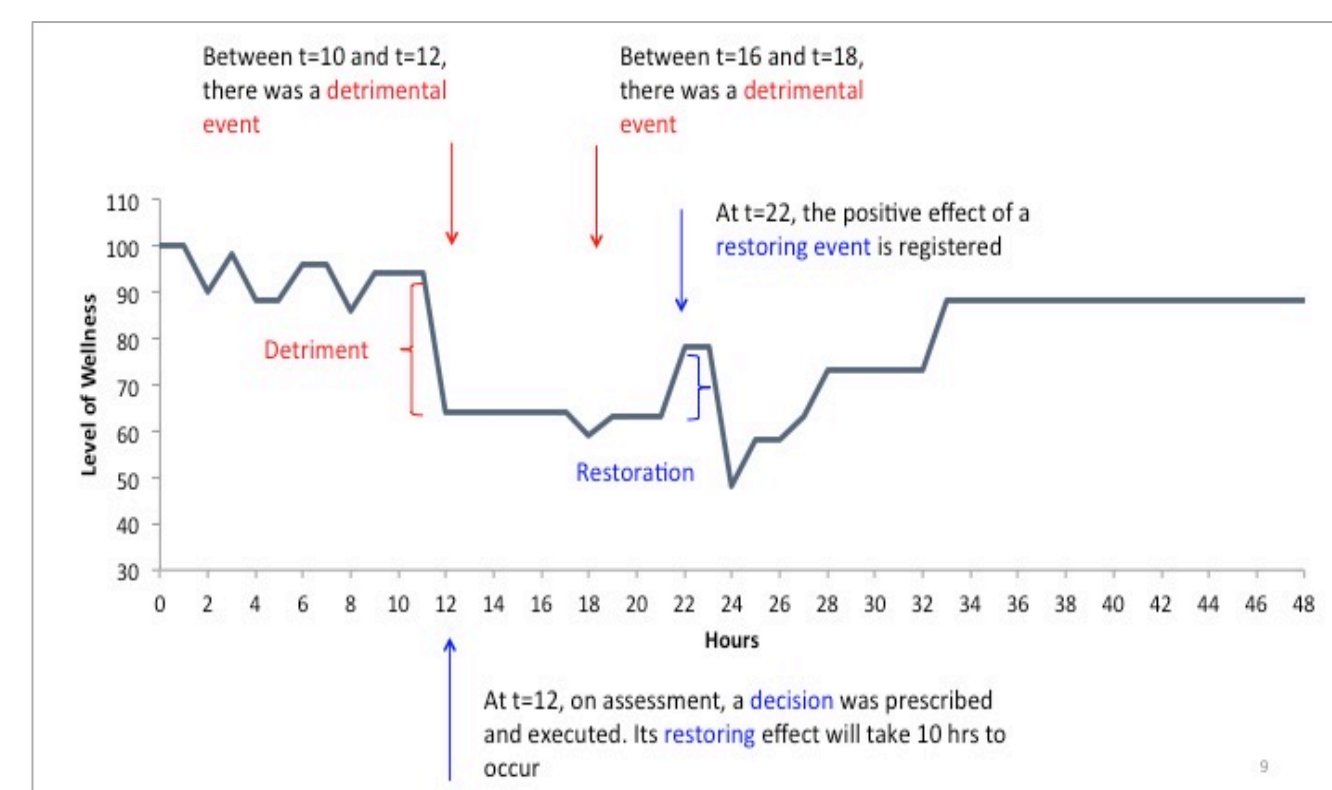**Figure 1.** Classic Inventory Control Model

Figure 2. Principal Elements of a Wellness Control Model

Outcomes / Results

- Respondents were most worried about friend's and relative's wellbeing, communications, utilities, and their plans for the future.

- The model verification consisted of collecting the experiences during Hurricane Maria of 5 individuals.

- The model represented their narratives with fidelity.

- The model validation consisted of generating events and solutions from the list with a random number strategy.

- The model was sensible enough to differentiate between DM strategies: shortest lead time and highest restorative effect, respectively.

- We coded the app in Microsoft PowerApps.

- It can work online and offline.

