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RESEARCH ARTICLE

Scenario-Based Comparison of Calculated Inventory Costs Using Economic Order Quantity and a Just-in-Time Replenishment Formulation in a Textile Company

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Abstract

Inventory-policy decisions require a distinction between calculated scenario costs and realized post-implementation performance. This study compares two inventory-cost scenarios for PT XYZ, a textile manufacturer, using 2022 company records for fabric, elastic, and thread. The primary analysis applies the Economic Order Quantity (EOQ) model and a Just-in-Time (JIT) replenishment formulation to estimate order quantities and inventory costs from the recorded inputs. Questionnaire responses from 50 employees in the Raw Material Warehouse Department and Production Control Unit are analyzed separately as contextual evidence on inventory-control practices and perceived cost efficiency. The operational calculations yielded total inventory costs of Rp62,591,402 for the EOQ scenario and Rp18,146,228 for the JIT scenario, a difference of Rp44,445,174 or 71.01% relative to the EOQ total. Because the two scenarios do not capture every logistics, shortage, transition, and supplier-coordination cost on an identical cost boundary, the difference is interpreted as a calculated scenario advantage rather than realized post-implementation savings. Before implementation, PT XYZ should apply a common total-cost boundary and evaluate JIT feasibility using supplier reliability, service-level performance, and organizational-readiness indicators.

KEYWORDS cost efficiency; economic order quantity; inventory control; just-in-time; scenario analysis

HIGHLIGHTS

- **The operational EOQ–JIT comparison is based on company records for fabric, elastic, and thread, while questionnaire regressions provide complementary contextual evidence.**
- **The JIT scenario produced a calculated total inventory cost 71.01% below the EOQ scenario within the defined calculation boundary.**
- **Implementation should be preceded by a common cost-boundary assessment and supplier, service-level, and organizational-readiness evaluation.**

INTRODUCTION

Manufacturing supply chains depend on coordinated material, information, and replenishment decisions across organizational boundaries. Inventory is therefore not only a local warehouse issue but also a network-level operating resource whose productivity can vary with a firm's position and relationships in the supply network (Agrawal & Osadchiy, 2024). Contemporary research also emphasizes that supply-chain design links sourcing, manufacturing, logistics, and network choices (Cohen & Lee, 2020). Demand-information sharing can materially reshape supply-chain decisions and coordination incentives (Wang et al., 2022), while supplier unreliability and sourcing interruptions can alter inventory and sourcing choices (Demirel et al., 2018; Jain et al., 2022). These findings make demand conditions, lead-time reliability, information quality, supplier relationships, and disruption exposure central to any comparison of inventory policies.

Within this system, material inventory performs two competing functions: it protects production continuity, but it also ties up capital and creates ordering, handling, and holding costs. Contemporary inventory research likewise treats capacity, stock, and replenishment as interdependent operational decisions rather than isolated accounting quantities (Song et al., 2020). Consequently, an inventory policy should not be judged by inventory cost alone. A lower-cost policy is operationally preferable only when the required material-availability and service conditions are maintained.

EOQ and JIT represent different analytical levels. EOQ is a lot-sizing model that identifies an economic order quantity under explicit assumptions about demand and relevant ordering and holding costs. JIT, by contrast, is a broader operating philosophy whose performance depends on mutually reinforcing manufacturing and supply-chain practices. Recent empirical research treats JIT as a coordinated system involving production planning, sourcing, logistics, knowledge sharing, and interorganizational cooperation rather than as a single ordering equation (Yang et al., 2021). Contemporary operations research further emphasizes that JIT should be configured selectively to the operating environment, particularly when turbulence and disruption risk are material (Choi et al., 2023). In this article, "JIT" refers specifically to the replenishment-cost formulation used in the scenario analysis rather than to a complete implementation of the JIT production system.

For a decision-useful comparison, both scenarios should be evaluated on a common economic boundary and under explicit service constraints. The scenario calculations include material requirements, ordering cost, holding cost, average inventory, and the JIT base-cost term. Stockout, expediting, transport, receiving, supplier-coordination, implementation, and service-level costs are outside the current calculation boundary. This distinction is important because the efficiency-resilience trade-off changes when disruption exposure rises: contemporary JIT research recommends adapting replenishment intensity to the operating environment rather than assuming that minimum inventory is universally optimal (Choi et al., 2023; Niu et al., 2025; Yu et al., 2024). These additional cost and service elements should therefore be incorporated when the scenarios are evaluated for implementation.

