Operations Report: IceCream Frainchise - Indonesia

Author: APOLLO Assistant | Profile: Operations_report_v1

1. Executive Summary

This report outlines key operational considerations for launching and scaling an ice cream franchise network in Indonesia. It focuses on store and commissary operations, cold-chain logistics, capacity and cost structure, and risk management, drawing on recent research in food and beverage operations, supply chains, capital structure, and sustainability.

The academic context does not directly study Indonesian ice cream franchises. The report therefore combines:

- Empirical findings from food and beverage manufacturing and franchised beverage chains in other countries [3], [8], [10]-[12]. - General supply-chain and capital-structure research [1], [2], [4], [7], [9], [13], [15]. - Assumptions and analogies where direct evidence is not available (explicitly labeled).

Supported by the cited literature:

- Warehousing and raw-material scheduling can improve space utilization and reduce stock imbalances in food and beverage contexts [3], [8]. - Data-driven supply-chain approaches can improve resource utilization and measured resilience in at least one documented global case [4], and predictive analytics is widely argued to support operational efficiency [9]. - Centralized procurement and cold-chain logistics are important components of the profit model for at least some large beverage/dessert chains (e.g., new tea industry cases) [10], [11]. - Innovation, supply-chain management, and green packaging are associated with better sustainability performance in Malaysia s food and beverage sector [12].

Assumption: These patterns are used as analogues for an Indonesian ice cream franchise, but their quantitative effects and exact applicability to Indonesia are uncertain.

For an Indonesian ice cream franchise, the operational priorities proposed (assumption-based, informed by the literature) are:

1. Design a hub-and-spoke cold-chain model with one or more regional commissaries supplying standardized mixes and semi-finished products to franchised outlets, supported by frozen distribution and temperature monitoring. 2. Implement data-informed demand forecasting and raw-material scheduling to better align production and distribution with demand, aiming to reduce waste and stockouts [4], [8], [9]. 3. Standardize store-level processes and quality controls to manage food safety and brand consistency across a dispersed franchise network, taking into account quality-control issues observed in some large beverage franchises [11]. 4. Adopt a considered capital structure and investment plan for production, logistics, and IT, using insights from Indonesian capital-structure studies to think about debt-equity balance and borrowing costs [1], [2], [7]. 5. Integrate sustainability and packaging choices early, drawing on regional evidence that green packaging and supply-chain innovation are linked to improved sustainable performance [12].

The report concludes with a prioritized, largely assumption-based action plan for pilot design, capacity planning, and risk mitigation, informed but not fully determined by the cited evidence.

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2. Operational Context and Value Chain Overview

2.1 Industry and Indonesian Context

There is no directly cited academic work on ice cream franchises in Indonesia in the provided context. The analysis below extrapolates from:

- Indonesian capital-structure and financing studies [1], [2] (relevance: high for financing, indirect for operations). - Food and beverage manufacturing and franchised beverage chains in other countries [3], [8], [10]-[12] (relevance: moderate-high as analogues, but not ice cream-specific).

Assumption: Consumer demand for cold desserts in Indonesia is supported by a tropical climate and rising middle-class consumption, similar to patterns observed in other Asian beverage/dessert markets [10], [11]. This is plausible but not directly evidenced in the provided sources.

From the Indonesian context:

- Indonesia offers relatively low labor costs and growing skilled labor, which has been attractive for capital-intensive industries such as automotive [1]. Assumption: By analogy, this may also support labor-intensive retail and food-service operations, including franchises, but this is not empirically tested in the context. - Access to bank financing and the cost of borrowing are critical for capital-intensive sectors in Indonesia [2]. An ice cream franchise with central production and cold-chain assets is likely to be moderately capital intensive, but this is an inference rather than a measured fact.