- Users report detrimental events the system **prescribes** solutions to restore wellness.

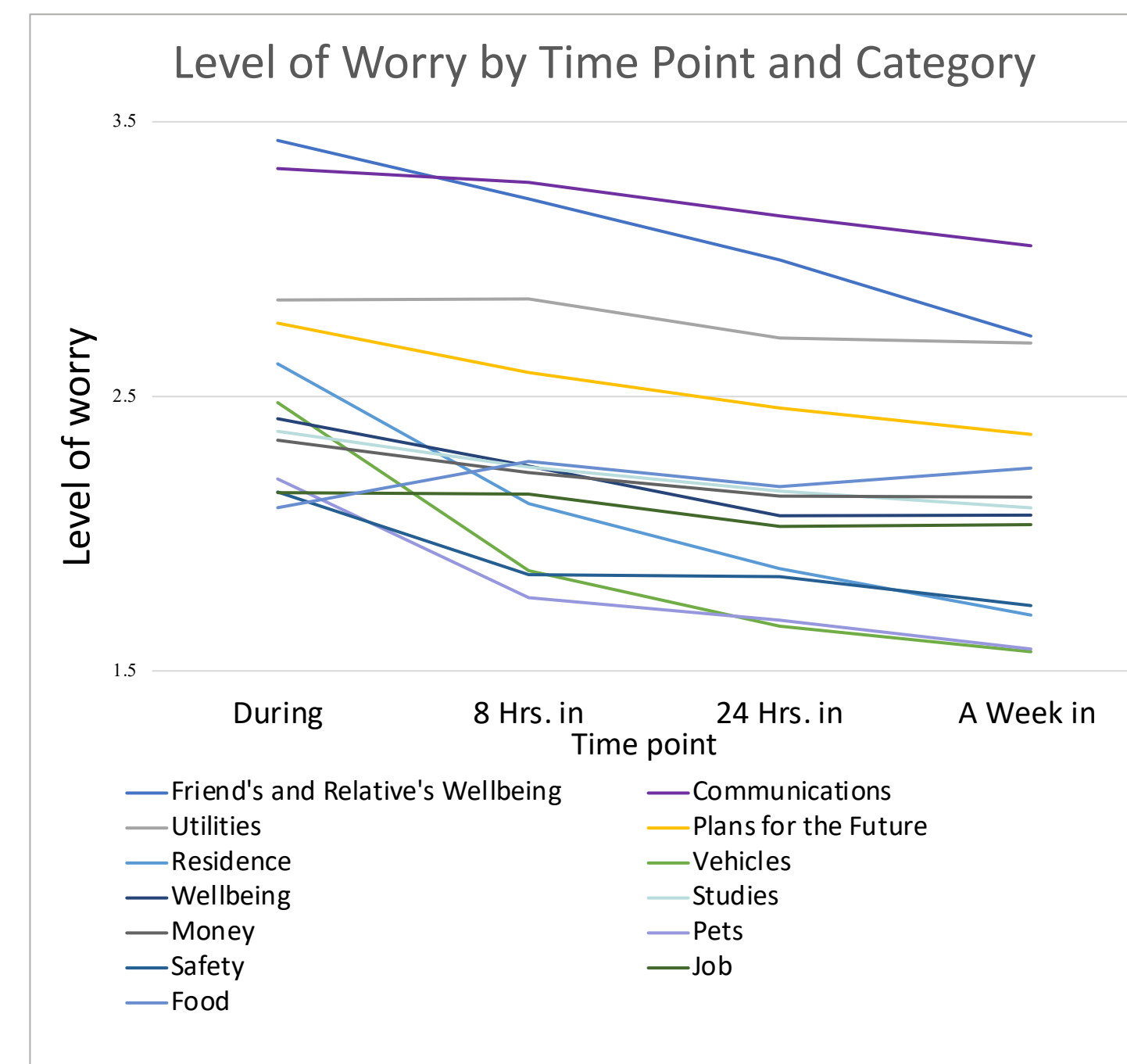- The app shows individual's live wellness levels.
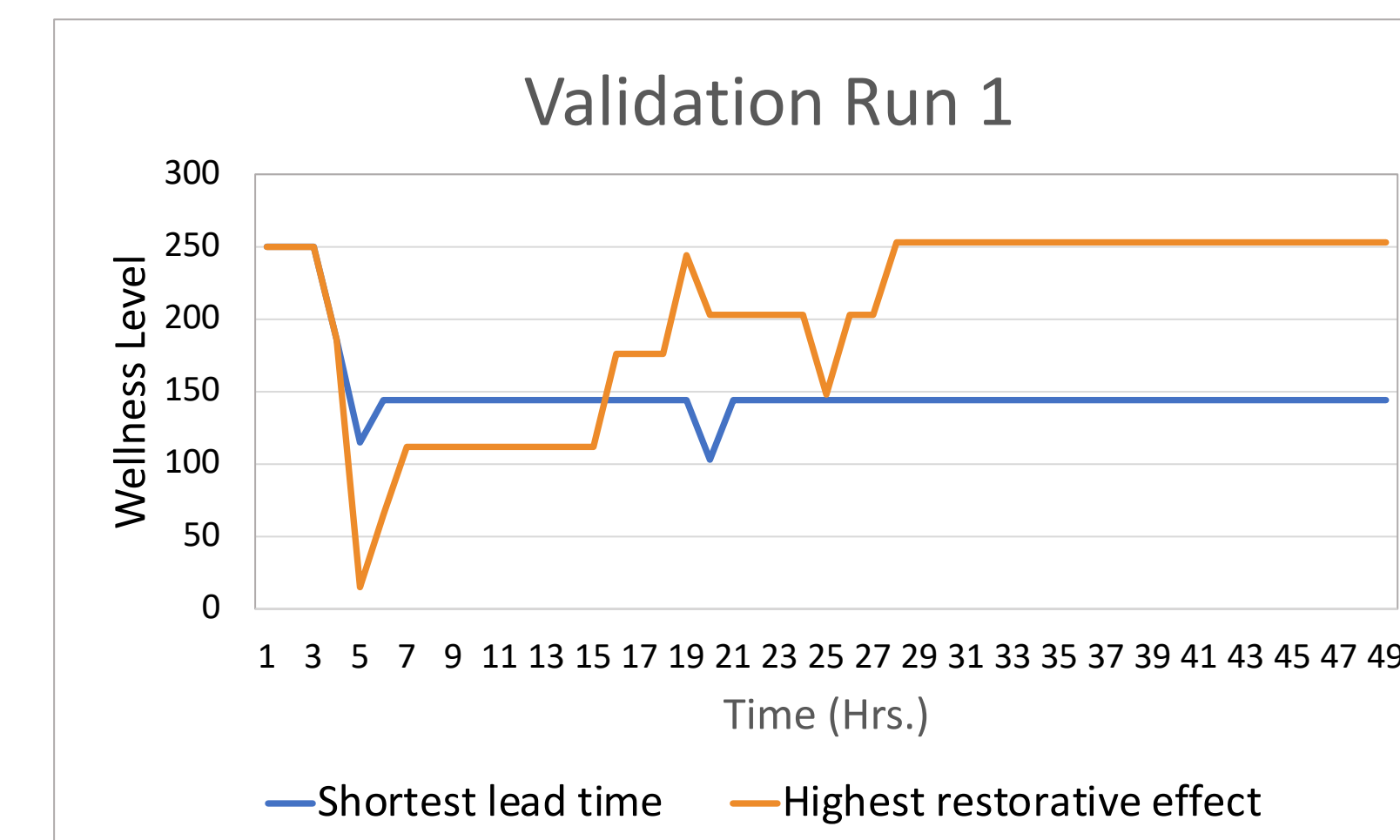

