DIJEFA: Dinasti International Journal of Economics, Finance & Accounting
https://dinastipub.org/DIJEFA dinasti.info@gmail.com +62 811 7404 455
E-ISSN: 2721-303X
P-ISSN: 2721-3021
DINASTI PUBLISHER
DOI: https://doi.org/10.38035/dijefa.v7i3

Strategic Timing of Retail Expansion Based on Store Performance: A Study Case of Harmonis Swalayan

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Abstract: Independent supermarkets increasingly face challenges in sustaining growth amid intensifying retail competition. This study evaluates the capacity and demand of Harmonis Swalayan, a supermarket in Pontianak, West Kalimantan, by integrating operational capacity assessment with demand forecasting. Using internal operational and sales data from 2023–2025, the analysis employs six capacity indicators, Monte Carlo simulation for checkout queuing, and five time-series forecasting methods. The findings reveal significant capacity constraints: SKU density reached 1.55, indicating inventory exceeded shelving capacity by 55%; supplier compliance declined from 120.5% in 2023 to 96.9%; checkout utilization during peak hours reached 0.94, with nearly two-thirds of customers waiting more than five minutes. Among the forecasting methods, decomposition achieved the highest accuracy (MAPE = 2.8%), projecting transactions to increase from 833,875 in 2025 to approximately 917,500 in 2026 and 999,400 in 2027. A projected 10% traffic increase would push checkout utilization beyond full capacity, indicating that expansion is already overdue. The analysis recommends adding approximately 578 m² of selling space through a second store. These findings demonstrate that retail expansion decisions should integrate both capacity and demand analyses rather than relying solely on managerial intuition.

Keywords: Retail Expansion, Strategic Timing, Store Capacity Analysis, Demand Forecasting, SKU Density.

INTRODUCTION

Supermarkets that are in a changing retail environment depend heavily on their physical capacity and can be seen as the key to commercial success. The selling area, shelving arrangement, warehouse storage, and checkout facilities all determine the range of products to sell, stock and number of customers in a store. It is then capacity that doesn't merely matter for the business but is strategic. And when a store is at its physical limits, any demand can't be translated into sales, the supplier orders can't be fulfilled and the growth doesn't come despite a growing customer base. For up-and-coming independent retailers struggling against well-funded chains, these challenges easily destroy customers and power for business negotiations.

The retail landscape in Indonesia exemplifies this challenge. After a decline in store-based retail sales during the pandemic, the store-based retail market is strengthening and predicted to grow at 8.1% compound annual rate from 2022 to 2026 and increase from USD 109.6 billion in 2022 to USD 149.9 billion in 2026 (Agriculture & Agri-Food Canada, 2022). The recovery is also reflected in monthly performance metrics, for instance, the national retail sales index rose back to 222.5 by July 2025 and was about 177 during the downturn between 2020-2021 (Bank Indonesia, 2025). But these structural pressures are also more challenging for smaller retailers: national and franchise chains expand with more capital resources, larger product ranges and established supply chains, forcing independents to compete for price and product availability without the same economies of scale (Deloitte, 2023). Retailers unable to align their capacity with market expansion are left in a state of stagnation due to these structural constraints (OECD, 2022). So how much to expand and how much to grow is critical to competitive success rather than just an operational decision.

As much as physical and operational capacity has been emphasized in past research for the purpose of retail performance, there has always been a need for different research to study them separately. Research on retail spatial design shows that selling space layout and visibility impact shopper behavior and sales results (Astarini & Utomo, 2025) and the physical space is the most significant factor driving store productivity. Research on warehouse operations shows that in-house congestion or slotting efficiency impact inventory flow (Hackman & Natarajan, 2001; Roodbergen & Vis, 2009), warehouse space usage leads to operational challenges (Grosse & Glock, 2015) and capacity planning can help in addressing physical limitations (Gu et al., 2010; Heragu et al., 2005). And assortment management literature is much more centered on SKU variety and shelf placement (Ailawadi & Farris, 2017; Hübner & Kuhn, 2012) where slotting optimization is demonstrated to make restocking more effective (Hsieh & Huang, 2011).

Commercial relationships are also explored in this context. The dynamics of supplier-retailer relationships are examined in the literature, and volume commitments and reliability are key for maintaining good partnerships (Claro et al., 2003; Ganesan, 1994; Mentzer et al., 2001), and market structures of emerging countries in which large-format retailers are competing against smaller ones (Javorcik & Li, 2008). In addition, demand forecasting research gives insights for forecasting demand levels, with grocery sector research considering forecasting to be a part of distribution planning (Seidel et al., 2021) and global forecasting studies making systematic comparisons of time series and their accuracy (Boyko & Salabay, 2026; Hyndman & Athanasopoulos, 2021). Lastly, research on retail location points to various socio-demographic factors in store sales, and gives criteria for site assessment (Formánek & Sokol, 2022; Lu et al., 2024), and growth strategies in terms of organic versus franchised expansion (Sadovnikova et al., 2023).