PT XYZ is an anonymized manufacturer of women's undergarments. Its inventory process does not formally calculate optimal order quantities, reorder points, or material-distribution lead times, and the company faces concerns related to excess inventory and storage cost. This study therefore evaluates EOQ and JIT replenishment scenarios using 2022 operational inputs as comparative decision benchmarks.

The relative performance of lean/JIT replenishment and more buffered inventory policies is context dependent. Recent research shows that JIT supply-chain performance depends on information, cooperation, synchronized production planning, sourcing, and logistics capabilities (Yang et al., 2021). More broadly, contemporary supply-chain strategy emphasizes balancing efficiency with robustness, resilience, and realignment rather than optimizing a single cost dimension in isolation (Cohen & Kouvelis, 2021). Evidence on turbulence further indicates that JIT can remain effective when applied selectively and adapted to disruption conditions (Choi et al., 2023), whereas high supply-chain shocks can make more just-in-case inventory configurations preferable (Yu et al., 2024). Research on post-pandemic supply-chain restructuring likewise highlights settings in which larger and less frequent shipments improve resilience and reduce dependence on precise delivery timing (Niu et al., 2025). A numerical JIT cost advantage should therefore be interpreted together with the capabilities and risk conditions required to realize it.

The primary objective of this study is to estimate and compare the calculated inventory costs of an EOQ scenario and a JIT replenishment scenario for fabric, elastic, and thread during the 2022 production period, and to identify the assumptions and feasibility conditions relevant to implementation. A secondary analysis examines associations among employee-reported JIT-related inventory-control scores (X1), EOQ-related inventory-control scores (X2), and perceived inventory cost efficiency (Y). The questionnaire analysis is interpreted separately from the operational cost comparison.

Conceptual basis

In this study, cost efficiency is defined narrowly as achieving the required material coverage with lower relevant inventory cost. This definition is consistent with the broader operations view that inventory productivity must be evaluated in relation to the operating context and supply-network position rather than as a standalone stock-minimization target (Agrawal & Osadchiy, 2024; Song et al., 2020). The "material coverage" condition is analytically important: a lower calculated cost would not represent improved efficiency if it caused unacceptable stockouts or production interruptions. The operational comparison assumes that the stated period requirement is fulfilled, while service-level and stockout performance are treated as implementation criteria rather than components of the present cost calculation.

Inventory control determines how much material is replenished, when replenishment occurs, and how much protection is retained against demand and supply uncertainty. Recent operations research shows that supplier unreliability can change where inventory is economically positioned and how sourcing arrangements perform (Demirel et al., 2018), while large-scale empirical evidence shows that sourcing strategy and long-term supplier relationships influence recovery from interruptions (Jain et al., 2022). Under EOQ, the relevant cost boundary in this study consists of ordering cost and holding cost. Under the JIT formulation, a delivery coefficient and a base inventory-cost term are used to generate a lower-stock replenishment scenario. The two calculations are therefore compared as analytical scenarios rather than as fully equivalent representations of complete EOQ and JIT systems.

The EOQ formula explicitly includes ordering cost S and holding cost H. The JIT formulation uses a base cost T and a delivery coefficient n. Transport, receiving, inspection, shortage and expediting cost, supplier-development and coordination cost, quality-failure cost, transition and training cost, information-system cost, and contingency-stock cost are outside the calculation boundary. These elements matter because JIT performance depends on tightly coordinated planning, sourcing, logistics, and information exchange (Wang et al., 2022; Yang et al., 2021), while contemporary disruption research shows that continuity, sourcing relationships, and protective inventory choices can materially affect resilience and recovery outcomes (Dohmen et al., 2023; Jain et al., 2022). Accordingly, the calculated percentage difference is interpreted within the defined scenario boundary rather than as a complete total-cost-of-ownership saving.

The questionnaire provides a distinct, employee-level perspective. X1 and X2 represent respondent ratings of JI-related and EOQ-related inventory-control practices, while Y represents perceived inventory cost efficiency. These scores can describe associations in employee perceptions, but they do not measure realized inventory cost and do not validate the operational calculations.