2.2 Value Chain Overview for an Ice Cream Franchise

Drawing on supply-chain analyses of beverage and dessert chains [10], [11] and food and beverage manufacturers [3], [8], [12], a plausible value chain for an Indonesian ice cream franchise would include:

1. Upstream Sourcing - Dairy (or dairy alternatives), sugar, stabilizers, flavorings, cones/toppings, packaging. - Centralized procurement has been shown to reduce raw-material costs via economies of scale in at least one new tea chain case [10], [11]. - Assumption: Similar benefits could be achievable for ice cream ingredients, but this is not directly studied.

2. Central Production / Commissary - Mixing, pasteurization, homogenization, aging, and possibly pre-freezing of base mixes. - Packaging into bulk containers or pre-portioned units. - Cold storage (frozen and chilled) with inventory management [3], [8]. - These steps are standard in dairy/ice cream processing, but the specific configuration for Indonesia is assumption-based.

3. Cold-Chain Logistics - Frozen/chilled transport from commissary to regional depots or directly to stores. - Use of cold-chain logistics and digital systems is described as part of profitable models in new tea industry cases [10]. - Assumption: A similar cold-chain structure would be required for ice cream, but the exact design and economics in Indonesia are not empirically documented here.

4. Franchise Store Operations - In-store storage (freezers), final freezing/churning (if soft-serve), assembly, and service. - Local procurement of some fresh toppings or ancillary items (e.g., beverages) where feasible. - This is based on common industry practice rather than specific academic evidence.

5. Reverse Logistics and Waste Management - Return of reusable containers, management of expired stock, and recycling of packaging. - Green packaging and waste reduction are associated with improved sustainable performance in Malaysia s food and beverage sector [12]. - Assumption: Similar sustainability drivers may apply in Indonesia, but this is not directly tested.

6. Support Functions - Demand forecasting, inventory planning, quality assurance, training, and IT systems [4], [9], [12]. - The importance of these functions is supported in general supply-chain and F&B; contexts, but not specifically for Indonesian ice cream.

This hub-and-spoke model resembles the supply-chain structures of some successful low-cost beverage franchises that rely on high self-sufficiency in raw materials and integrated supply chains [10], [11]. The transfer of this model to ice cream in Indonesia is an informed assumption, not a documented empirical result.

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3. Capacity, Throughput, and Cost Structure

3.1 Production and Storage Capacity

Evidence from food and beverage warehousing and raw-material scheduling indicates that:

- Firms often prioritize space optimization and adequate aisle space but may underinvest in automation, which can limit efficiency [3]. - Optimized raw-material supply scheduling can improve storage utilization and reduce both shortages and overstocking in at least one food and beverage company [8].

Assumption: These findings are used as guidance for an ice cream commissary in Indonesia, although no study directly examines such a facility.

For an ice cream commissary in Indonesia (assumption-based):

- Production capacity would typically be sized based on forecasted demand across the franchise network, with allowance for seasonality and promotions. - Cold storage capacity would need to cover safety stock and lead times for both raw materials and finished/semi-finished products, consistent with general inventory principles.

Assumption: A planning target of around 70-80% average utilization of production and storage capacity is suggested to balance efficiency and resilience. This is based on general operations practice and the notion that some idle capacity can support resilience [4], but the specific percentage is not empirically validated for this context.

3.2 Throughput and Process Design

A data-driven framework applied to one global supply-chain case showed that optimizing idle capacity and reallocating resources improved resource utilization by about 18% and enhanced measured resilience by about 25% [4]. A review of predictive analytics argues that forecasting and optimization can support better planning for demand, inventory, workforce, and assets across multiple industries [9].

These results are context-specific and should not be assumed to generalize numerically to an Indonesian ice cream franchise. They do, however, support the qualitative claim that data-driven planning can improve utilization and resilience.

Implications for an ice cream franchise (assumption-based, informed by [4], [8], [9]):

- Commissary throughput could be planned using demand forecasts at SKU and region level, with batch sizes chosen to reduce changeover and cleaning times. - Distribution throughput would need to account for route planning, vehicle capacity, and delivery windows to maintain product temperature. - Store throughput would depend on service processes, layout, and staffing; standardized procedures are likely to reduce variability, though this is not directly quantified in the literature provided.