Despite the great scope of this literature there is a significant gap in research. Because each stream confines itself to a single dimension, none provides a combined diagnosis of when a store has reached its overall capacity ceiling. Warehouse research does not connect backroom congestion to sales stagnation or supplier compliance; assortment research assumes that shelf space can be adjusted freely and offers little guidance once space is saturated; supplier-relationship research overlooks the operational barriers that prevent a retailer from meeting volume targets even when demand exists; forecasting research projects demand without tying it to a fixed physical capacity; and location and growth-mode research treat the choice of where and how to expand separately from any internal evidence that expansion is in fact warranted. More specifically, limited research has examined how converging capacity indicators and a demand projection can jointly determine not only whether a store has reached its limit, but when, at what scale, and in what form it should expand. In addition, few of these studies are set in the independent, single-store supermarket segment of an emerging-market secondary city, where expansion is capital-intensive and difficult to reverse and where capacity constraints bind more tightly than in the large-format or multi-outlet contexts most often studied.

Harmonis Swalayan, an independent supermarket operating in Pontianak, West Kalimantan, provides a relevant case for examining this issue. Opened in January 2020 as a family business, the store carries over 31,201 active SKUs across an 800 m² selling floor and has become one of the four most visited supermarkets in the city. Its market environment is favourable: Pontianak's population reached 686,019 in 2025 (Badan Pusat Statistik Kota Pontianak, 2025), its adjusted per capita expenditure of approximately Rp16.7 million per person per year is the highest among all regencies and cities in West Kalimantan (Badan Pusat Statistik Kota Pontianak, 2026), and its Human Development Index of 82.80 in 2025 is the only "very high" rating in the province (Badan Pusat Statistik Provinsi Kalimantan Barat, 2026). With this demand base, internal data shows that quarterly sales jumped from Rp24.99 billion in Q1 2023 to Rp40.1 billion by Q1 2025, before the momentum waned. Customer transactions also plateaued during this period despite the strong demand. This stagnation suggests that there are physical constraints rather than market demand that should help us to question expansion timing in this context.

Based on these findings, the study pursues four sequential objectives, progressing from capacity diagnosis to expansion decision-making. First, it assesses the magnitude of the existing capacity gap by evaluating current operational performance alongside projected future demand. Second, it identifies the appropriate timing for expansion by comparing operational capacity limits with anticipated customer growth. Third, it determines the scale of expansion required to eliminate existing shelf capacity constraints. Finally, it proposes an implementation strategy to support efficient and effective execution of the expansion plan.

This research differs on three dimensions: First of all, it provides empirical insight on how capacity assessment, demand forecasting and expansion decisions are made in an independent supermarket in a rapidly developing secondary city (where capital is very important). It also compares the trend-only model to seasonal forecasting with real transaction data, and shows that it is better to take forward projections, rather than just fitted ones, into account when historical series are very short. Finally, it proposes a unified analytical framework that combines capacity indicators with demand forecasts to form a single decision system, and where it can be used to determine the appropriate time, scale and expansion. By making diagnostic indicators repeatable early warning systems, this approach fills a gap in capacity measurement and demand forecasting and expansion planning, which are usually considered separately and not linked in managerial contexts.

METHOD

Research Design and Data Sources

This study employed a quantitative descriptive-evaluative case study approach to examine the integration of capacity analysis, demand forecasting, and expansion decision-making within a retail business context. A case study design was selected because the analysis required business-specific operational data that could not be adequately captured through a cross-sectional approach. Furthermore, key retail characteristics, including sales space, product assortment, storage capacity, and customer flow, vary substantially within a single retail setting (Yin, 2018). The quantitative approach enabled the empirical measurement of retail capacity conditions (Heizer et al., 2020; Jacobs & Chase, 2018), thereby providing an objective basis for expansion decisions rather than relying solely on managerial judgment.

Internal operational data from Harmonis Swalayan covering the period from January 2023 to December 2025 were analyzed. Internal data were selected because the study focused on the store's physical and operational constraints, which could only be accurately evaluated using company records. The dataset included sales and point-of-sale transactions, inventory and purchasing records, physical store layout information, supplier contracts and target volumes, and direct CCTV observations of checkout operations during peak trading periods. Two temporal resolutions were adopted according to the analytical objectives. Quarterly data were used for capacity assessment to evaluate operational performance over time, whereas monthly data were employed for demand forecasting to capture underlying trends and seasonal patterns. The monthly dataset consisted of 36 observations spanning 2023–2025, while the quarterly dataset provided complementary information for evaluating capacity performance.

Analytical Stages

The analysis process consisted of four consecutive stages in order to create a cohesive decision-making framework.

In the first phase, six capacity indicators were taken from the data of the store and compared to well-established data, including space productivity, SKU density and shelf capacity of the store, warehouse, supplier targets, basket size and customer throughput. Prior to making decisions, the assessment was guided only by a set of criteria. This evaluation of checkout performance was based on Monte Carlo simulations for waiting lines, rather than on theoretical distributions, where arrival times and service times were measured using empirical frequency distributions and sampled from multiple replications.

The second phase is to predict future demand by applying five different methods on monthly transaction data: linear trend analysis, moving averages, Holt's method (double exponential smoothing), classical decomposition, Holt-Winters. The models were selected mainly based on mean absolute percentage error (MAPE) but also mean absolute deviation (MAD) and mean squared deviation (MSD). The forward projections are then made plausible.

In the third phase, each of the indicators were combined to make a comprehensive capacity diagnosis through the analysis of their convergence. This minimizes the risk of misdiagnosis that could arise from a single metric. The last phase then turned this diagnosis into decisions regarding expansion in a systematic way: when to start, how much of the selling space must be expanded, and when and how it should be expanded? Table indicates how each focus is different depending on the stage of the analysis, methodology and expected outcome.

