

Accounting Analytics for Inventory Integrity and Working Capital Control: Continuous Auditing Approaches For ERP-Enabled Supply Chains

EVANS CHINGEZI¹, LAST CHINGEZI², LUCY GANYANI³, PASCAL GBANG YELDUORA⁴,
MUNASHE NAPHTALI MUPA⁵

¹American University

²University of Northern Iowa

³Babson College

⁴Park University

⁵Hult International Business School

Abstract- This study develops an accounting-analytics framework for continuous auditing of inventory integrity and working capital control in ERP-enabled supply chains. The empirical analysis uses the DataCo SMART SUPPLY CHAIN FOR BIG DATA ANALYSIS dataset, a public transaction-level dataset distributed through Mendeley Data and mirrored on Kaggle, containing 180,519 records and 53 variables spanning 2015 to 2018. The paper operationalizes inventory-integrity stress through a set of ERP-visible exception signals: delay variance, severe delay, negative-profit orders, high discounting, workflow-status anomalies and fraud labels. Descriptive analytics, cross-segment heat maps, Pareto concentration analysis and logistic regression are used to identify where risk is concentrated and how a continuous-auditing rule library can be designed. The results show that 54.83% of observations carry late-delivery risk, 18.71% are negative-profit orders, 11.11% involve high discounting and 2.25% are fraud-labelled orders. Positive shipping slippage averages 1.62 days and generates 34.01 million sales-days of working-capital drag, equivalent to 0.92 extra cycle days across the portfolio. Shipping mode, rather than broad market geography, explains most late-delivery variation: relative to First Class, the odds of late-delivery risk are materially lower for Same Day, Second Class and Standard Class channels. Exposure concentration is also non-trivial: a small set of product categories, led by Fishing, Cleats and Camping & Hiking, accounts for a disproportionate share of negative-profit sales exposure. On the basis of these findings, the paper proposes a six-rule continuous-auditing architecture for ERP-enabled supply chains, combining transaction screening, exception scoring, root-cause triage, remediation ownership and working-capital escalation. The contribution of the study lies in translating continuous-auditing theory into a practical control design

that links transaction analytics with inventory integrity, margin protection and liquidity discipline.

Keywords: Continuous Auditing, Inventory Integrity, Working Capital Control, ERP Analytics, Supply Chain Accounting, Internal Audit

I. INTRODUCTION

Inventory integrity is both an operational and an accounting problem. In digitally integrated supply chains, transaction records drive replenishment decisions, customer promises, margin calculations, working-capital commitments, and audit trails. When those records are inaccurate or when execution departs persistently from plan, the consequences extend beyond logistics inefficiency. They surface in delayed fulfilment, stock distortion, margin leakage, avoidable write-offs, customer attrition, and cash tied up in slow or disrupted conversion cycles.

ERP-enabled environments make these problems especially visible because order capture, pricing, fulfilment status, shipping commitments, and profitability signals are stored within connected data structures. That visibility creates an opportunity for continuous auditing. Rather than waiting for month-end review or periodic internal-audit testing, management and assurance teams can continuously monitor transaction flows, rank anomalies by materiality, and intervene before losses accumulate.

Continuous auditing, in this sense, is not merely a technology application; it is a governance and control philosophy that shifts assurance from retrospective verification to proactive, data-driven monitoring embedded within live business processes (Vasarhelyi et al., 2004; Chan and Vasarhelyi, 2011).

Despite this potential, the practical discussion surrounding inventory integrity, working-capital management, and continuous auditing remains fragmented. Inventory-accuracy research has largely focused on record discrepancies, stockouts, and replenishment performance (Kull et al., 2013; Bruccoleri et al., 2014; Destro et al., 2023), while working-capital studies have emphasized cash-conversion cycles, liquidity management, and profitability implications associated with inventory and receivables discipline (Deloof, 2003; Huynh and Le, 2025).

Internal-audit and control research, by contrast, frequently concentrates on system architecture, monitoring frameworks, and exception-management methodologies (Alles et al., 2006; Alles et al., 2008; Singh et al., 2014). Although each stream provides valuable insights, relatively few studies integrate inventory integrity, working-capital control, and continuous auditing into a single accounting-analytics framework capable of supporting real-time governance and operational decision-making.

