

Executive Brief

AI-Driven Operational Intelligence for Conut Bakery

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1. Problem Framing

Conut is a fast-growing Lebanese bakery chain operating in Tyre, Jnah, and Batroun. Management currently makes inventory, staffing, pricing, and expansion decisions based on intuition rather than data. This leads to product waste from demand miscalculation, missed revenue from suboptimal bundling, and staffing inefficiencies across shifts. With plans to expand, Conut needs a data-driven framework to guide where to grow and how to optimize existing operations.

We built an AI Chief of Operations that integrates 6 machine learning models, trained on real Conut data (8 datasets, 6,700+ records), to answer the key business questions below.

2. Top Findings

Expansion Readiness: Score 67.3/100

- Conut Jnah** and **Conut Tyre** classified as High Performers by K-Means clustering; Batroun branch is Growing/Stabilizing.
- Revenue growth is strong (100/100) and revenue scale is high (90.3/100), but operational efficiency (15/100) and customer loyalty (37.6/100) need improvement before aggressive expansion.
- Verdict:** "Recommended with Caution" — address staffing and channel gaps first.

Best New Location: Kaslik/Zouk (Score 71.2)

Rank	Area	Score	Population	Gap	Key Strength
1	Kaslik/Zouk	71.2	50,000	+8.8	High social activity, underserved
2	Tripoli	68.6	730,000	0.0	Massive demand, low rent
3	Jounieh	63.2	120,000	+3.7	Tourism + university hub
4	Mar Mikhael	61.1	15,000	+3.5	Highest social activity (95)
5	Aley	56.9	90,000	+5.7	Low competition, affordable rent

Model accuracy: $R^2 = 0.976$, MAE = 2.8 competitors. Analyzed 24 Lebanese areas using population, social activity, traffic, and competitor data.

Revenue Optimization: Product Combos

- Apriori analysis across 69 baskets found **3,777 association rules**. Top combos have 100% confidence and lift of 69x.
- Top bundle: **Conut Berry Mix + Conut Original + Espresso** — cross-category combo (bakery + coffee) with highest revenue potential.
- Recommended ~15% combo discount to drive adoption while maintaining margin.

Demand Forecast & Staffing

- Tyre:** Stable trajectory, forecast ~1.19B LBP/month (MAPE 8.3%). Best-performing forecast model.

- **Jnah:** Explosive growth trend, forecast 3.3B–6.2B LBP over next quarter. Highest revenue per labor hour (5.1M LBP/hr).
- **Staffing gap identified:** Tyre morning shifts are understaffed. Ridge Regression model (MAE = 0.63 staff) recommends adding 1 employee to morning weekday shifts.

3. Recommended Actions

1. **Launch combo bundles immediately.** Start with Conut Berry Mix + Original + Espresso and Classic Chimney + Pistachio + Oreo Milkshake at all branches. Expected to increase average basket value by 10–15%.
2. **Open 4th branch in Kaslik/Zouk.** Highest opportunity score (71.2). Underserved market with strong social activity and university presence. Target monthly revenue: 1.14B LBP (benchmark: Jnah). Offer delivery + dine-in from day one.
3. **Fix staffing gaps at Tyre.** Add 1 staff member to morning weekday shifts. Maintain current evening levels. This addresses the understaffing flagged by the ML model without increasing labor costs significantly.
4. **Add delivery channel at Batroun.** Jnah achieves 5.1M LBP/labor hour with delivery. Batroun currently lacks this channel. Adding it could boost revenue 20–30% based on Jnah's channel diversification data.
5. **Grow coffee and milkshake sales.** Cross-sell espresso with bakery combos. The data shows coffee items appear in 80%+ of top association rules, indicating strong pairing potential that is currently underexploited.

4. Expected Impact & Risks

Expected Impact

Action	Expected Impact	Timeline
Combo bundles	+10–15% avg basket value	Immediate
Kaslik/Zouk branch	+1.1B LBP/month revenue	6–12 months
Tyre staffing fix	Reduced wait times, +5% retention	Immediate
Batroun delivery	+20–30% branch revenue	1–3 months
Beverage cross-sell	+15% coffee/shake revenue	1–2 months

Risks & Mitigations

- **Limited training data.** Models trained on 5 months of data. Forecasts beyond Q1 2026 carry higher uncertainty. Mitigation: retrain monthly as new data arrives.
- **Expansion capital requirements.** Kaslik/Zouk has a rent index of 72 (above average). Mitigation: start with a smaller format store; use Jnah's revenue-per-labor-hour as the profitability target.
- **Operational efficiency gap.** Expansion score flagged efficiency at 15/100. Mitigation: implement staffing recommendations and delivery channel before opening a 4th branch.
- **Market volatility.** Lebanon's economic environment adds uncertainty to all projections. Mitigation: the AI system can be re-run with updated data at any time to recalibrate recommendations.

This brief was generated by the Conut AI Chief of Operations system, a hackathon project integrating 6 ML models (Apriori, Ridge Regression, K-Means, Polynomial Regression, Exponential Smoothing, Market Gap Analysis) with real operational data. All figures are derived from model outputs, not estimates.