



ANALYSIS OF PURCHASE ORDERS AND PRODUCTION PLANNING ON SUPPLY TO DEMAND FULFILLMENT IN FOOD SMEs: A CASE STUDY OF SME SOTONG 315 TASIKMALAYA

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Abstract. Indonesian food Micro, Small, and Medium Enterprises (MSMEs) often face significant challenges in balancing supply and demand due to limited technological adoption and reliance on intuitive planning. This study aims to investigate the effectiveness of purchase orders and production planning in optimizing demand fulfillment at MSME Sotong 315, a local food producer in Tasikmalaya. Employing a descriptive quantitative research design, data were collected from the entire population of the firm (n=9) through structured questionnaires, in-depth interviews, and documentation of production logs. The analysis focuses on the consistency between planned targets and actual realization over a two-week period. Empirical results from August 28 to September 10, 2025, reveal that plan adherence averaged 97%, with a mean absolute percentage error (MAPE) of 3.2%. These figures indicate a high degree of scheduling stability and process reliability, despite the absence of sophisticated ERP systems. However, minor inefficiencies were observed during peak demand fluctuations. Consequently, this study recommends that while current manual methods are effective, efficiency can be further enhanced by stabilizing safety stock levels and adopting more flexible, demand-driven scheduling protocols. The research contributes to operations management literature by validating that rudimentary planning tools can sustain high performance in resource-constrained environments.

Keywords: purchase orders; production planning; supply-demand fulfillment; MSMEs; food industry.

1. Introduction

Micro, small, and medium enterprises (MSMEs) absorb the majority of Indonesia's workforce and are central to regional value creation. Food MSMEs grow rapidly because food products have stable demand and relatively low entry barriers; nonetheless, many operate with constrained capital, limited staff, and simple information systems. Under such constraints, production scheduling and raw-material ordering are often handled reactively. The consequences are familiar: stockouts of key inputs, idle time, overtime, and delivery delays that erode customer trust.

Operations-management literature emphasizes that two managerial levers—purchase ordering and production planning directly shape service performance. Timely, quantity-accurate purchase orders ensure materials arrive before they are needed and in sufficient volume, while a capacity-feasible production plan sequences tasks to utilize resources efficiently. However, many MSMEs lack formal policies such as safety stock, reorder points, and rolling schedules. This creates a gap between demand signals and the enterprise's response.

Many food MSMEs operate with short planning horizons, minimal buffers, and manual record-keeping. In such settings, even small delays in raw-material deliveries or minor schedule deviations can cascade into stockouts, overtime, and late shipments (Slack, Brandon-Jones, & Burgess, 2020; Stevenson, 2021). Prior studies show that purchase ordering and production planning jointly shape service performance by

synchronizing material availability with capacity-feasible execution (Goyal, Kumar, & Singh, 2023; Zhang, Li, & Chen, 2020). This study contributes by (i) operationalizing a lightweight set of indicators owners can track weekly (Slack et al., 2020); (ii) illustrating how reorder points and a rolling daily schedule can be combined for short lead-time contexts (Chopra & Meindl, 2021; Heizer & Render, 2020); and (iii) quantifying performance through fill rate, plan adherence, and absolute percentage error (Chopra & Meindl, 2021; Stevenson, 2021). The focus is an SME in Tasikmalaya producing frozen squid-based products typical conditions for local MSMEs in Indonesia (Khumairo, Rahmadani, & Lestari, 2025).

Instrument development and validity. Indicators used five-point Likert scales (1–5). Constructs for Purchase Orders (timeliness, quantity accuracy, frequency alignment, supplier coordination), Production Planning (schedule accuracy, capacity alignment, flexibility, utilization), and Demand Fulfillment (availability, on-time delivery, quality, satisfaction) were adapted from operations and supply-chain management sources (Slack et al., 2020; Chopra & Meindl, 2021). Content validity was reviewed by the owner and a supervisor; a short pilot ensured clarity. Internal consistency was assessed and items with weak item–total correlations were earmarked for revision (Stevenson, 2021).