This study addresses that gap by developing an integrated accounting-analytics framework for continuous auditing in ERP-enabled supply chains using transaction-level evidence from the DataCo SMART SUPPLY CHAIN FOR BIG DATA ANALYSIS dataset (Constante et al., 2019).

Unlike prior studies that examine inventory accuracy, liquidity management, or continuous auditing independently, this research combines these disciplines to create a practical and scalable monitoring architecture that links transaction-level anomalies to inventory integrity, margin protection, working-capital efficiency, and organizational risk management.

The study therefore contributes both to the academic literature and to professional practice by

demonstrating how accounting analytics can be operationalized as a continuous assurance mechanism.

The article is motivated by three research questions. First, which transactional patterns most clearly signal inventory-integrity stress and working-capital drag? Second, where are those exposures concentrated across shipping modes, product categories, and geographic markets? Third, how can internal audit and management accounting transform those signals into a practical, repeatable exception-monitoring architecture capable of supporting proactive risk management and control improvement?

The paper also draws selectively on recent work associated with internal controls, compliance integration, and accounting analytics in the author's broader scholarly ecosystem. Mupa et al. (2024) argue that management accountants increasingly operate as risk-management and internal-control professionals rather than traditional scorekeepers.

Netshifhefhe et al. (2024) emphasize the strategic value of integrating internal auditing and legal compliance, while Nhemachena et al. (2026a, 2026b) demonstrate how integrated operational-control frameworks and data-driven financial visibility can strengthen organizational resilience and decision-making. These perspectives are directly relevant to ERP-enabled supply chains, where transaction data, operational performance, financial outcomes, and risk management objectives increasingly converge.

The principal contribution of this study is the development of a practical continuous-auditing architecture that enables organizations to identify inventory-integrity risks, detect margin leakage, monitor working-capital drag, and prioritize corrective action using transaction-level ERP data. By translating accounting analytics into a deployable governance framework, the study demonstrates how continuous auditing can evolve from a monitoring technology into a strategic mechanism for enhancing operational integrity, financial performance, and organizational resilience.

II. LITERATURE REVIEW AND CONCEPTUAL FRAMING

The continuous-auditing literature provides the foundational logic for this study. Vasarhelyi et al. (2004) define continuous assurance as the analytic monitoring of business processes supported by automation and integrated information systems. Subsequent work shows how that logic becomes operational when transaction-level controls are embedded in ERP environments, alarm hierarchies are configured and exception routing is assigned to accountable users (Alles et al., 2006; Alles et al., 2008).

Chan and Vasarhelyi (2011) extend the argument by showing that continuous auditing changes audit practice across timing, evidence, methodology and organizational responsiveness. Singh et al. (2014) reinforce the implementation point: ERP-based continuous auditing is most effective when monitoring rules are tied to business-process realities rather than generic control checklists.

The inventory-accuracy literature complements this by explaining why transaction-level anomalies matter. Kull et al. (2013) demonstrate that inventory record inaccuracy is not benign; daily errors distort channel performance and service outcomes. Bruccoleri et al. (2014) further show that behavioural and process factors amplify inaccuracy across supply chains, while Destro et al.

(2023) show that inventory record inaccuracy materially affects picking productivity, lost sales and warehouse-capacity utilization, and that cycle counting alone may be insufficient unless supported by broader process control. These findings imply that inventory integrity should be monitored through recurrent execution symptoms, not only through occasional physical counts.

Working-capital theory adds another layer. Deloof (2003) shows that inventory days, receivables and payables management are meaningfully associated with profitability. More recent evidence links supply-chain risk directly to working-capital performance, indicating that disruption, fulfilment variability and operational uncertainty transmit into liquidity

pressure and capital inefficiency (Huynh and Le, 2025). From an accounting perspective, therefore, shipping slippage and transaction instability are not only service problems; they are also working-capital problems.

Recent scholarship associated with Munashe Naphtali Mupa's research profile is especially useful for linking these literatures. Mupa et al. (2024) position management accounting as a function deeply involved in risk management and internal control design.