Table 1. Mapping of Analytical Focus, Stages, Methods, and Expected Outputs

Analytical Focus	Analytical Stage	Primary Method / Metric	Expected Output
Capacity gap	Capacity indicator computation and integration of findings	Sales/m²; SKU density; Storage Capacity Factor; compliance rate; basket average; Monte Carlo queueing simulation; MAPE, MAD, MSD	Size of the current capacity gap established through converging indicators
Expansion timing	Expansion-timing assessment against the two-condition rule	Demand forecast projection combined with peak-hour traffic intensity (ρ) and capacity lead time	Point at which expansion must begin for capacity to arrive in time
Expansion scale	Scale design for the binding shelf constraint	Target SKU density; slot, shelf-length, and floor-area conversion; headroom analysis	Additional selling area required, separated into baseline deficit and forecast-driven buffer
Implementation plan	Form comparison and implementation sequencing	Scenario comparison; selective assortment design; indicator-based monitoring thresholds	Effective, efficient, and sustainable implementation plan

Source: Author’s methodological framework based on the research design and analytical procedures.

Core Equations and Decision Rules

In this study, capacity diagnosis is based on converging indicators, where no single indicator is taken to be very good. A store is said to have reached its capacity only when independent indicators agree on the same finding. The following equations describe the measures and the interpretation rules for their results.

Space productivity assesses how well the sales floor turns physical space into revenue:

$$\text{Space Productivity} = \text{Total Sales} \div \text{Selling Area } (m^2) \tag{1}$$

A store is considered to have reached its spatial limit when sales per square meter plateau or decline after a period of consistent growth, even if transaction numbers are rising. If sales are still increasing, there is still space available.

Shelf capacity and SKU density determine whether the active product assortment fits within the available shelving space:

$$\text{Shelf Capacity} = (\text{Total Shelf Length} \times \text{Shelf Levels}) \div \text{Average SKU Width} \tag{2}$$

$$\text{SKU Density} = \text{Active SKUs} \div \text{Shelf Capacity} \tag{3}$$

Since one slot represents one standard width facing, a density of 1.0 means that each SKU occupies exactly one standard facing. Values exceeding 1.0 indicate that the assortment surpasses the display shelving's capacity; values below 1.0 indicate that there is more buffer space.

Warehouse utilization is assessed using the Storage Capacity Factor (SCF), which is evaluated against the working buffer for replenishment and larger orders:

$$SCF = \text{Actual Stored Volume} \div \text{Total Storage Capacity} \tag{4}$$

The warehouse is considered to be effectively at its capacity when SCF is high and available space is always filled with essential stock, with little usable buffer.

Supplier compliance evaluates whether any shortfall in achieving purchase targets is the result of physical limitations instead of low demand:

$$\text{Compliance Rate} = \text{Actual Purchase Volume} \div \text{Supplier Target Volume} \times 100 \tag{5}$$

A decline or stagnation in compliance while transaction levels are stable or growing serves as an indication that physical constraints, rather than demand issues, are limiting purchasing performance.

Basket average indicates whether physical conditions in the store are hindering customer purchases during a single visit:

$$\text{Basket Average} = \text{Total Sales} \div \text{Number of Transactions} \tag{6}$$

A relatively unchanged basket average with increasing transaction counts indicates that this physical factor is limiting the purchasing ability.

Customer throughput is evaluated through multi-server queue measures based on observed checkout parameters. First, the service rate per cashier (μ) and arrival rate (λ) are converted to hourly measures, leading to traffic intensity (ρ):

$$\rho = \lambda \div (s \times \mu) \tag{7}$$

Here, s is the number of cashier lanes open. A traffic intensity of ρ greater than 1.0 indicates that customer arrivals are higher than checkout clearing rates, causing a waiting line to be very long (Jacobs & Chase, 2018). Checkout processes are considered a bottleneck if the utilization rate and the number of customers waiting beyond acceptable service thresholds exceeds the maximum during peak times.

Forecast accuracy was evaluated using Mean Absolute Percentage Error (MAPE) as the primary measure of relative accuracy, with Mean Absolute Deviation (MAD) and Mean Squared Deviation (MSD) used as complementary measures of absolute deviation and sensitivity to large forecasting errors, respectively:

$$MAPE = (1/n) \cdot \Sigma\, |At - Ft| \,/\, At \times 100 \tag{8}$$
$$MAD = (1/n) \cdot \Sigma\, |At - Ft| \tag{9}$$
$$MSD = (1/n) \cdot \Sigma\, (At - Ft)^2 \tag{10}$$

In this case, At indicates actual demand in period t, Ft represents forecasted demand in period t and n is the number of observations.

Finally, expansion scale converts target density into physical area based on the store's specific layout:

$$\text{Slots Required} = \text{Active SKUs} \div \text{Target Density} \tag{11}$$
$$\text{Additional Shelf Length} = (\text{Additional Slots} \times \text{Average SKU Width}) \div \text{Shelf Levels} \tag{12}$$
$$\text{Additional Selling Area} = \text{Additional Shelf Length} \times (\text{Selling Area} \div \text{Total Shelf Length}) \tag{13}$$

The final conversion ratio reflects the ratio between floor space and shelf height for each store configuration and includes aisles and circulation areas rather than external planning standards.