Procedure and ethics. Data were collected via on-site observation, semi-structured interviews, and short questionnaires; secondary records (plan vs. realization; purchase logs) were extracted from routine sheets. Triangulation across sources was used to corroborate findings, following practices in SME scheduling case studies (Lestari, 2022; Putra & Sari, 2021).

Based on the operational challenges identified, this study aims to evaluate the effectiveness of purchase orders and production planning in fulfilling market demand at MSME Sotong 315. Specifically, it analyzes how raw material procurement and daily scheduling correlate with production output stability. By using a quantitative descriptive approach, this research seeks to determine whether the current simple planning methods are sufficient to meet fluctuating demand or if significant gaps remain in the fulfillment process.

This study contributes to the operations management literature by providing empirical evidence from the unorganized food sector in Indonesia, which is often underrepresented in mainstream supply chain studies. Unlike previous research that focuses on complex ERP systems in large manufacturing firms (Slack et al., 2020; Heizer & Render, 2020), this research highlights how micro-enterprises maintain plan adherence using rudimentary tools. The findings offer practical insights for small-scale food producers on optimizing supply-to-demand fulfillment without heavy investment in technology.

2. Research Method

Design. The study adopts a quantitative descriptive design. Rather than hypothesis testing, the analysis characterizes current practices and performance using structured indicators to support managerial recommendations.

Setting and participants. The research was conducted at MSMEs Sotong 315 (Tasikmalaya). Nine employees including the owner are involved across purchasing, production, and delivery. Total sampling was used so that all nine members provided inputs through interviews, observations, or questionnaires.

Variables and indicators. Purchase Orders (X1) capture timeliness of orders, accuracy of ordered quantity, order frequency consistency with demand, and supplier

coordination. Production Planning (X2) captures schedule accuracy, capacity–demand alignment, flexibility of rescheduling, and resource-utilization efficiency. Supply-to-Demand Fulfillment (Y) captures product availability, on-time delivery, product quality as requested, and customer satisfaction. All indicators use 5-point Likert scales.

Data sources and procedures. Primary data were gathered through semi-structured interviews with the owner and production staff, on-site observation of the four production stages, and a short questionnaire capturing the indicators above. Secondary data were retrieved from daily production logs planned versus realized output—and purchase records. Data were cleaned and organized into tables for further summarization.

Inventory policy (worked example). Reorder point (ROP) was computed as: $ROP = (\text{average daily usage} \times \text{supplier lead time}) + \text{safety stock}$ —consistent with standard inventory-control practice for continuous review with short, stable lead times (Chopra & Meindl, 2021; Heizer & Render, 2020; Zhang et al., 2020). Using the site’s parameters: wheat flour 20 kg/day, 2-day lead, SS 20 kg → 60 kg; tapioca 18 kg/day, 2-day lead, SS 18 kg → 54 kg; seasoning 5 packs/day, 1-day lead, SS 2 → 7; LPG 2 cylinders/day, 1-day lead, SS 1 → 3.

Service performance from a 10-day excerpt. Average demand ≈ 321 units/day, plan ≈ 324 , and realization ≈ 321 . Fill rate (realization $\div$ demand), plan adherence ($1 - |\text{realization} - \text{plan}|/\text{plan}$), and MAPE are standard indicators to judge service and execution stability in short-cycle lines (Chopra & Meindl, 2021; Stevenson, 2021). Day-level variation (e.g., 28-Aug 331 vs. 304; 31-Aug 340 vs. 341) suggests in-day control is more critical than weekly totals. A mid-day rolling schedule focused on the bottleneck helps reduce end-of-day over/under-shoots (Goyal et al., 2023; Slack et al., 2020).

Bottleneck and simple scheduling. The baking step (~60 minutes per batch) is the natural bottleneck. Staging one extra batch before baking, pre-labeling packaging, and cross-training one worker to flex between cooling and packaging can smooth flow without capital expenditure, aligned with basic bottleneck-aware scheduling principles (Heizer & Render, 2020; Slack et al., 2020). Evidence from food-sector MSMEs shows simple dispatching rules such as EDD can be effective under resource constraints (Rahman, 2023).