Netshifhefhe et al. (2024) argue for a strategic alignment between internal auditing and compliance systems. Nhemachena et al. (2026a) propose an integrated operational-control framework built around standardization, reconciliations and monitoring discipline, while Nhemachena et al. (2026b) emphasize how data-driven visibility can improve budget control, cash-flow awareness and receivables performance. Taken together, these studies suggest that accounting analytics should not end with descriptive dashboards; it should drive control prioritization, exception escalation and remediation governance.

On that basis, this paper adopts a four-part conceptual framing. First, ERP transaction data provides a sufficiently rich signal base for continuous assurance. Second, inventory integrity is observable not only through count discrepancies but also through execution symptoms such as delayed fulfilment, negative-margin orders, workflow exceptions and fraud indicators.

Third, working-capital drag can be approximated through delay-weighted sales exposure even when ledger-level financing costs are unavailable. Fourth, continuous auditing is most valuable when analytics are paired with an explicit decision architecture: thresholds, severity logic, ownership, follow-up and closure discipline.

III. DATA AND METHODOLOGY

3.1 Dataset and empirical context

The empirical analysis uses the DataCo SMART SUPPLY CHAIN FOR BIG DATA ANALYSIS

dataset, originally published on Mendeley Data and publicly mirrored on Kaggle (Constante et al., 2019). After import and validation, the usable analytical file contained 180,519 transaction records and 53 variables spanning order processing, product categories, fulfilment, profitability, delivery status, shipping modes and market segments. The observed order period runs from 1 January 2015 to 31 January 2018, with shipping dates extending to 6 February 2018.

The dataset is appropriate for the present study because it resembles an ERP-adjacent order-to-fulfilment environment: it contains order dates, shipping dates, scheduled and actual shipping durations, market and category fields, sales values, discount rates, profitability outcomes, order-status flags and delivery-risk indicators. That breadth makes it possible to examine control conditions across logistics, revenue quality and working-capital exposure using one integrated transaction base.

A limitation must be acknowledged. The dataset does not provide physical count adjustments, detailed accounts-payable aging, purchase-order histories or general-ledger inventory balances. Accordingly, inventory integrity is operationalized here through transactional symptoms that commonly appear when order, stock, pricing and fulfilment control is weak: delivery slippage, negative-margin orders, abnormal discounting, cancellation or hold statuses, and fraud-labelled transactions. The analysis therefore focuses on continuous-auditing proxies for inventory integrity rather than direct book-to-physical reconciliation gaps.

3.2 Variable construction and analytical design

Five derived measures are central to the analysis. First, shipping delay is defined as actual shipping days minus scheduled shipping days. Positive values indicate slippage against the promised fulfilment schedule. Second, negative-profit orders identify transactions with order-level profit below zero.

Third, high-discount orders capture cases with an order item discount rate of at least 20%. Fourth, workflow-status exceptions combine cancelled, on-hold and payment-review orders. Fifth, working-capital drag is defined as sales multiplied by positive

shipping delay. This is not interpreted as a financing cost in dollars; rather, it is a sales-days exposure proxy that shows how much transactional value is tied up in delayed conversion.

Three analytical procedures are then applied. The first is descriptive and segment-level profiling, including shipping-mode summaries and heat maps across markets and categories. The second is exposure concentration analysis using Pareto logic to determine whether negative-profit exposure is dispersed or concentrated.

The third is logistic regression with late-delivery risk as the dependent variable, testing whether shipping mode, market, quantity, discount rate and sales value are associated with fulfilment risk. This sequence moves from descriptive insight to risk prioritization and then to explanatory modelling.

To convert the statistical results into a control architecture, the paper also develops a continuous-auditing rule library. Each rule is defined by a quantitative threshold, mapped to the number of affected transactions and the number of sales exposed, and linked to a recommended assurance or management response. In practice, this is the critical bridge between research analytics and deployable internal-control design.