Benchmark Definition and Validation Procedures

The expansion timing adopted in this study was based on capacity management literature. Retail expansion is recommended when two conditions are met simultaneously: (1) capacity indicators consistently demonstrate that demand has exceeded the store's operational limits, and (2) demand forecasts indicate that the imbalance is expected to persist or intensify rather than diminish (Jacobs & Chase, 2018; OECD, 2022). Accordingly, expansion timing should not be interpreted as a predetermined calendar date but rather as the point at which store capacity becomes saturated while demand continues to grow beyond the store's ability to accommodate additional customers.

Several validation procedures were implemented to enhance the reliability of the analysis. Physical measurements of shelf space were conducted across all 23 gondola sections rather than estimated from layout plans. Average SKU width was calculated from 130 product measurements representing different merchandise categories. Checkout observations were performed during peak trading hours with all seven cashier lanes operating simultaneously, confirming that checkout capacity had reached its practical limit rather than being constrained by staffing shortages. Supplier compliance was evaluated alongside customer demand to determine whether stock shortages resulted from capacity limitations rather than insufficient demand. Forecasting models were assessed not only by their historical goodness-of-fit but also by the plausibility of their future projections, with forecast outputs compared against historical performance trends.

This study focused on a single-company case to evaluate store performance as a basis for expansion decisions. Consequently, the findings should be interpreted within the operational context of Harmonis Swalayan. Additional analyses, including location feasibility assessment, capital investment requirements, and expected financial returns, would be necessary before determining the most suitable expansion strategy. Future research may extend this framework by incorporating comprehensive financial feasibility analysis, longer forecasting horizons, and location-specific demand models to improve the generalizability of the findings.

RESULTS AND DISCUSSION

Capacity Diagnosis: Physical Saturation

The preliminary analysis indicated that the performance stagnation of Harmonis Swalayan was not attributable to a single capacity constraint but rather to a combination of structural limitations in the store's physical layout. These challenges cannot be effectively addressed through incremental improvements alone. Instead, a comprehensive assessment is required to examine the interactions between space constraints, operational capacity, and overall business performance.

Space productivity is the first indicator of saturation. With an 800 m² sales area, the revenue per square meter increased from Rp31,233,750 in Q1 2023 to Rp44,860,244 in Q4 2024, a 43.6% increase in two years. But starting in Q1 2025, this trend stopped: revenue per m² fluctuated only in a limited range between Rp46,015,790 and Rp50,125,279 and did not achieve a sustained increase. The change of this growth to a new plateau indicates that the selling space has reached its productive limit at this stage and that there is no possibility to make any additional income from the current area even though it is still operating.

SKU density is an indication of this. 23 gondola sections were measured and a total shelf length of 420.32 m was obtained. The six levels of shelf space in the store and average SKU width (12.54 cm) have been estimated from 130 products, which amounts to (42,032 cm × 6) ÷ 12.54 = 20,107 slots in the shelf space. Then for the total number of SKUs (31,201), the density ratio is 31,201 ÷ 20,107 = 1.55. The store is therefore at 55% more SKUs than the shelving is able to hold. The direct operational impact is that less product visibility arises as products are overcrowded or compressed below the standard facing widths of the product; it becomes more difficult to sort out categories; replenishment takes longer; and there is no available capacity to develop new SKUs without removing the existing ones.

The warehouse capacity also confirms that this is true in storage facilities. Three warehouses of the store cover a total floor area of 1,088 m² and are fully utilized, with an optimum utilization of 85%, a SCF of 0.85 and 15% to cover incoming deliveries and seasonal stock build-up as well as an emergency restocking need. At present, this is all the buffer stocks of essential goods (cooking oil and rice) to support the supply chain and price stability. As a result, the warehouse is operating at its maximum capacity and there is little room left in the storage for extra inventory, so the store has to make those smaller orders more often and is also more likely to be in a situation of stockout during the peak demand phase.

Capacity Diagnosis: Commercial and Operational Consequences

Supplier compliance illustrates how physical capacity constraints can influence commercial performance. Supplier compliance was evaluated for six major suppliers over the 2023–2025 period (Table 2). Purchase targets were not determined solely by the store's physical size but were established based on external commercial considerations, including sales growth in the previous year, regional demographic changes, new product launches, and national sales targets cascaded to the store level. These factors continuously increased procurement targets in line with market growth, resulting in higher agreed purchase volumes each year regardless of whether the store possessed sufficient selling and storage capacity to accommodate the additional inventory.

Table 2. Supplier Compliance Rate by Year (2023–2025)

Supplier	2023	2024	2025	Change 2023–2025
Supplier A	132%	112%	104%	–28 pp
Supplier B	116%	109%	93%	–23 pp
Supplier C	115%	103%	92%	–23 pp
Supplier D	124%	104%	94%	–30 pp
Supplier E	106%	108%	103%	–3 pp
Supplier F	129%	102%	95%	–34 pp
Average	120.5%	106.5%	96.9%	–23.6 pp

Source: Author's analysis based on Harmonis Swalayan internal purchasing records and supplier agreements, 2023–2025.

In 2023, all six suppliers achieved their targets with an average compliance rate of 120.5% and stores handled their purchased volumes well. But compliance began to fall away thereafter and declined to 106.5% in 2024 and 96.9% in 2025. Four out of six suppliers failed to meet the benchmark of 100%, and only Suppliers A and E were above-target with sales and transactions growth of 104% and 103% respectively. This continued decline of nearly all suppliers, as the supply has been taken into account, was not caused by a decrease in demand but rather to receive, store and display more stock. If this is neglected, trading relations will be compromised and there are no trade opportunities and no priority allocations and promotional support.