METHODS

Design and setting

This study uses a quantitative descriptive-comparative design with two analytically separate data streams at PT XYZ. The primary operational stream uses company records for the 2022 production period to construct EOQ and JIT replenishment-cost scenarios. The second stream consists of questionnaire responses from 50 of 90 employees in the Raw Material Warehouse Department and Production Control Unit. Purposive sampling targeted personnel involved in managing company assets and material stock, aged 20–50 years.

Instruments and procedures

The employee questionnaire used a five-point Likert scale and covered raw-material needs, production process, and lead-time indicators across X1 (JIT-related inventory control), X2 (EOQ-related inventory control), and Y (perceived inventory cost efficiency). Company documentation and the company calculation worksheet were used to construct the operational EOQ and JIT scenarios.

Inventory-control calculation procedures

The operational analysis compares an EOQ lot-sizing scenario with a JIT replenishment formulation applied in the company calculation worksheet. The equations are treated as study-specific scenario calculations and should not be interpreted as representing the full JIT production system described in contemporary operations research. The comparison estimates inventory-cost outputs from recorded parameters and does not model the full set of supplier, transport, quality, service-level, information-sharing, and organizational conditions associated with JIT implementation (Choi et al., 2023; Yang et al., 2021; Yu et al., 2024). Table 3 reports the calculation inputs used in the analysis.

For the JIT scenario, the continuous delivery coefficient is calculated as:

$$n = Q / (2a) \quad (1)$$

The corresponding JIT scenario order quantity is calculated as:

$$Q\_JIT = n \times Q^* \quad (2)$$

The JIT scenario inventory cost is calculated as:

$$TC\_JIT = T / \sqrt{n} \quad (3)$$

where n is a continuous delivery/replenishment coefficient rather than an integer shipment count; Q is the total raw-material requirement for the analysis period; a is average raw-material inventory; Q* is the EOQ quantity; Q_JIT is the JIT scenario order quantity; T is the base inventory-cost term used in the JIT calculation; and TC_JIT is the calculated JIT scenario inventory cost.

For comparison, EOQ estimates the lot size that balances ordering and holding costs:

$$Q\_EOQ = \sqrt{(2SD / H)} \quad (4)$$

The corresponding EOQ relevant inventory cost is calculated as:

$$TC\_EOQ = S(D / Q\_EOQ) + H(Q\_EOQ / 2) \quad (5)$$

where D is the material requirement for the analysis period, S is ordering cost per order, H is holding cost per unit for the same period basis, Q_EOQ is the economic order quantity, and TC_EOQ is the EOQ relevant inventory cost. The EOQ quantities and relevant inventory costs are calculated from D, S, and H, while the JIT calculation uses T as its base inventory-cost term.

For each scenario, the theoretical order frequency is $f = D/Q$. Because this ratio need not be an integer, the analysis reports both the theoretical frequency and, for operational planning, the ceiling value required to cover the full period requirement when no opening inventory or carryover is assumed. The operational comparison then reports quantity, frequency, and calculated inventory cost side by side. A threshold robustness check is also used to identify the maximum additional JIT-specific cost that could be incurred before the calculated cost advantage is eliminated.

Analysis and evaluation

Questionnaire results are analyzed as a secondary contextual component. Means are reported directly for X1, X2, and Y. Two separate simple regressions evaluate the associations between X1 and Y and between X2 and Y. Model-level statistics include the regression coefficient, standard error, standardized coefficient, t statistic, p value, R^2, adjusted R^2, F statistic, and 95% confidence interval. The operational EOQ–JIT comparison is analyzed separately at the material level using paired descriptive cost results for fabric, elastic, and thread.

Research ethics

The company is anonymized as PT XYZ, and employee questionnaire results are reported in aggregate without personally identifying information.

RESULTS

Descriptive statistical analysis

Descriptive statistics summarize responses from the 50 employees. Mean scores are reported directly for the raw-material needs, production-process, and lead-time indicators across X1, X2, and Y.

Across the reported indicators, mean scores ranged from 4.02 to 4.58. The aggregate means reported for raw-material needs were 4.28 for X1, 4.30 for X2, and 4.19 for Y. For production-process indicators, the aggregate means were 4.35 for X1, 4.05 for X2, and 4.40 for Y. For lead-time indicators, the aggregate means were 4.52 for X1, 4.12 for X2, and 4.31 for Y. These values describe respondent ratings only.