Table 1. Summary profile of the analytical dataset

Indicator	Value
Orders	180,519
Distinct products	118
Distinct categories	50
Distinct markets	5
Average sales per order (USD)	203.77
Median sales per order (USD)	199.92
Average scheduled ship days	2.93
Average actual ship days	3.50
Late-delivery risk (%)	54.83
Negative-profit orders (%)	18.71
High-discount orders ($\geq 20\%$) (%)	11.11
Fraud-labelled orders (%)	2.25
Working-capital drag (sales-days, USD m equivalent)	34.01
Extra cycle days	0.92

Source: Author’s computation using the DataCo SMART SUPPLY CHAIN FOR BIG DATA ANALYSIS dataset (Constante et al., 2019). Values are rounded to two decimals where appropriate.

IV. RESULTS

4.1 Descriptive analytics and shipment discipline

The dataset exhibits a high baseline level of control stress. Late-delivery risk affects 54.83% of all observations, while 18.71% of orders are negative-profit transactions and 11.11% are high-discount observations. Fraud-labelled orders account for 2.25% of the file. These are not trivial fringe cases. They indicate that margin protection, shipping discipline and status-quality control all require systematic monitoring rather than ad hoc review.

Positive shipment slippage averages 1.62 days among affected observations. When weighted by sales, those delays generate an aggregate working-capital drag of 34.01 million sales-days, equivalent to 0.92 extra cycle days across the portfolio. This is analytically important because it shows that fulfilment variability has liquidity implications even before it is translated into explicit financing cost. In practice, every additional cycle day lengthens the cash conversion process and increases the operational value locked inside delayed transactions.

Shipping-mode analysis shows that the risk profile is highly uneven. First Class records the highest late-delivery risk at 95.32%, while Second Class also remains elevated at 76.63%. Same Day and Standard Class perform materially better, though both still show non-negligible execution risk.

The implication is not that premium service options are inherently defective; rather, the promised lead times associated with some channels appear to be materially harder to meet. That mismatch between promise structure and execution capacity is exactly the kind of issue a continuous-auditing dashboard should highlight early.

Table 2. Shipping-mode risk and cycle-time profile

Shipping mode	Orders	Late-delivery risk (%)	Average delay days	Negative-profit rate (%)	Extra cycle days	Average sales per order (USD)
First Class	27814	95.32	1.0	18.34	1.0	204.01
Same Day	9737	45.74	0.48	18.85	0.47	199.5
Second Class	35216	76.63	1.99	18.54	2.0	202.9
Standard Class	107752	38.07	-0.0	18.86	0.6	204.38

Late-delivery risk and negative-profit rate are reported as percentages. Extra cycle days reflect working-capital drag divided by sales within each shipping mode.

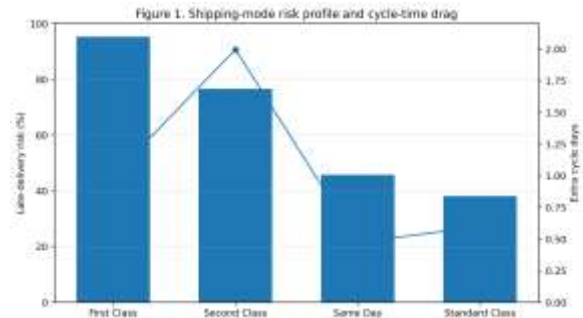


Figure 1. Shipping-mode risk profile and cycle-time drag

Bars report late-delivery risk by shipping mode; the line reports extra cycle days computed from delay-weighted sales exposure. Source: Author’s computation from Constante et al. (2019).

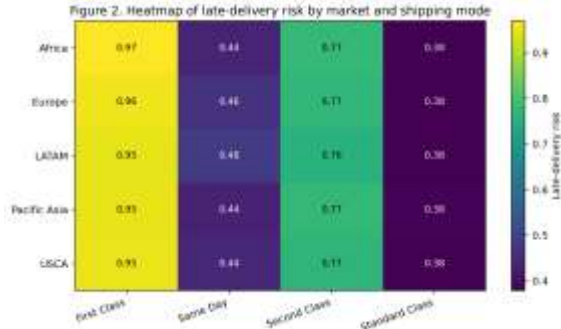


Figure 2. Heatmap of late-delivery risk by market and shipping mode

The heatmap indicates that fulfilment risk is differentiated much more strongly by shipping mode than by broad market geography. Source: Author’s computation from Constante et al. (2019).