The average basket size also shows that transactions are constrained in terms of individual transactions. The expenditure per transaction increased from Rp162,429 in Q1 2023 to a high of Rp192,026 in Q1 2025 before stabilizing at Rp186,733 by Q4 2025 even as transactions continued to grow. With overcrowded shelves and narrow aisles preventing unplanned items from being added to the basket size, while the store can still handle more transactions overall, it can no longer increase every transaction significantly.

The customer throughput highlights the constraints at the end of the customer experience. Checkout efficiency was evaluated by a Monte Carlo waiting-line simulation based on direct CCTV observations during peak trading periods when all seven cashier lanes were confirmed open and staffed. The observed metrics and subsequent queue results are summarized in Table 3.

Table 3. Observed Checkout Parameters and Simulated Performance (Peak Hours)

Parameter / Metric	Value	Interpretation
Average service time per transaction	146.7 sec	$\mu = 3{,}600 \div 146.7 \approx 24.5$ transactions/hour per cashier
Average arrival interval per lane	155.5 sec	23.1 customers/hour per lane
Number of cashier lanes open	7	$\lambda = 23.1 \times 7 = 162$ customers/hour
Cashier utilisation (ρ)	0.94 (94%)	$\rho = 162 \div (7 \times 24.5)$; almost no spare capacity
Customers waiting longer than 5 minutes	66%	Exceeds the store's internal service-level target
Average waiting time	≈ 9.5 minutes	Congestion whenever arrivals cluster
Maximum waiting time	≈ 42 minutes	Direct risk of queue abandonment

Source: Author's Monte Carlo simulation based on CCTV observation of Harmonis Swalayan checkout operations during peak trading hours.

A traffic intensity rating of 0.94 means that the checkout system operates at 94% capacity during peak times and the store has little reserve capacity for dealing with the change in customer arrival. When the system is close to full capacity it is full of congestion and the simulated waiting times are high: approximately two-thirds of customers wait longer than five minutes, which is beyond the company's internal service-level goal, with peaks up to forty-two minutes. The two traditional solutions are not feasible: increasing cashier lanes is not possible because of the floor space and the point of sale system is already upgraded and works properly, so there is no technological improvement. In the past there have been so far no solutions to alleviate checkout congestion and therefore the store has no real way in which to get through that.

Demand Forecasting and Model Selection

Because the capacity indicators demonstrated that the store had already reached its operational limits, demand forecasting in this study was not intended to predict when capacity would be exceeded in the future. Instead, it was conducted to assess how rapidly the gap between increasing demand and fixed capacity would widen if no expansion measures were implemented. The monthly transaction series exhibited two notable characteristics: a clear upward trend, with transactions increasing by approximately 15% from 2023 to 2024 and a further 9% from 2024 to 2025, and a consistent seasonal pattern in which transaction volumes were lowest at the beginning of the year, followed by peaks during Ramadan and Eid al-Fitr (March-April, depending on the lunar calendar) and another peak in December. Based on these characteristics, two seasonal forecasting methods appeared particularly suitable. Nevertheless, all five forecasting methods were evaluated and compared, with the results presented in Table 4.

Table 4. Forecast Accuracy Comparison Across the Five Candidate Methods

Forecasting Method	MAPE (%)	MAD	MSD	Seasonal Component
Linear (Trend Analysis)	4.0	2,518.9	11,159,691.7	No
Moving Average (length 3)	4.2	2,747.5	14,093,183.0	No
Holt’s (Double Exponential Smoothing)	4.7	2,979.3	13,532,577.3	No
Decomposition	2.8	1,799.2	5,853,338.8	Yes (selected)
Holt-Winters	3.2	2,029.2	7,577,071.2	Yes

Source: Author’s analysis based on Harmonis Swalayan monthly transaction data (2023–2025), fitted in Minitab.

Two main conclusions can be drawn from the comparison. First, the seasonal forecasting methods outperformed the three trend-only methods across all evaluation metrics, indicating that the annual seasonal pattern was stable and provided meaningful predictive value. Second, among the seasonal methods, the decomposition model achieved the highest forecasting accuracy, with a MAPE of 2.8%, MAD of 1,799.2, and MSD of 5,853,338.8. Model selection, however, should not rely solely on historical goodness-of-fit, as accurate fitting does not necessarily guarantee reliable future forecasts. The observed data indicate a continuing increase in transaction volumes. Although the Holt–Winters model achieved comparable historical accuracy, it projected a decline in future transactions, which was inconsistent with the observed growth trend of the store. This discrepancy is likely attributable to the limited dataset, which contained only three seasonal cycles, the minimum required for seasonal modeling and insufficient to produce robust forecasts using the Holt–Winters method. This finding is consistent with the recommendation that forecasting models based on limited historical data should be evaluated not only by statistical accuracy but also by the plausibility of their future projections (Hyndman & Athanasopoulos, 2021). Consequently, the decomposition model was selected because it combined high forecasting accuracy with realistic future demand projections.

The selected model was then used to forecast monthly transactions for 2026 and 2027. The results are summarized quarterly in Table 5.