Exploratory questionnaire associations

The first simple regression examines the association between the employee-reported JIT-related inventory-control score (X1) and perceived inventory cost efficiency (Y). The result is interpreted as an association in employee perceptions rather than as a direct measure of realized company cost.

Table 1 Regression coefficients for JIT inventory control (X1) and inventory cost efficiency (Y)

Coefficients[a]						
Model		Unstd. Coeff.		Std. Coeff.		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.785	.478		5.829	.000
	X1	.343	.109	.414	3.154	.003
a. Dependent Variable: Y						

Source: Processed using SPSS 26, 2023.

The coefficient for X1 was positive (B = 0.343, SE = 0.109, β = 0.414, t = 3.154, p = 0.003). With n = 50 in a simple regression, these values correspond to R^2 = 0.172, adjusted R^2 = 0.154, F(1,48) = 9.95, and an approximate 95% confidence interval for B of 0.124 to 0.562. The result indicates a positive association between the employee-reported JIT-related inventory-control score and perceived inventory cost efficiency.

The second simple regression examines the association between the employee-reported EOQ-related inventory-control score (X2) and perceived inventory cost efficiency (Y). The result is interpreted as an association in employee perceptions rather than as evidence of operational superiority.

Table 2 Regression coefficients for EOQ inventory control (X2) and inventory cost efficiency (Y)

Coefficients[a]						
Model		Unstd. Coeff.		Std. Coeff.		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.277	.453		7.232	.000
	X2	.242	.108	.307	2.239	.030
a. Dependent Variable: Y						

Source: Processed using SPSS 26, 2023.

The coefficient for X2 was positive (B = 0.242, SE = 0.108, β = 0.307, t = 2.239, p = 0.030). With n = 50, these values correspond to R^2 = 0.095, adjusted R^2 = 0.076, F(1,48) = 5.01, and an approximate 95% confidence interval for B of 0.025 to 0.459. The smaller standardized coefficient than X1 is descriptive and is not interpreted as proof that one inventory policy is operationally superior, because the two models represent employee perceptions rather than realized cost outcomes.

The operational comparison is analyzed separately from the questionnaire results. Because fabric, elastic, and thread are each evaluated under both EOQ and JIT scenarios, the cost results are treated as paired material-level observations. Table 3 presents the inputs used in the scenario calculations.

Table 3 Calculation inputs used in the EOQ and JIT scenario analysis

Material	D: Req.	S: Order cost	H: Hold cost	a: Avg. inv.	JIT base T
Fabric (rolls)	2,400	Rp5,000,000	Rp20,833	1,291	Rp5,020,833
Elastic (m)	27,600	Rp7,500,000	Rp1,268	18,467	Rp7,501,268
Thread (m)	4,200	Rp4,285,174	Rp8,333	2,093	Rp4,294,047

Source: Company calculation worksheet, 2022 production-period data. Monetary units are Indonesian rupiah (Rp).

The EOQ inputs D, S, and H reproduce the EOQ quantities and cost totals to rounding precision. The JIT calculation additionally uses average inventory a and the base inventory-cost term T.

Economic Order Quantity calculation

Manual EOQ calculations were performed for fabric, elastic, and thread using the inputs in Table 3. One worked calculation is shown for each material to illustrate the calculation pathway.

EOQ order quantity

Fabric: $Q\_EOQ = \sqrt{[(2 \times 5{,}000{,}000 \times 2{,}400) / 20{,}833]} = 1{,}073$ rolls

Elastic: $Q\_EOQ = \sqrt{[(2 \times 7{,}500{,}000 \times 27{,}600) / 1{,}268]} = 18{,}069$ m

Thread: $Q\_EOQ = \sqrt{[(2 \times 4{,}285{,}174 \times 4{,}200) / 8{,}333]} = 2{,}078$ m

The calculated EOQ quantities were 1,073 rolls of fabric, 18,069 m of elastic, and 2,078 m of thread.

EOQ theoretical and operational order frequency

Fabric: f = 2,400 / 1,073 = 2.24 orders/period; ceiling plan = 3

Elastic: f = 27,600 / 18,069 = 1.53 orders/period; ceiling plan = 2

Thread: f = 4,200 / 2,078 = 2.02 orders/period; ceiling plan = 3

The theoretical frequencies are 2.24, 1.53, and 2.02 orders per period for fabric, elastic, and thread, respectively. When whole orders are required and no opening inventory or carryover is assumed, the corresponding ceiling plans are 3, 2, and 3 orders.

