Solving the Preschool Conundrum – A Data-Driven Approach for ECDA

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Executive Summary

Issue: Persistent mismatch between childcare demand and preschool supply across subzones.

Solution: 5-year subzone-level forecast using population and preschool data.

Outcome: Identifies critical gaps, supports location planning.

Tool: Modular dashboard prototype to support real-time decision-making.

Objective

01

Forecast demand for childcare (18 months–6 years) at the **subzone level**.

02

Determine **how many and where** preschools are needed.

03

Provide ECDA a flexible tool for **continuous updates**.

Scope & Assumptions

Age group: 18 months to 6 years (≈ ages 2–6).

Capacity assumption: Each preschool can serve **up to 100 children**.

Forecast horizon: **5 years** (2025–2029).

Data granularity: 412 subzones, aligned with HDB planning units.

Data Sources

Source	Dataset	Use
SingStat	Age-by-subzone population (2010–2020)	Historical trends
Data.gov.sg	Preschool locations	Supply estimation
GitHub	BTO mapping to subzones	Future demand driver
Internal	ECDA assumptions	Planning thresholds

Forecasting Methodology

- **Two-tier approach**:
  - **Fast forecast**: Linear regression for speed and interpretability.
  - **Advanced model**: LSTM neural networks for subzones with complex trends.
- **Scenario engine**: 720 combinations across population, BTO, and closure scenarios.

Key Results

Projected shortfall in 68 subzones by 2029.

Top 10 critical subzones by projected child–capacity gap.

Example: *Sengkang West* needs +4 centres by 2029.

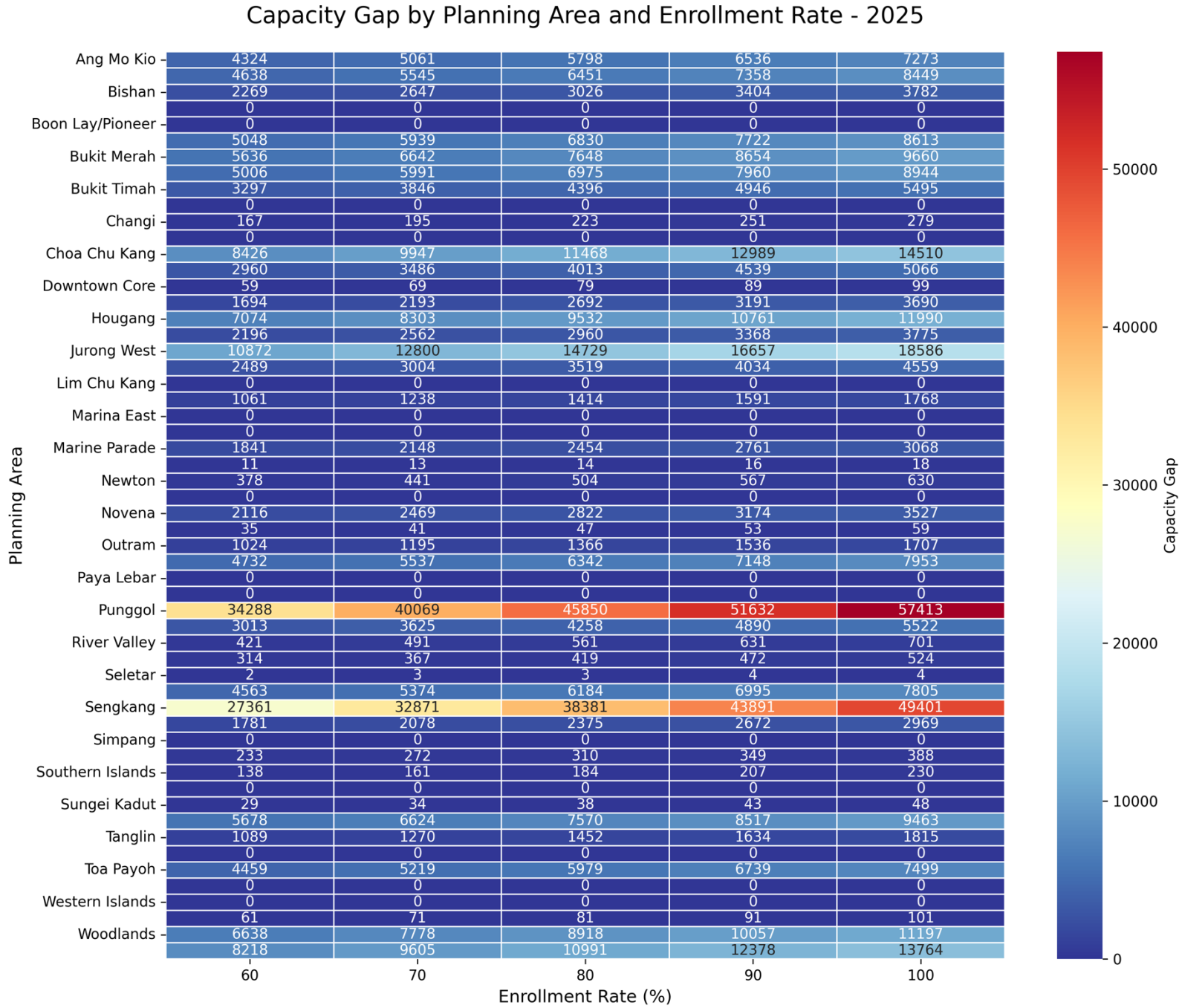
Regional Insights

North-East: highest concentration of emerging demand.

Mature estates: flat or declining demand, with some over-supply.

Visual heatmap: Gap by subzone.

Enrollment Impact Heatmap

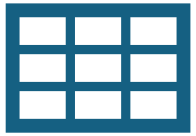


Dashboard Demo Highlights

Interactive map with demand/supply overlays.

Real-time scenario switching (720 combinations).

Toggle between forecasting models.



Exportable reports for planning use.

Benefits & ROI

Higher childcare accessibility = better work-family balance.

Data-driven site planning = smarter investments.

Scenario planning = lower long-term risk of over-/under-building.

Roadmap & Deployment

Phase	Timeline	Deliverable
1	Done	Forecasting model + dashboard prototype
2	Q3	Beta dashboard + user training
3	Q4–2025	Fully integrated with ECDA internal systems

Limitations & Mitigations

No forward-looking birth rates or migration trends yet.

Childcare operator constraints not yet modeled.

Future work: add infant care and after-school segments.

Questions for Management

Should infant care (0–18 months) be forecasted too?

What policy thresholds define “critical shortage”?

Should private preschools be included in planning assumptions?

Summary – Why This Matters

Strategic, scalable, and evidence-based planning tool.

Delivers real-time insight for national early childhood infrastructure.

Ensures that **no family is left behind** due to childcare inaccessibility.

The End