Table 5. Projected Quarterly Transactions Using the Decomposition Method (2026–2027)

Quarter	2026	2027
Q1	221,700	242,200

Q2	226,400	246,800
Q3	232,600	253,100
Q4	236,800	257,300
Annual total	917,500	999,400
Change vs. 2025 actual (833,875)	+10.0%	+19.8%

Source: Source: Author’s analysis based on Harmonis Swalayan monthly transaction data and decomposition forecasting, 2023–2025.

The forecast assumes that annual transactions increase from 833,875 in 2025 to about 917,500 in 2026 and eventually to about 999,400 in 2027 (about a 10% increase between 2025 and 2026) and 20% growth in total by 2027 and to some 5,000 transactions each quarter. This growth is significant especially since it happens when capacity is already fully used in selling areas, shelving units, warehouse space, and checkout stations. Thus, this forecast captures an increasing gap between demand and capacity that is growing with each passing quarter.

Integration of Findings: The Size of the Capacity Gap

The indicators discussed earlier do not represent any different problems but rather a chain of causal events resulting from the store's fixed physical dimensions. Table 6 shows a summary of each indicator against its benchmark.

Table 6. Summary of Capacity Indicators Against Benchmarks

Indicator	Key Finding	Benchmark	Status
Space productivity	Sales per m² rose 43.6% to Q4 2024, then plateaued at Rp46–50 million	Should keep rising if space is sufficient	Floor at its limit
SKU density	31,201 active SKUs against 20,107 shelf slots (ratio 1.55)	1.0 (one SKU per standard facing)	55% over capacity
Warehouse utilisation	Effectively full; the 15% buffer absorbed by rice and cooking-oil stock	Retain 15% usable buffer (SCF 0.85)	No usable buffer
Supplier compliance	Average fell from 120.5% (2023) to 96.9% (2025); 4 of 6 below target	At least 100%	Below target
Basket average	Peaked at Rp192,026 in Q1 2025, then flattened	Should rise with assortment growth	Cannot grow per sale
Checkout throughput	ρ = 0.94 at peak; 66% of customers wait over 5 minutes	Comfortably below full utilisation	Near breakdown
Demand forecast	917,500 (2026) and 999,400 (2027) vs. 833,875 (2025)	–	Gap widening

Source: Author’s consolidation of capacity indicator results based on Harmonis Swalayan internal operational data, 2023–2025.

This chain can be divided into three phases. At first, the store has reached a physical saturation: space productivity is plateauing, the product assortment is above shelf capacity by 55%, and the warehouse is essentially at full capacity. The second phase illustrates the commercial and operational implications of this saturation. With less space to receive and display more inventory, supplier compliance has dropped below 100%. Due to the lack of space and store size, basket size has not increased; and the checkout area cannot be extended in peak hours, peak-hour utilization is 0.94. Thus, these spatial limitations persist across all stages of operation: buying, merchandising, and checkout. In the third phase, the gap continues to widen rather than stabilize, with demand expected to exceed 10% and 20% over 2025 levels by 2026 and 2027 respectively.

Collectively, this evidence shows the size of the capacity gap: it is not a short-term problem but a current one and a problem for the future. The store has reached the shelf limit and the warehouse and suppliers' level of production are too low to meet its checkout target and demand is rising. This gap indicates that, with the current situation, just incremental change in the business would not be enough; physical expansion is needed. This is also a good example of a much broader literature that is well known for the general situation by warehouses, assortments, and supplier relationships to be saturated in their respective fields. The convergence of these, and the similarities in their analysis, indicates that this is a single constraint and not a group of problems.

Expansion Timing

The appropriate timing for expansion can be determined using the two-condition rule established in the methodology. Both conditions have now been satisfied. The capacity assessment indicates that the store has exceeded its shelving, warehouse, and checkout capacity limits, while the demand forecasts show that the gap between demand and available capacity will continue to widen rather than resolve naturally. Consequently, the key issue is no longer whether these capacity limits will be reached, but how soon expansion must begin to ensure that additional capacity becomes available before operational constraints further restrict business performance.

The checkouts analysis makes it much more specific rather than vague. As utilization increases with customer arrival during peak hours (if traffic grows according to projections), the expected 10% increase in 2026 would push peak utilization over 1.0 ($0.94 \times 1.10 \approx 1.03$). Once this threshold is reached, queueing theory suggests that waiting lines will not stabilize but will keep on growing, with customers coming faster than they can be processed through checkouts (Jacobs & Chase, 2018). So if not enough capacity is built in store, then this prominent constraint in store could break down in the first forecast year.

At this stage, timing goes from guidance to an imminent deadline. Physical capacity can't be expanded instantly; realistic lead times are around one year. Looking back, even if it is started just then, new capacity may not be operational in 2027, well after peak checkout pressure is reached in 2026. There is no flexibility in the scheduling, immediate action still means operating beyond checkout limits before any relief is available. So the perfect time for expansion is now, to be precise, a very recent one. Any delay will lead to several thousand transactions beyond the fixed store and delay the arrival date for new capacity beyond what is already required. This is the reality of linking forecasting to capacity ceiling estimates in the real world; forecasting only might indicate growth in the future, but forecasting with the capacity estimates alone means that the capacity is already tapped. If the capacity forecasts even include the prediction, the expansion process can become a time-based project with a time limit.

Expansion Scale

Scale is measured through SKU density because shelf overcrowding is the largest limitation and has to be addressed for expansion. This required scale is formed by two things: the deficit, which sets the minimum size, and the demand forecast of how much additional capacity should be added to avoid overcrowding within one or two years.