Figure 3. Levels of Worry by Time-point and Category

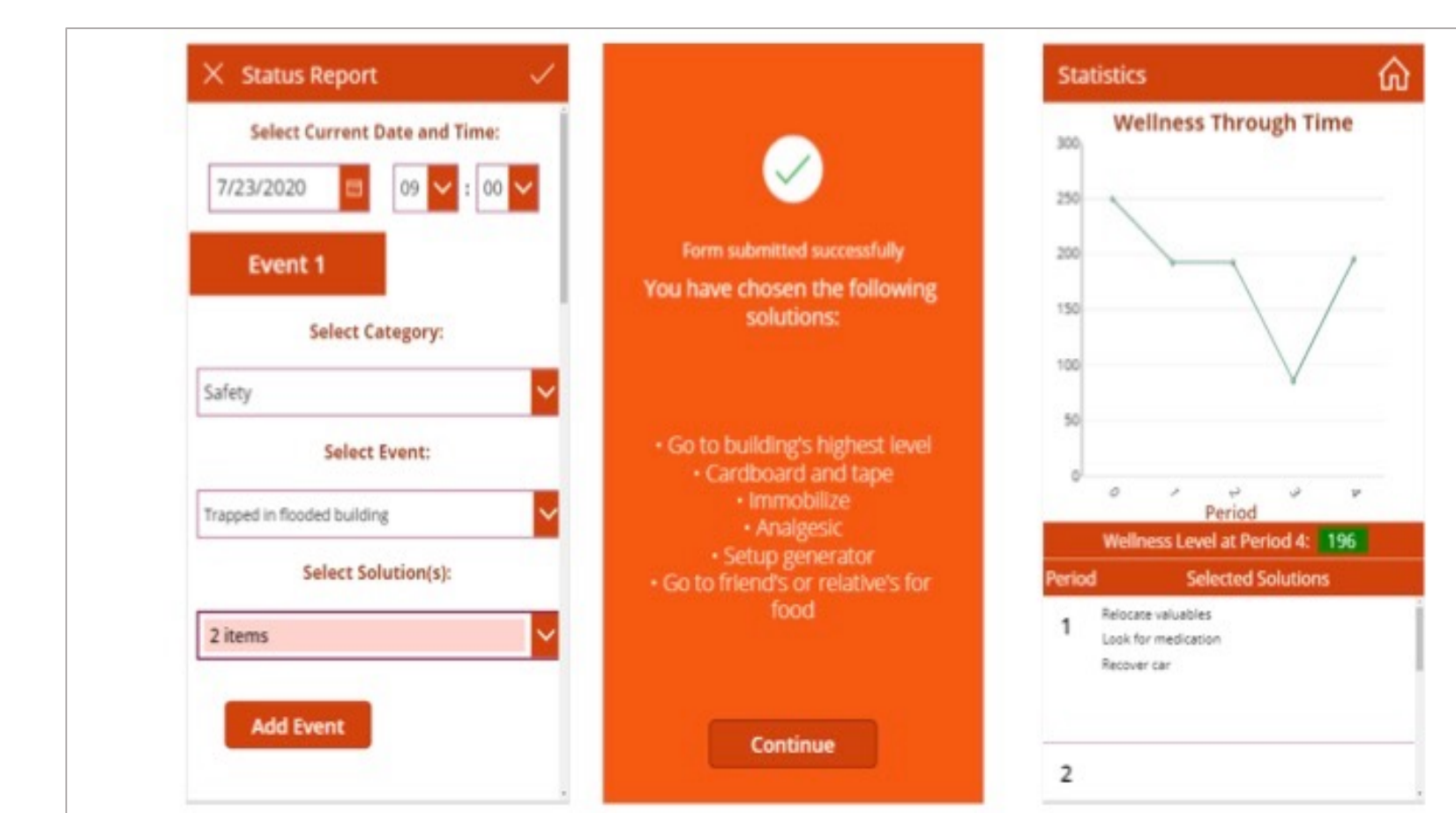**Figure 4.** Validation Run 1 of the Wellness Model

Figure 5. Prototype of the Wellness Model using Microsoft PowerApps

Conclusions

In this work, we designed a wellness monitoring system for hurricane disasters using individuals' experience during Hurricane María. The decision-support system developed is based on a classical inventory model theory. It is our perspective that the prescriptive model could provide a useful guide to help individuals make better decisions by helping them work towards solutions that work in favor of their wellbeing in situations where decision making can be, not only at it most uncertain, but at its most critical.

References

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Acknowledgements