4.2 Exposure concentration and materiality

The exposure is also concentrated by category. Table 3 and Figure 3 show that a relatively small group of

categories accounts for a disproportionate share of negative-profit sales exposure. Fishing alone accounts for approximately USD 1.28 million in negative-profit sales, followed by Cleats at USD 0.82 million and Camping & Hiking at USD 0.78 million. Cardio Equipment, Water Sports and Women’s Apparel also contribute materially.

This concentration matters for internal audit and controllership because it narrows the field of investigation. When exposure is clustered, broad untargeted review is inefficient. Instead, the control response should begin with category-specific exception mapping: price override patterns, fulfilment delays, replenishment timing, return patterns, promotion governance and master-data quality. The Pareto profile shows that the greatest gains are likely to come from targeted control redesign in a limited set of product families rather than generalized monitoring alone.

Table 3. Top categories by negative-profit sales exposure

Category	Orders	Sales (USD m)	Negative-profit sales (USD m)	Late-delivery risk (%)	Negative-profit rate (%)	Extra cycle days
Fishing	17325	6.93	1.28	54.93	18.52	0.92
Cleats	24551	4.43	0.82	54.97	18.7	0.93
Camping & Hiking	13729	4.12	0.78	54.53	18.87	0.91
Cardio Equipment	12487	3.69	0.69	54.5	18.68	0.92
Water Sports	15540	3.11	0.59	54.81	18.82	0.92
Women's Apparel	21035	3.15	0.58	54.56	18.65	0.92
Indoor/Outdoor Games	19298	2.89	0.55	54.75	18.74	0.92
Men's Footwear	22246	2.89	0.54	54.49	18.74	0.92
Shop By Sport	10984	1.31	0.26	55.15	19.61	0.94
Computers	442	0.66	0.11	50.68	16.52	0.87

Negative-profit sales measure the sales value of orders with order-level profit below zero. The concentration pattern supports targeted category-level remediation.

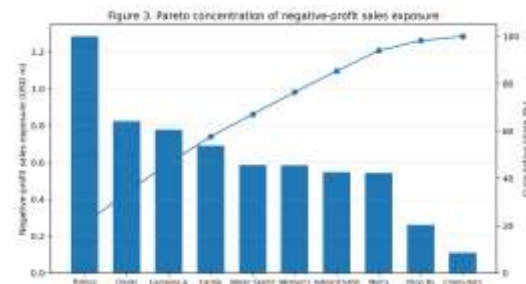


Figure 3. Pareto concentration of negative-profit sales exposure

The cumulative line shows that the leading categories account for a majority share of the negative-profit sales exposure represented in the top-ten group. Source: Author’s computation from Constante et al. (2019).

4.3 Continuous-auditing rule library

To convert the statistical evidence into an operational monitoring model, a six-rule exception library was designed. The rules were selected because they identify recurring conditions that are material, observable in ERP-style data and actionable by finance, operations or internal audit. The first two rules capture shipping slippage; the third captures discount-driven margin leakage; the fourth isolates high-value late orders; the fifth captures workflow-status instability; and the sixth escalates fraud-labelled orders.

The quantitative burden of these rules is substantial. Delay variance greater than zero affects 103,400 orders and exposes USD 21.03 million in sales. Severe delay of at least two days affects 42,753 orders and exposes USD 8.70 million. Negative-profit orders with discount rates of at least 10% affect 17,050 orders and expose USD 3.46 million.

Even the seemingly smaller fraud-labelled group still represents more than 4,000 observations. These are precisely the conditions under which continuous auditing outperforms periodic sampling, because the signal is frequent, repeatable and economically meaningful.

Table 4. Continuous-auditing exception library for ERP-enabled supply chains

Rule	Flagged orders	Share of orders (%)	Sales exposed (USD m)	Escalation logic	Primary response
Delay variance > 0 days	103,400	57.28	21.03	Daily operational review	Investigate carrier adherence, warehouse release timing and promise-date logic
Severe delay >= 2 days	42,753	23.68	8.70	Escalate within 24 hours	Trigger root-cause analysis and working-capital review for persistent lanes or nodes
Negative profit and discount >= 10%	17,050	9.44	3.46	Controller review	Examine pricing overrides, promotion approval and cost-to-serve assumptions
High-value late order (>= 90th percentile sales)	12,104	6.71	5.31	Priority exception queue	Review fulfilment bottlenecks for materially important orders
Workflow status exception	15,389	8.52	3.11	Case-management review	Assess order holds, cancellations, payment controls and documentation gaps
Fraud-labelled order	4,062	2.25	0.83	Immediate fraud triage	Route to internal audit/compliance and preserve investigation evidence

The rule library translates statistical evidence into a deployable monitoring architecture. Sales exposed is reported in USD millions.