The baseline component size is the expansion relative to the current overcrowding. To reduce density from 1.55 to 1.0, it would take $31{,}201 \div 1.0 = 31{,}201$ slots - this represents an extra 11,094 slots beyond the current capacity. This is represented in the store's configuration measurements of the number of shelving spaces ($(11{,}094 \times 12.54 \text{ cm}) \div 6$ levels $= 232$ metres of new shelving. This is the store's ratio of 1.9 m² floor space per meter of shelving ($800 \text{ m}^2 \div 420.32 \text{ m}$), so that is an additional 441 m² of selling area. This is a bare minimum, and it does not solve the present overcrowding problem perfectly; introducing a new product would again require moving an existing item.

The buffer layer accounts for capacity requirements that are not captured by the baseline calculation. Although annual transaction volume is projected to increase by approximately

10%, active SKU growth typically occurs at a slower rate than transaction growth. Accordingly, a moderate annual assortment growth rate of 3–5% (approximately 900–1,600 additional SKUs) was assumed for capacity planning. The available headroom was estimated by dividing the buffer capacity by the projected number of new SKUs added each year. Table 7 presents the comparison of the resulting planning scenarios.

Table 7. Comparison of Target Density Scenarios

Scenario	Target Density	Slots Required	Additional Selling Area	Buffer	Approx. Headroom
Current	1.55	20,107	–	None	–
Minimum fit	1.00	31,201	≈ 441 m²	None	0 years
Modest buffer	0.95	32,843	≈ 506 m²	~1,642 slots (5%)	~1–2 years
Selected	0.90	34,668	≈ 578 m²	~3,467 slots (10%)	~2–4 years

Source: Author's calculation based on Harmonis Swalayan shelf measurements, SKU records, and decomposition forecast, 2023–2025.

A target SKU density of 0.90 was selected because it provides a buffer of approximately 3,467 slots (about 10% of total capacity), equivalent to an estimated 2–4 years of additional capacity under the projected growth rate. This level of capacity is expected to support sustainable operations throughout the forecast period. By comparison, a higher target density of 0.95 would provide only 1–2 years of additional capacity before overcrowding conditions re-emerge, despite requiring less selling space. For the selected target density of 0.90, the required capacity was calculated using the same conversion procedure: 31,201 ÷ 0.90 = 34,668 slots. This corresponds to an additional 14,561 slots, equivalent to (14,561 × 12.54 cm) ÷ 6 of shelving, resulting in an estimated requirement of approximately 578 m² of additional selling space based on a conversion factor of 1.9 m² per linear meter of shelving.

Thus the total is divided into two components: about 441 m² corresponds to the baseline deficit and 137 m² to the forecasted buffer layer. The first account is for overcrowding and the second keeps it full as demand increases over time. This kind of two-layer approach is different from the traditional assortment management approach of shelf space allocation that is fairly easy to adjust and can adjust to fit the physical space and will keep to the intended assortment trend, and not just put product places in the same range.

Form of Expansion and Implementation Plan

There are two options for 578 m² expansion: expand the existing store further or create a second Harmonis Swalayan in another part of Pontianak. Increasing on-site seems to be the most feasible way to increase demand and expand shelves; however, the problem is that this is not possible. Currently, the selling area is 800 m², and an increase to 578 m² would be a 72% increase. This would require adjacent land which is nearly half of the current space. Unfortunately, there is no such land behind the store, and one would have to purchase a residential block for the expansion to occur in the future, whereas the expansion would be blocked from the other side of the store as it is a business that does not sell. Scenario 1 is not a financial problem but a logistics problem, and there is no way to get more space on-site in the shortest time.

In comparison, having a second location completely avoids the issue of land and offers a number of advantages. Pontianak has 686,019 inhabitants in six districts, but one store is largely in its immediate vicinity as customers are not likely to travel far to shop. So much of the population in the city is outside the reach of the existing store. Many local supermarkets with multiple branches of the same sort are just one example, expanding across locations to cope with Pontianak's scattered people. With a second store, a lot of pressure from the current site would be removed, and supplier relations would be improved since there would be higher order volumes from two stores, so there would be no problem in compliance, and stock would be moved from one place to another. This also reduces operational risk on both sites and strengthens Harmonis's position in an environment where competitors are also launching new outlets. But there are some drawbacks: opening a second store takes far more capital than simply expanding an existing one; it may not have the traffic of existing foot traffic that the first one has; there might be risk if an unsuitable site is selected, and management is complicated.

Here, there is one important methodological component. The sales forecast is based on data on the current store and for a new store in the city. The new store is not forecasted to show sales but rather demand is higher than what can be met now and continues to rise. Sales continue to grow, and this retail format serves well in Pontianak with high purchasing power and the designation as very high HDI ratings (which are applicable to all of the city rather than only a few streets). Dense areas offer an opportunity if you want to expand; for example, West Pontianak has 152,894 inhabitants as compared to 124,249 in Pontianak Kota where the current shop is located, and is a good place to start a new trade area where you can build a personal customer base without depending on the existing store customers. According to retail location theory (Formánek & Sokol, 2022; Lu et al., 2024), specific demand assessments at specific sites must still be confirmed through dedicated feasibility studies before moving forward.