Analysis. Descriptive statistics (mean, median, standard deviation) were calculated for each indicator. Triangulation across interviews, observation notes, and logs was used to validate consistency. Findings are interpreted against established operations concepts safety stock, reorder points, and capacity planning to generate practical recommendations.

Table 1. Operational Variable

Variable	Operational Definition	Key Indicators	Scale
Purchase Orders (X1)	Decisions on quantity and timing of raw-material orders that ensure continuous production.	Timeliness; quantity accuracy; order frequency vs. demand; supplier coordination.	Likert 1–5
Production Planning (X2)	Planning what, how much, and when to produce within capacity constraints.	Schedule accuracy; capacity alignment; flexibility to reschedule; utilization efficiency.	Likert 1–5

Variable	Operational Definition	Key Indicators	Scale
Demand Fulfillment (Y)	Degree to which demand is met in quantity, quality, and promised time.	Availability; on-time delivery; product quality; customer satisfaction.	Likert 1–5

3. Results and Discussion

Sotong 315 produces more than 300 units per day with simple equipment (mixers, fryers, sealers). The production flow runs through four stages with approximate times: mixing (≈ 10 minutes), baking (≈ 60), cooling (≈ 30), and packaging (≈ 20). Raw materials consist primarily of wheat flour, tapioca, seasoning, and LPG. Daily consumption and inventory parameters are summarized below.

Table 2. Daily Consumption

Material	Daily Consumption	Lead Time (days)	Safety Stock	Reorder Point
Wheat Flour	20 kg	2	20 kg	60 kg
Tapioca Flour	18 kg	2	18 kg	54 kg
Seasoning	5 packs	1	2 packs	7 packs
LPG	2 cylinders	1	1 cylinder	3 cylinders

Table 3. Inventory Parameters

Production Stage	Avg. Time (minutes)
Mixing	10
Baking	60
Cooling	30
Packaging	20

Limitations and Future Work. This is a single-site study over a short window with a small sample; the design is primarily descriptive. Extending to multi-month data, simulating alternative safety-stock levels under delayed deliveries, and testing a mid-day rescheduling routine via quasi-experimental designs are promising next steps (Goyal et al., 2023; Zhang et al., 2020; Lestari, 2022).

Managerial Implications. Couple ROP control on critical inputs with a rolling daily schedule anchored on the bottleneck; set stock alerts at ROP, fix materials cut-off times with suppliers, review plan-vs-realization mid-day, and track three metrics weekly (fill rate, plan adherence, APE) (Chopra & Meindl, 2021; Slack et al., 2020).

The findings of this study offer a significant theoretical implication regarding production control in micro-enterprises. While standard Operations Management theory (Heizer & Render, 2020) often advocates for automated Material Requirements Planning (MRP) to minimize errors, this case demonstrates that high plan adherence (97%) can be achieved through 'informal flexibility'. Consistent with Slack et al.'s (2020) concept of planning and control, the short communication lines in Sotong 315 allow for rapid adjustment without the latency found in rigid systems. This suggests that for MSMEs, the 'human element' in monitoring serves as a functional equivalent to the digital feedback loops described in larger supply chain literatures (Chopra & Meindl, 2021).

Table 4. Daily Demand, Plan, and Realization

Date	Demand	Plan	Realization
2025-08-28	331	322	304
2025-08-29	294	304	320
2025-08-30	351	341	327
2025-08-31	340	341	341
2025-09-01	300	311	299
2025-09-02	354	355	373
2025-09-03	354	368	365
2025-09-04	303	309	292
2025-09-05	282	281	285
2025-09-06	301	306	299