4.4 Explanatory evidence from logistic regression

Table 5 reports the logistic model with late-delivery risk as the dependent variable. The coefficients show that shipping mode, rather than broad market geography, explains most of the systematic variation in late-delivery risk. Relative to First Class, Same Day, Second Class and Standard Class all exhibit substantially lower odds of late-delivery risk. By contrast, the market coefficients are close to one and statistically insignificant. Quantity, discount rate and sales value also do not materially explain fulfilment risk once shipping mode is included.

This result is strategically useful. It suggests that the principal control issue lies less in where orders are sold and more in how service promises are structured and operationalized. In other words, the problem appears to be embedded in channel design, scheduling logic and fulfilment execution rather than in broad geographic market conditions. For continuous auditing, that means the most efficient control response is to monitor service-level promises, release timing, warehouse throughput and carrier coordination at the shipping-mode level.

Table 5. Logistic regression results for late-delivery risk

Variable	Odds ratio	95% CI	p-value
Same Day (vs First Class)	0.041	0.039 to 0.044	<0.001
Second Class (vs First Class)	0.161	0.151 to 0.171	<0.001
Standard Class (vs First Class)	0.03	0.028 to 0.032	<0.001
Europe (vs Africa)	0.99	0.946 to 1.036	0.661
LATAM (vs Africa)	0.967	0.924 to 1.012	0.143
Pacific Asia (vs Africa)	0.991	0.946 to 1.038	0.714
USCA (vs Africa)	0.97	0.923 to 1.019	0.225
Order item	1.0	0.993 to 0.964	

quantity		1.007	
Discount rate	1.038	0.895 to 1.204	0.622
Sales value	1.0	1.000 to 1.000	0.193

Baseline categories are First Class for shipping mode and Africa for market. Odds ratios below one indicate lower odds of late-delivery risk relative to the baseline.



Figure 4. Heatmap of category-market control priority

The composite control-priority index averages standardized values for late-delivery risk, negative-profit rate, high-discount rate and fraud rate. Positive values indicate above-average combined exposure. Source: Author's computation from Constante et al. (2019).

V. A CONTINUOUS-AUDITING FRAMEWORK FOR ERP-ENABLED SUPPLY CHAINS

The empirical results support a five-layer control design for ERP-enabled supply chains. The first layer is data integrity. Order dates, shipping dates, status codes, discount rates, product hierarchies and market tags must be standardized and reconciled before exception analytics are trusted. The second layer is rule-based transaction screening, using the six-rule library in Table 4 as a minimum viable assurance engine.

The third layer is risk scoring, where exceptions are ranked by materiality, recurrence, value at risk and category concentration. The fourth layer is workflow governance, which assigns ownership, due dates,

evidence requirements and escalation thresholds. The fifth layer is remediation analytics, which tests whether repeat findings are actually declining over time.

Within that architecture, internal audit and management accounting play complementary roles. Internal audit validates rule logic, independence of monitoring, evidence preservation and closure discipline.

Management accounting connects the same exceptions to gross margin, inventory exposure, working-capital drag and budget variance. This integrated view is consistent with the argument made by Mupa et al. (2024) that management accountants increasingly function as risk and control specialists, and with the integrated operational-control logic advanced by Netshifhefhe et al. (2024) and Nhemachena et al. (2026a).

For implementation, organizations should avoid three common errors. The first is alarm inflation: flagging too many low-value exceptions without a prioritization model. The second is ownership ambiguity: creating dashboards without assigning accountable action owners.

The third is closure without learning: resolving individual cases but failing to identify recurring structural causes such as overly aggressive service commitments, weak promotion governance or unstable master data. Continuous auditing only creates value when it improves the underlying process, not when it merely documents failure more efficiently.