The implementation plan consists of two approaches: first, optimizing product assortment in the present store immediately (by assessing SKU performance metrics, removing slow-moving items from stock, reorganizing shelf displays to ease congestion) with no need for extra space (and thus temporary relief) in the interim before the second outlet is opened. The second is to find a new location, with two potential options: buying a former supermarket site is a quicker process with minimal investment and new shelving but requires due diligence on why there was no previous store and whether there is still demand for it after closure. But if you want to build on empty land on the former store site, that would be an expensive task with a long timeline (the residential zoning would need to be determined in plot-by-plot) and would be a longer process than buying, which is more in the current frame of time.

The proposed expansion strategy is intended to provide a sustainable long-term solution rather than a one-time intervention. Accordingly, three key measures are recommended. First, capacity should incorporate built-in buffers to maintain an SKU density of approximately 0.90, thereby reducing the risk of reaching maximum capacity shortly after expansion. Second, product assortment should prioritize best-selling product lines from each supplier rather than duplicating the entire SKU portfolio, thereby minimizing the risk of recurring overcrowding while reducing inventory investment. Third, the six capacity indicators used in the initial assessment should be integrated into a continuous monitoring system supported by the early warning thresholds and corresponding trigger actions presented in Table 8.

Table 8. Post-Expansion Capacity Monitoring Thresholds

Indicator	Warning Sign	What It Signals	Action Triggered
SKU density	Rises back toward 1.0	The shelf buffer is being used up	Plan the next shelf or space addition
Checkout utilisation (peak)	Approaches 0.85	Queues begin to build again	Add lane or cashier capacity
Space productivity (sales/m²)	Stops rising and plateaus	Selling floor nearing its limit again	Review space capacity
Warehouse utilisation (SCF)	Stays at or above 0.85 with no usable buffer	Storage filling up	Review storage capacity
Supplier compliance	Falls below 100% again	Purchasing outgrowing available space	Review storage and ordering
Basket average	Stalls while transactions keep rising	Assortment constrained once more	Review shelf capacity

Source: Author's framework based on the capacity indicators applied in the diagnosis stage.

By converting the diagnostic indicators into a routine monitoring tool, the store treats expansion not as a one-off event but as a repeatable decision: the same evidence that signalled the need to expand now signals, in good time, when the next capacity action is required. The plan is accordingly justified on three terms. It is effective, because it resolves the binding constraint at its source, adding the 578 m² the store cannot obtain on-site and directly relieving shelf, warehouse, and checkout saturation, while assortment optimisation provides interim relief. It is efficient, because it is sequenced to deliver relief quickly and at controlled cost through immediate optimisation, the faster acquisition route, a selective rather than duplicated assortment, and combined purchasing that restores supplier compliance through economies of scale. And it is sustainable, because the built-in buffer, the selective second-store assortment, and ongoing monitoring keep capacity ahead of demand over time. Given the level of commitment involved, the plan remains subject to approval by the owner and the board of commissioners and, for the second location, to the outcome of the dedicated location feasibility study.

CONCLUSION

This study demonstrates that retail expansion decisions at Harmonis Swalayan are more effectively addressed through an integrated capacity-diagnosis and demand-forecasting framework than through intuitive judgement or reactive response to visible symptoms. Through six capacity indicators, a demand forecast, and the decision to expand into a cohesive decision-making framework, this study provides a systematic approach for translating store performance metrics into a practical expansion strategy.

This indicates that the alignment of indicators is necessary before any expansion decision is made. The six indicators are not different but rather indicate the same causal sequence, which stems from the store's fixed physical layout. This physical saturation is accompanied by a shrinking space productivity, a density of SKUs of 1.55, and a warehouse that is nearly full; these are the consequences of declining supplier compliance from 120.5% to 96.9%, a shrinking average basket size, and peak checkout utilization of 0.94. Seasonal forecasting methods outperformed trend-only models but not enough to be used for model selection. For example, Holt-Winters produced a competitive mean absolute percentage error (MAPE) of 3.2% and generated a declining projection in the three-year data series because of the lack of seasonal cycles. Decomposition achieved a MAPE of 2.8%, which resulted in a very low error and a reasonably accurate future projection.

When applied to expansion decision-making, the proposed framework demonstrates that the existing capacity gap represents an immediate operational challenge rather than a future concern. Under the projected annual traffic growth of approximately 10% in 2026, peak checkout utilization is expected to exceed 1.0, while capacity expansion is estimated to require approximately one year of lead time. Consequently, expansion should be initiated immediately, as the optimal timing has already passed. The analysis indicates that approximately 578 m² of additional selling space is required, comprising a baseline requirement of 441 m² to eliminate the existing overcrowding and an additional 137 m² buffer to accommodate projected demand growth and provide 2–4 years of operational flexibility. Given the limited availability of adjacent land for physical expansion, establishing a second store represents the most appropriate strategy for increasing retail capacity while maintaining continuous operational monitoring.

Thus, this study is a strong endorsement of the notion that the timing of expansion of independent supermarkets should be an integrated system, which is how capacity is linked to demand rather than as one-to-one facility decisions. For retailers in today's modernizing and competitive markets, sustainable growth is not just about analytical skills but also managing skills that keep an eye on capacity and can be proactively corrected in advance of problems. However, this research is limited by the focus on one case and store performance is preferred over financial return. The strategic insights could be further developed in the future by conducting a detailed feasibility study and financial analysis in the selected location; re-evaluating all seasonal forecasting methods for an additional transaction history; creating demand models customized to the local catchment area and then monitoring the outcome in post-implementation to see if the actual results are the same as the expectations.

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