3.3 Cost Structure

The cost structure of an ice cream franchise is not directly studied in the cited literature. The following breakdown is therefore assumption-based, with some support from general capital-structure research:

1. Fixed / Semi-Fixed Costs (assumption-based) - Commissary: equipment (pasteurizers, freezers), building, cold storage, IT systems. - Logistics: refrigerated trucks or outsourced cold-chain contracts. - Franchise support: training, quality assurance, marketing.

2. Variable Costs (assumption-based) - Raw materials (dairy, sugar, flavors, cones, toppings). - Packaging (cups, cones, lids, spoons), where green options may carry a premium but are associated with better sustainable performance in a Malaysian F&B; context [12]. - Energy (electricity for freezers and air conditioning). - Labor at commissary and stores.

3. Financing Costs (partly evidence-based) - Cost of borrowing for capital investments, influenced by interest rates and collateral value [2]. - Debt-equity mix and resulting weighted average cost of capital (WACC) [1], [5], [7].

Research on Indonesian real estate firms shows that higher cost of borrowing has a negative and significant impact on capital structure, while profitability and collateral value positively influence leverage [2]. Research on Indonesian automotive firms shows that optimal debt ratios vary by firm, and some firms are under- or over-levered relative to their WACC-minimizing structure [1]. More generally, optimal capital structure depends on industry conditions and cash-flow stability [7].

Implication (assumption-based, informed by [1], [2], [7]): For a franchise operator:

- Stable, recurring franchise fees and product sales could support moderate leverage, but excessive debt would increase financial risk, especially given potential volatility in energy and cold-chain costs. - Investment in core cold-chain and IT infrastructure should be evaluated against WACC, with sensitivity to borrowing costs, but the exact optimal leverage level for an Indonesian ice cream franchise is not established in the literature.

3.4 Illustrative Cost and Capacity Scenarios

The table below provides a simplified, qualitative scenario comparison for a central commissary and logistics operation. All values and categorizations are assumptions for illustration only and are not derived from empirical data on ice cream franchises.

Assumption-based scenario table (illustrative only):

Scenario	Capacity Utilization	Unit Production + Logistics Cost	Comments
Downside (weak demand, poor planning)	50%	High	Underutilized equipment and trucks; fixed costs spread over low volume; risk of product expiry.
Base (forecast-driven, moderate optimization)	75%	Medium	Balanced utilization; some buffer for demand spikes; manageable waste.

Upside (data-driven optimization, strong demand)	85%	Low-Medium	Higher utilization with more advanced scheduling and routing [4], [8], [9]; requires robust systems and risk controls.

The qualitative relationships (e.g., higher utilization tending to lower unit fixed cost) are consistent with general operations logic, but the specific utilization levels and cost categories are not empirically validated for this context.

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4. Reliability, Quality, and Supply Chain Risks

4.1 Warehousing and Cold-Chain Reliability

Research on warehousing in Kenyan food and beverage manufacturing firms shows that companies prioritize space optimization and regulatory-compliant maintenance but often do not automate or mechanize workflows, which can limit efficiency [3]. This suggests that:

- There is room for improvement through automation and mechanization in similar sectors. - Space and regulatory compliance are already key concerns.

For ice cream operations, the following points are assumption-based, informed by [3], [9], [15]:

- Cold storage reliability is likely to be critical; failures would plausibly lead to product spoilage and food safety risks, although this is not quantified in the literature provided. - Automation opportunities could include temperature monitoring, inventory tracking, and automated alerts, which are consistent with general supply-chain and predictive-analytics recommendations [3], [9].

RFID and cold-chain logistics have been discussed as enablers of food cold-chain visibility and control [15]. While the specific study is older and not Indonesia-specific, it supports the general idea that RFID and similar technologies can:

- Track product location and temperature. - Reduce manual errors in stock handling. - Improve recall capability in case of quality issues.

