PREFACE TO THE SPECIAL ISSUE DECISION ANALYTICS UNDER UNCERTAINTY: METHODS AND APPLICATIONS IN LATIN AMERICA

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In Latin America, deciding with imperfect data is not an academic exercise: it is the ordinary condition of work. The engineer who must prioritize interventions on a water network exposed to earthquakes, the research office that allocates reviewing hours among competing manuscripts, the local government that schedules distribution routes for short marketing circuits — all of them decide before the data are complete, with criteria that conflict and with evidence that does not always reach the threshold of statistical significance. Operations research was born for that world, and this journal — the dean of the field in the region since 1966 — has been its natural home.

This journal has long published multi-criteria and configurational methods — CRITIC for comparing outreach models (Vol. 46, No. 1), TOPSIS for selecting local development programs (Vol. 46, No. 4), the analytic hierarchy process in educational assessment (Vol. 46, No. 3), fuzzy-set qualitative comparative analysis in pluricultural settings (Vol. 47, No. 2). This special issue takes that tradition as its point of departure, not its destination. Most of the twenty contributions gathered here do not build a new compensatory ranking from primary data; they take a result that already exists — a thesis, a survey, a prior assessment, a published model — and ask how much of its conclusion survives once the analyst's discretionary choices are made explicit and varied. The repertoire that answers that question differs from the one that produced the original result: partial identification when the underlying judgment matrix was never disclosed, Bayesian reanalysis and minimax regret when only aggregated tables remain, sensitivity analysis when a threshold or a weight was never justified, and paraconsistent or evidential representations when the honest answer is that evidence is missing or contradictory, not merely uncertain. These are not interchangeable diagnoses: a judgment matrix that was simply never disclosed is a gap that more evidence of the same kind would close, while two sources that genuinely disagree are not resolved by collecting more of either — the disagreement has to be typed and carried into the decision, not averaged away. We develop this distinction at length elsewhere, under the name of typed indeterminacy engineering — separating ignorance, conflict and falsity, and within each, what more of the same evidence would remove from what is built into how the question was posed (Leyva-Vázquez, currently under review at the Journal of Evidential and Paraconsistent Reasoning). Multi-criteria and neutrosophic tools remain in the issue where the problem genuinely calls for them, but as one instrument among several, not as the organizing method.

On that basis, the issue gathers twenty contributions organized into four sections. The section on methods and foundations opens with the representation of evidence through independent coordinates in paraconsistent logic, and extends the toolkit with robust model selection under inconclusive or competing evidence, the partial identification and robustness of a classical multi-criteria method whose original judgment matrix was never disclosed, and structured analyses of competing hypotheses with explicit degrees of indeterminacy. The section on engineering and

infrastructure takes the repertoire to the field: agroclimatic and environmental monitoring, occupational-risk sensing under the Internet of Things, greenhouse climate control, thermal-insulation design, hydraulic turbine verification, electrical-insulation and partial-discharge diagnostics, and the seismic vulnerability of water and sanitation infrastructure. The section on management of organizations and higher education addresses the evaluation of educational outcomes, agritourism demand, retail marketing and brand positioning under aggregated ordinal data, classifier choice for labor-market outcomes, and citation-training programs. The section on public policy and territory closes with cultural-heritage inventories, household confidence and consumption dynamics, competing hypotheses on administrative due process in digital public registries, and precision-irrigation water requirements.

Three cross-cutting requirements unify the accepted contributions. First, real Latin American data: every paper decides on a situated problem, and most work from evidence someone else already collected — a thesis, a survey, an institutional record — rather than from a toy example. Second, reproducibility: decision matrices, calibrations and scripts accompany the articles whenever data protection allows it. Third, honesty about uncertainty: the papers declare which part of their conclusions depends on analyst choices — weights, calibration anchors, thresholds, priors — and what happens when those choices vary. A decision method that hides its sensitivity does not help to decide: it helps to justify.

Fifteen of the twenty contributions come from a single institution, Universidad Técnica de Cotopaxi, and that concentration is deliberate: it shows what a regional university can produce when its applied research is read with a common methodological lens. The remaining five come from Chile, Peru and other Ecuadorian universities, and they keep the issue from becoming a local monograph.

We thank the editorial team of Revista Investigación Operacional for hosting this special issue, the referees who upheld its standard, and the institutions that contributed the cases: universities and local governments of Ecuador, Chile and the wider region. We trust the reader will find here not a collection of techniques but a way of working: auditable methods for decisions that matter, in contexts where uncertainty is not the exception but the point of departure.

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