EOQ calculated inventory cost

Fabric: $TC\_EOQ = 5{,}000{,}000(2{,}400/1{,}073) + 20{,}833(1{,}073/2) =$ Rp22,360,501

Elastic: $TC\_EOQ = 7{,}500{,}000(27{,}600/18{,}069) + 1{,}268(18{,}069/2)$ = Rp22,911,831

Thread: $TC\_EOQ = 4{,}285{,}174(4{,}200/2{,}078) + 8{,}333(2{,}078/2) =$ Rp17,319,070

The EOQ relevant inventory costs were Rp22,360,501 for fabric, Rp22,911,831 for elastic, and Rp17,319,070 for thread.

Just-in-Time calculation

The JIT scenario uses the same material requirements together with average-inventory and base-cost terms from the company calculation worksheet. The following steps show the continuous delivery coefficient, scenario order quantity, order frequency, and calculated inventory cost.

JIT delivery/replenishment coefficient

Fabric: n = 2,400 / (2 × 1,291) = 0.930; coefficient used for scenario quantity = 0.92

Elastic: n = 27,600 / (2 × 18,467) = 0.747; coefficient used for scenario quantity = 0.75

Thread: n = 4,200 / (2 × 2,093) = 1.003; coefficient used for scenario quantity = 1.00

These n values are continuous calculation coefficients rather than literal integer shipment counts.

JIT scenario order quantity

Fabric: $Q\_JIT = 0.92 \times 1{,}073 = 987$ rolls

Elastic: $Q\_JIT = 0.75 \times 18{,}069 = 13{,}552$ m

Thread: $Q\_JIT = 1.00 \times 2{,}078 = 2{,}078$ m

The resulting JIT scenario quantities are 987 rolls of fabric, 13,552 m of elastic, and 2,078 m of thread. The fabric order quantity uses a coefficient of 0.92 in the scenario calculation.

JIT theoretical and operational order frequency

Fabric: f = 2,400 / 987 = 2.43 orders/period; ceiling plan = 3

Elastic: f = 27,600 / 13,552 = 2.04 orders/period; ceiling plan = 3

Thread: f = 4,200 / 2,078 = 2.02 orders/period; ceiling plan = 3

The theoretical JIT frequencies are approximately 2.43, 2.04, and 2.02 orders per period for fabric, elastic, and thread. When whole orders are required and no carryover is assumed, the ceiling plan is three orders for each material.

JIT calculated inventory cost

Fabric: $TC\_JIT = T/\sqrt{n}$ = Rp5,230,034 (T = Rp5,020,833)

Elastic: $TC\_JIT = T/\sqrt{n}$ = Rp8,622,147 (T = Rp7,501,268)

Thread: $TC\_JIT = T/\sqrt{n}$ = Rp4,294,047 (T = Rp4,294,047)

The calculated JIT scenario costs are Rp5,230,034 for fabric, Rp8,622,147 for elastic, and Rp4,294,047 for thread.

Comparison of EOQ and JIT

TABLE 4 Paired EOQ and JIT scenario results by raw material

Item	Material	EOQ scenario	JIT scenario	Difference / note
Raw material req.	Fabric	2,400	2,400	0
Raw material req.	Elastic	27,600	27,600	0
Raw material req.	Thread	4,200	4,200	0
Order quantity	Fabric	1,073	987	86
Order quantity	Elastic	18,069	13,552	4,517
Order quantity	Thread	2,078	2,078	0
Order freq.	Fabric	2.24 (3)	2.43 (3)	+0.19 (0)
Order freq.	Elastic	1.53 (2)	2.04 (3)	+0.51 (+1)
Order freq.	Thread	2.02 (3)	2.02 (3)	0.00 (0)
Calc. inv. cost	Fabric	Rp 22,360,501	Rp 5,230,034	Rp 17,130,467 lower
Calc. inv. cost	Elastic	Rp 22,911,831	Rp 8,622,147	Rp 14,289,684 lower
Calc. inv. cost	Thread	Rp 17,319,070	Rp 4,294,047	Rp 13,025,023 lower

Source: Calculated from company records and the EOQ–JIT scenario equations. Frequency is shown as theoretical D/Q; the whole-order ceiling required for full stated-period coverage appears in parentheses.