The extent to which these benefits would materialize in an Indonesian ice cream franchise is not empirically established here.

4.2 Quality and Food Safety in a Franchise Model

Case studies of large beverage franchises in the new tea industry highlight that:

- Supply-chain integration and high self-sufficiency in raw materials support low-cost differentiation in at least one documented case [11]. - Franchise models can face quality-control challenges; for example, one chain experienced food safety problems in multiple stores in a single city [11].

These findings are specific to the studied chain and context but suggest general risks in franchise models.

Implications for an Indonesian ice cream franchise (assumption-based, informed by [10], [11]):

- Centralized production of base mixes would likely reduce variability and allow tighter control over pasteurization and microbiological safety, though this is not directly measured in the literature. - Standardized operating procedures (SOPs) for store-level handling (thawing, serving, cleaning, temperature checks) are a reasonable requirement to manage risk, but their effectiveness would depend on implementation. - Regular audits and training are commonly recommended in franchise and food-safety practice; the literature here only indirectly supports this via observed quality issues when controls fail [11].

4.3 Supply Chain Risks and Resilience

A data-driven framework applied to a specific global supply chain showed that optimizing idle capacity and resource allocation improved resilience by 25%, measured via reduced recovery times and better continuity during disruptions [4]. A review of predictive analytics similarly argues that such tools help organizations prepare for demand and supply disruptions [9]. These results are context-specific and should be treated as indicative rather than directly transferable.

Key risk categories for an Indonesian ice cream franchise are assumption-based, but consistent with general F&B; and logistics risks:

1. Supply Risks (assumption-based) - Dairy and sugar price volatility; potential import dependencies. - Disruptions in packaging or refrigerant supply.

2. Logistics Risks (assumption-based) - Power outages affecting cold storage. - Vehicle breakdowns or traffic delays compromising product temperature. - Geographic dispersion across islands, increasing complexity.

3. Demand Risks (assumption-based) - Seasonality (e.g., rainy seasons), economic downturns, or shifts in consumer preferences. - Competition from other dessert and beverage chains.

4. Regulatory and Sustainability Risks (partly evidence-based) - Evolving food safety regulations (assumption-based for Indonesia). - Pressure for greener packaging and reduced environmental impact, supported by evidence that green packaging and supply-chain management influence sustainable performance in Malaysia s F&B; sector [12].

Mitigation strategies, supported to varying degrees by the literature, include:

- Data-driven planning and monitoring to anticipate disruptions and reallocate capacity [4], [9]. The specific magnitude of resilience improvement in this context is unknown. - Shared or collaborative distribution models to improve utilization and reduce empty trips, as seen in shared distribution systems with revenue-sharing contracts in the express delivery industry [13]. Applying this to cold-chain distribution for ice cream is an analogy (relevance: low-medium) and not empirically tested. - Sustainable supply-chain practices and green packaging, which are associated with improved environmental and economic performance in the Malaysian F&B; sector [12]. The transferability of these benefits to Indonesia is plausible but not directly evidenced.

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5. Operational Scenario Analysis (Demand / Supply Shocks)

This section uses qualitative scenarios to explore how the franchise s operations might respond to shocks. The scenarios are assumption-based and are informed by evidence on scheduling optimization [8], data-driven resilience [4], [9], and shared distribution [13]. Numerical values mentioned from the literature (e.g., 18% utilization improvement, 25% resilience improvement) are specific to the studied cases and are not forecasts for the Indonesian ice cream context.

5.1 Demand Shock Scenarios

Scenario A: Sudden Demand Surge (e.g., viral marketing success)

- Impact (assumption-based): Rapid increase in store orders; risk of stockouts and service delays. - Evidence-informed levers: - Use predictive analytics and real-time sales data to adjust production and distribution schedules, consistent with the benefits described in [4], [8], [9]. - Temporarily increase production line utilization and reallocate idle capacity, analogous to the utilization improvements observed in [4], though the exact percentage gain here is unknown. - Operational responses (Assumption-based): - Prioritize high-margin SKUs and simplify the menu temporarily. - Increase delivery frequency to high-performing stores; defer non-critical maintenance where risk is acceptable.

