



Research article

Construction of a Dynamic Hybrid Model for Analyzing the Demand of Chinese NEV Consumers: Based on DS-Kano and C2SLM-Kano

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Appendix A

Table A1: Input Variable Correlations

Variable	Battery Satisfaction	Power Demand	Purchase Intention
Temperature	-0.42 (Lou et al., 2017)	-	-
Speed	-	0.38 (this study)	-
Safety risk	-	-	-0.51 (Lou et al., 2017)

Table A2: DRL Reward Weight Justification (Expert Interviews, n=10)

Stakeholder	ΔSat	1-RMSE	Cost
R&D Managers	0.4	0.3	0.3
Policymakers	0.4	0.3	0.3

Table A3: Constraints & Boundary Settings for RMSE (demand prediction deviation) and Impact on Robustness

Constraints & Boundaries	Definition	Impact on Robustness
Constraint 1: Numerical variables (temperature, speed)	normalized to [0,1] to avoid scale bias; outliers beyond are removed (e.g., speed > 120 km/h, temperature < -30°C or > 40°C)	reduces RMSE sensitivity to noisy data (verified in Section 4.3.1:
Constraint 2: Text data (reviews/complaints)	filtered to retain only demand-related content via BERT topic classification (e.g., delete service complaints unrelated to product attributes)	10% data perturbation leads to only 5.5% RMSE increase)
Boundary 1: Temporal boundary	2022–2024 to reflect recent market dynamics	A limitation: RMSE may be less reliable for scenarios outside the boundaries (e.g.,
Boundary 2: Spatial boundary	10 Chinese provinces (covering cold/hot/temperate climates, tier-1/rural areas) to ensure RMSE reflects diverse regional demand patterns	
Boundary 3: Attribute boundary	23 core NEV demand attributes identified via literature and expert interviews, without niche attributes with <0.1% user mention rate	reflect mainstream consumer preferences via RMSE

Table A4: Sample Balance (Cold/Rural Data)

Region	Original Size	Oversampled Size	Rate
Cold	86	120	+39.5%
Rural	72	100	+38.9%

Table A5: Policy Effectiveness Simulation (Non-Tier-1 Cities)

Policy	Traditional Adoption Growth	Hybrid Adoption Growth	Improvement
Charging Subsidy	8%	23%	+15%
Purchase Subsidy	6%	18%	+12%



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