Across the three materials, the EOQ scenario yields a total inventory cost of Rp62,591,402 and the JIT scenario yields Rp18,146,228. The arithmetic difference is Rp44,445,174, equivalent to 71.01% of the EOQ total. By material, the calculated reductions are 76.61% for fabric, 62.37% for elastic, and 75.21% for thread. These percentages represent scenario-level cost differences within the defined calculation boundary rather than realized post-implementation savings. A break-even threshold check shows that the calculated JIT advantage would be eliminated if additional JIT-specific costs exceeded Rp17,130,467 for fabric, Rp14,289,684 for elastic, Rp13,025,023 for thread, or Rp44,445,174 in aggregate.

DISCUSSION

The principal operational finding is a large calculated cost difference in favor of the JIT scenario, but the mechanism and cost boundary are as important as the magnitude. In the EOQ calculation, cost is generated by the ordering term S(D/Q) and the holding term H(Q/2). The JIT formulation uses a separate base-cost term T and a delivery coefficient n. The lower JIT total reflects both smaller scenario order quantities for fabric and elastic and the alternative cost formulation. Because the two scenarios do not apply an identical full total-cost boundary, the 71.01% difference is interpreted as a scenario-level cost advantage rather than a verified total-cost saving from complete JIT implementation.

The international operations literature supports a more conditional interpretation than a simple claim that JIT is always cheaper. Recent empirical research indicates that supply-chain intelligence, knowledge sharing, cooperation, production planning, sourcing, and logistics are mutually important for JIT performance (Yang et al., 2021). Choi et al. (2023) likewise argue that JIT can remain valuable in turbulent environments when it is selectively configured rather than applied indiscriminately. However, resilience research shows that the appropriate inventory posture depends on disruption characteristics and organizational response capacity. Yu et al. (2024) find that higher shock conditions can favor more just-in-case configurations, while Niu et al. (2025) identify circumstances in which larger, less frequent shipments reduce dependence on precise delivery schedules. Recent evidence also shows that supplier reliability, sourcing relationships, and continuity responses materially shape disruption outcomes (Demirel et al., 2018; Dohmen et al., 2023; Jain et al., 2022). For PT XYZ, the worksheet therefore indicates a potentially attractive low-inventory scenario, but the company-specific mechanism can only be confirmed after the omitted logistics, disruption, and service costs are measured and the JIT base-cost term is reconciled with the EOQ boundary.

Implications for inventory management

For PT XYZ, the appropriate managerial next step is a staged feasibility test rather than direct full-scale JIT adoption. Before a pilot, the company should establish a common total-relevant-cost boundary covering ordering, holding, transport, receiving, inspection, shortage/expediting, supplier coordination, transition, and contingency-stock costs. Supplier readiness should be assessed through lead-time level and variability, on-time-in-full delivery, delivery-frequency capacity, incoming quality consistency, willingness to share production and demand information, and the stability of supplier relationships; large-scale sourcing evidence shows that long-term relationships can support faster recovery from interruptions (Jain et al., 2022). This emphasis is consistent with recent evidence that demand-information sharing, cooperation, and coordinated production-planning, sourcing, and logistics are central to supply-chain and JIT performance (Wang et al., 2022; Yang et al., 2021). Internal readiness should cover production-schedule stability, receiving capacity, inventory-data accuracy, role clarity, staff training, and cross-functional coordination among purchasing, warehouse, and production control. Because disruption exposure and continuity-response capability can alter the optimal balance between lean inventory and protective buffers (Choi et al., 2023; Dohmen et al., 2023; Yu et al., 2024), the pilot should use explicit KPIs for total relevant cost, stockout and expediting incidents, production interruptions, schedule adherence, supplier delivery reliability, incoming defects, and inventory days. A stop/go decision should require that service performance is not materially degraded and that realized total relevant cost remains below the validated baseline after all additional logistics and transition costs are included.

LIMITATIONS

This study has several limitations. First, the operational analysis covers one textile company and one production period, which limits generalizability across firms, seasons, and disruption conditions. Second, the analysis compares calculated scenarios rather than realized pre- and post-implementation performance. Third, the cost boundary focuses on the variables included in the EOQ and JIT formulations and does not represent a complete total-cost-of-ownership model for JIT implementation. Fourth, the operational comparison includes only three raw-material categories, so the results are descriptive at the material level. Fifth, the questionnaire captures employee perceptions and is used as contextual evidence rather than a direct measure of realized inventory cost. Future research should use multi-period operational data, broader material coverage, service-level and supplier-performance measures, and a common total-cost framework to evaluate inventory-policy performance more comprehensively.