Scenario B: Demand Drop (e.g., economic slowdown or new competitor)

- Impact (assumption-based): Lower throughput, rising unit costs due to underutilized capacity. - Evidence-informed levers: - Adjust raw-material ordering and production schedules to avoid overstocking and waste, as demonstrated in [8]. - Use forecasting to adjust workforce and logistics capacity, consistent with predictive-analytics applications described in [9]. - Operational responses (Assumption-based): - Introduce limited-time offers to stimulate demand. - Explore contract manufacturing or third-party sales channels to utilize excess capacity.

5.2 Supply Shock Scenarios

Scenario C: Raw-Material Disruption (e.g., dairy shortage or price spike)

- Impact (assumption-based): Higher input costs, potential inability to produce core products. - Evidence-informed levers: - Centralized procurement and vertical integration can secure material stability and lower costs in at least one new tea industry case [10], [11]. - A diversified supplier base and safety stocks, supported by optimized storage utilization [8], are consistent with general risk-management practice. - Operational responses (Assumption-based): - Reformulate recipes to use alternative ingredients where feasible and compliant with regulations. - Temporarily adjust pricing or portion sizes to protect margins.

Scenario D: Cold-Chain Disruption (e.g., power outage, vehicle breakdown)

- Impact (assumption-based): Product spoilage risk, stockouts at stores, reputational damage. - Evidence-informed levers: - Temperature monitoring and RFID-based tracking in cold-chain logistics can help detect and isolate compromised batches [15]. - Data-driven contingency planning to reroute deliveries and reallocate inventory is consistent with the resilience framework in [4] and predictive-analytics applications in [9]. - Operational responses (Assumption-based): - Backup generators or battery systems at commissaries and key depots. - Service-level agreements with logistics partners for rapid replacement vehicles.

5.3 Illustrative Resilience Impact

Based on the data-driven framework s empirical results in a specific global supply chain [4], we can qualitatively compare resilience under different operational maturity levels. The table below is assumption-based for the ice cream context, using [4] only as a conceptual reference.

Assumption-based, informed by [4]:

Operational Setup	Resource Utilization	Relative Resilience (Recovery Time)	Notes
Traditional, manual planning	Low-Medium	Baseline (longer recovery)	Limited visibility; reactive responses.
Forecast-driven, basic analytics	Medium	Improved (moderate recovery)	Better scheduling and inventory control [8], [9].
Integrated, data-driven framework	High	Strong (shorter recovery; [4] reports ~25% improvement in its case)	Optimized idle capacity, dynamic reallocation, real-time monitoring.

The relative ordering (traditional < basic analytics < integrated data-driven) is conceptually supported by [4], [8], [9], but the exact magnitude of improvement for an Indonesian ice cream franchise is unknown.

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6. Conclusion and Recommended Next Steps

6.1 Key Conclusions

Within the limits of the available evidence and the analogies used:

1. Centralized, data-informed operations are likely to be beneficial. Evidence from food and beverage manufacturing and global supply chains indicates that warehousing improvements, raw-material scheduling, and predictive analytics can improve efficiency and resilience in the studied contexts [3], [4], [8], [9]. Applying these principles to an Indonesian ice cream franchise is an informed assumption, not a tested result. 2. Cold-chain reliability and quality control are critical risk areas. RFID and digital monitoring have been shown to strengthen cold-chain control in general food logistics [15], and case studies of beverage franchises illustrate the consequences of quality-control failures [11]. The specific impact for an Indonesian ice cream franchise would depend on design and execution. 3. Capital structure and financing require careful consideration. Indonesian evidence indicates that borrowing costs significantly influence capital structure [2], and optimal debt ratios vary by firm [1]. General capital-structure theory emphasizes aligning debt-equity mix with cash-flow stability [7]. These insights can inform, but do not determine, the optimal financing strategy for an ice cream franchise. 4. Sustainability and packaging can be strategic levers. Innovation, efficient supply-chain management, and green packaging are associated with improved sustainable performance in Malaysia s food and beverage sector [12]. It is reasonable, though not empirically confirmed here, to expect similar pressures and potential benefits in Indonesia. 5. Scenario-based planning and data-driven tools can support resilience. Data-driven frameworks have improved resource utilization and resilience in at least one documented case [4], and predictive analytics is widely advocated for managing demand and supply variability [9]. The exact gains for an Indonesian ice cream franchise are uncertain, but the direction of impact is likely positive.

6.2 Recommended Next Steps

The following steps are recommendations based on assumptions, informed by but not dictated by the cited literature:

1. Design and Pilot the Operating Model

- Establish a pilot commissary and a small cluster of franchised stores in one or two urban regions (assumption-based). - Implement centralized production of base mixes, standardized store processes, and basic cold-chain monitoring, drawing conceptually on centralized models in beverage chains [10], [11]. - Use the pilot to observe actual capacity utilization and refine SOPs, rather than relying solely on assumed targets.

2. Build a Data and Analytics Capability

- Implement systems to capture sales, inventory, and temperature data across the network (assumption-based). - Start with demand forecasting and raw-material scheduling, leveraging approaches shown to improve storage utilization and reduce stock issues in a food and beverage company [8] and supported by predictive-analytics literature [9]. - Progressively consider more integrated, data-driven frameworks for capacity and logistics optimization, taking [4] as a conceptual reference while validating locally.

3. Develop a Cold-Chain and Warehousing Policy Framework

- Define standards for storage temperatures, handling procedures, maintenance, and space utilization, taking inspiration from warehousing policy frameworks in food and beverage manufacturing [3]. - Evaluate RFID or equivalent technologies for product and temperature tracking, informed by their discussed role in food cold chains [15]. - Consider, cautiously, whether shared or collaborative distribution arrangements could be beneficial, inspired by shared distribution models that improved efficiency in express delivery [13], while recognizing that empirical evidence for cold-chain ice cream distribution is lacking.

4. Establish Quality and Franchise Governance

- Create detailed SOPs for food safety, hygiene, and equipment maintenance at store level (assumption-based, consistent with general franchise practice). - Implement training and certification for franchisees and staff, with regular audits and transparent reporting, to mitigate the types of quality issues observed in some beverage franchises [11]. - Define clear consequences and remediation processes for non-compliance; the effectiveness of such governance would need to be monitored empirically.

5. Plan Capital Structure and Financing

- Develop a phased investment plan for commissaries, logistics, and IT (assumption-based). - Assess borrowing options and costs, considering the negative impact of high borrowing costs on capital structure observed in Indonesian real estate firms [2]. - Target a moderate leverage level consistent with expected stability of franchise fee and product revenue, referencing the principle of optimal debt-equity balance [1], [5], [7], while recognizing that the optimal ratio for this business must be determined through detailed financial modeling rather than inferred from other sectors.

6. Integrate Sustainability from the Outset

- Evaluate green packaging options and recycling programs, supported by evidence that green packaging and supply-chain innovation are linked to better sustainable performance in Malaysia s F&B; sector [12]. - Track environmental KPIs (energy use, waste, packaging footprint) alongside financial metrics; the specific targets and trade-offs will need to be established empirically for the Indonesian context.

By following these steps, an Indonesian ice cream franchise can begin to build a scalable, resilient, and cost-conscious operations platform. However, many of the recommendations are extrapolated from other sectors and countries; local pilots, data collection, and iterative refinement will be essential to validate and adjust these assumptions for the Indonesian ice cream market.

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