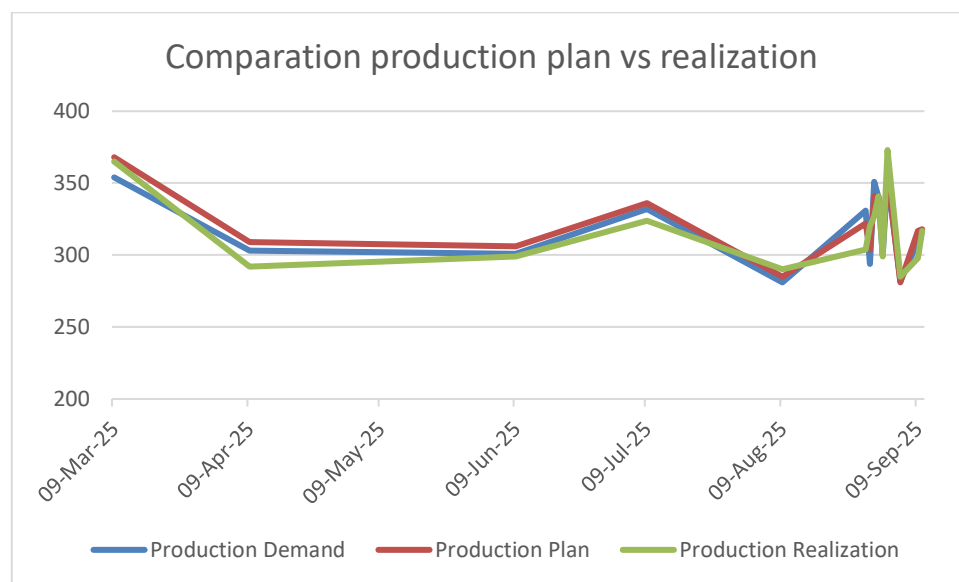


Figure 1. Comparison Production Plan and Realization

To provide a clearer visual framework of the production stability, Figure 1 illustrates the daily comparison between planned targets and actual realization. As shown in the graph, the realization line closely follows the planning line, indicating a high degree of process reliability. Although there are minor fluctuations (e.g., on August 28 and September 2), the consistent overlap suggests that the MSME's simple scheduling method is reliable enough to handle daily demand variations with a low error margin (MAPE 3.2%). This visual evidence confirms that the production system is stable despite the lack of complex automated tools.

Descriptive trends. Across the excerpt, the mean daily demand is ~321 units while realized output averages slightly above planned levels on certain days (e.g., 2025-09-02 and 2025-09-03) and below on others (e.g., 2025-08-28). This pattern is consistent with short production horizons and manual scheduling.

Impact of purchase orders. The reorder-point and safety-stock design for flour and tapioca (two-day lead time) is reasonable for average demand but remains sensitive to shipment delays. When arrivals slip by a day, production must either prioritize SKUs or postpone batches, which explains occasional shortfalls. Closer supplier coordination and

a simple alert mechanism when on-hand inventory approaches the reorder point would mitigate this risk.

Impact of production planning. The four-stage flow is capacity-constrained by the baking step (≈ 60 minutes), which acts as a bottleneck. On days with heightened demand, the plan should increase parallelization upstream (e.g., staging more batches pre-baking) and allocate extra labor during packaging to prevent end-of-day queues. A rolling daily schedule updated at mid-day using actual progress can realign plans and reduce deviations.

Managerial levers. (i) Adopt a minimum safety-stock policy equal to one day of usage for critical inputs; (ii) negotiate supplier service-level targets and clarify cut-off times; (iii) implement a weekly Sales & Operations Review light 30-minute stand-up to review last week's numbers and plan the next; and (iv) digitize records in a spreadsheet to visualize demand vs. plan vs. realization (run charts), enabling exception-based control.

4. Conclusion and Recommendation

Purchase orders and production planning jointly shape demand fulfillment performance at Sotong 315. Timely orders and accurate quantities sustain material availability, while a feasible plan smooths flow through the bottleneck stage. Yet the short lead-time context and daily demand variability cause periodic mismatches between plan and realization.

Recommendations. Maintain at least one day of safety stock for critical materials, implement reorder alerts, apply a rolling schedule with a mid-day replanning checkpoint, and record demand/plan/realization systematically for weekly review. These no- or low-cost interventions are compatible with MSME constraints and should raise service levels and reduce overtime and rework.

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Overall, demand fulfillment at the SME is driven by the interplay between material readiness and bottleneck-aware scheduling. Making ROP signals explicit and instituting a mid-day schedule check are actionable steps to stabilize daily output while containing overtime and rework (Chopra & Meindl, 2021; Slack et al., 2020).

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