CONCLUSION

This study yields two complementary findings. The employee questionnaire shows positive associations between JIT-related and EOQ-related inventory-control scores and perceived inventory cost efficiency. Separately, the operational scenario analysis yields an EOQ inventory cost of Rp62,591,402 and a JIT scenario cost of Rp18,146,228 for fabric, elastic, and thread, a calculated difference of Rp44,445,174 or 71.01% relative to the EOQ total. The result indicates a substantial calculated cost advantage for the JIT scenario within the defined model boundary, but it should not be interpreted as realized post-implementation savings. Before implementation, PT XYZ should apply a common total-cost boundary and conduct a staged pilot that evaluates supplier reliability, delivery frequency, quality, scheduling discipline, cross-functional readiness, stockouts, service performance, and realized total relevant cost.

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Ethics, participation, and publication. PT XYZ is anonymized, and employee questionnaire results are reported in aggregate without personally identifying information.

Data availability. Aggregated questionnaire results and the operational scenario calculations are presented in this article.

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REFERENCES

Agrawal, D., & Osadchiy, N. (2024). Inventory productivity and stock returns in manufacturing networks. Manufacturing & Service Operations Management, 26(2), 573–593. https://doi.org/10.1287/msom.2022.0229

Choi, T. Y., Netland, T. H., Sanders, N., Sodhi, M. S., & Wagner, S. M. (2023). Just-in-time for supply chains in turbulent times. Production and Operations Management, 32(7), 2331–2340. https://doi.org/10.1111/poms.13979

Cohen, M. A., & Kouvelis, P. (2021). Revisit of AAA excellence of global value chains: Robustness, resilience, and realignment. Production and Operations Management, 30(3), 633–643. https://doi.org/10.1111/poms.13305

Cohen, M. A., & Lee, H. L. (2020). Designing the right global supply chain network. Manufacturing & Service Operations Management, 22(1), 15–24. https://doi.org/10.1287/msom.2019.0839

Demirel, S., Kapuscinski, R., & Yu, M. (2018). Strategic behavior of suppliers in the face of production disruptions. Management Science, 64(2), 533–551. https://doi.org/10.1287/mnsc.2016.2626

Dohmen, A. E., Merrick, J. R. W., Saunders, L. W., Stank, T. P., & Goldsby, T. J. (2023). When preemptive risk mitigation is insufficient: The effectiveness of continuity and resilience techniques during COVID-19. Production and Operations Management, 32(5), 1529–1549. https://doi.org/10.1111/poms.13677

Jain, N., Girotra, K., & Netessine, S. (2022). Recovering global supply chains from sourcing interruptions: The role of sourcing strategy. Manufacturing & Service Operations Management, 24(2), 846–863. https://doi.org/10.1287/msom.2021.0967

Niu, Y., Werle, N., Cohen, M., Cui, S., Deshpande, V., Ernst, R., Huchzermeier, A., Tsay, A. A., & Wu, J. (2025). Restructuring global supply chains: Navigating challenges of the COVID-19 pandemic and beyond. Manufacturing & Service Operations Management, 27(4), 1025–1036. https://doi.org/10.1287/msom.2024.0879

Song, J.-S., van Houtum, G.-J., & Van Mieghem, J. A. (2020). Capacity and inventory management: Review, trends, and projections. Manufacturing & Service Operations Management, 22(1), 36–46. https://doi.org/10.1287/msom.2019.0798

Wang, Y., Ha, A. Y., & Tong, S. (2022). Sharing manufacturer's demand information in a supply chain with price and service effort competition. Manufacturing & Service Operations Management, 24(3), 1698–1713. https://doi.org/10.1287/msom.2021.1028

Yang, J., Xie, H., Yu, G., & Liu, M. (2021). Achieving a just-in-time supply chain: The role of supply chain intelligence. International Journal of Production Economics, 231, 107878. https://doi.org/10.1016/j.ijpe.2020.107878

Yu, W., Wong, C. Y., Jacobs, M. A., & Chavez, R. (2024). What are the right configurations of just-in-time and just-in-case when supply chain shocks increase? International Journal of Production Economics, 276, 109352. https://doi.org/10.1016/j.ijpe.2024.109352