From a working-capital perspective, the framework should also be linked to treasury and controller dashboards. A delay-weighted exposure measure, even when proxied in sales-days rather than financing cost, helps organizations distinguish between operational noise and economically meaningful drag. Once paired with receivables timing, return rates and margin erosion, the same exception structure can become a liquidity early-warning system rather than a narrow logistics report. This is precisely the type of cross-functional visibility emphasized in Nhemachena et al. (2026b).

VI. DISCUSSION

The findings make three contributions to the literature and to practice. First, they show that transaction-level supply-chain data can support a practical inventory-integrity assurance model even when direct physical count data are absent. This matters because many organizations have richer order and fulfilment data than they have clean cycle-count histories. Monitoring transactional symptoms therefore provides a feasible pathway toward earlier detection of integrity breakdowns.

Second, the results show that inventory control, margin control and working-capital control are analytically intertwined. Negative-profit orders and delay-weighted exposure do not belong in separate silos. They describe different surfaces of the same control problem: weak transaction discipline in a digitally integrated operating system. This supports a more integrated accounting and internal-audit perspective than one based purely on periodic compliance review.

Third, the evidence suggests that control design should be selective. Shipping mode explains late-delivery risk more strongly than market geography, and a narrow set of categories carries a disproportionate share of the negative-profit exposure. This means that effective continuous auditing is not only continuous; it is also focused. It directs scarce assurance attention to the combinations of transaction type, channel and product family where control failure is most economically consequential.

The limitations of the study should be acknowledged. The dataset is observational and does not allow direct causal inference. It also does not contain general-ledger inventory balances, physical count adjustments or supplier-payment timestamps.

Future work should link transaction-level ERP data to warehouse counts, return histories, aged payables and receivables collections so that inventory integrity, margin leakage and working-capital performance can be modelled jointly at the ledger-to-operations interface.

Even with those limitations, the present evidence demonstrates that a rigorous and useful continuous-auditing structure can be designed from publicly available ERP-style transaction data.

6.1 Implications for Internal Audit

The findings of this study have important implications for internal audit functions operating in ERP-enabled environments. Traditional audit approaches rely heavily on periodic reviews and sample-based testing, but the increasing volume and complexity of transaction data require more dynamic assurance methodologies. Consistent with the continuous auditing literature (Vasarhelyi et al., 2004; Chan and Vasarhelyi, 2011), the results demonstrate how accounting analytics can support continuous risk monitoring by enabling auditors to identify anomalies, prioritize high-risk transactions, and focus assurance efforts on areas with the greatest potential impact.

The six-rule continuous-auditing framework provides a practical mechanism for integrating automated exception monitoring into routine audit activities. By leveraging ERP-generated data, internal auditors can detect inventory-integrity issues, shipping delays, margin leakage, workflow anomalies, and potential fraud indicators in near real time. This approach enhances the timeliness of assurance while supporting earlier intervention and more effective remediation of control weaknesses (Alles et al., 2006; Alles et al., 2008).

The findings also reinforce the evolving role of internal auditors as strategic risk advisors. As organizations increasingly adopt data-driven decision-making, internal auditors are well positioned to evaluate monitoring systems, validate exception-detection logic, assess data integrity, and verify the effectiveness of corrective actions.

In line with the Global Internal Audit Standards (IIA, 2024), integrating accounting analytics with risk management and operational oversight enables internal audit functions to move beyond retrospective compliance reviews and contribute more directly to governance, organizational resilience, and value creation.

CONCLUSION

The practical implication is clear. Organizations should monitor fulfilment slippage, discount-driven margin leakage, workflow exceptions, and fraud indicators through a structured rule library embedded within ERP and analytics platforms. These monitoring mechanisms should be integrated with accountable remediation workflows, management reporting, and working-capital oversight processes to ensure timely corrective action and sustainable control improvement.

More broadly, this study demonstrates how accounting analytics can transform internal auditing from a retrospective assurance function into a proactive governance mechanism capable of protecting inventory integrity, improving liquidity management, strengthening operational resilience, and supporting data-driven decision-making.

By integrating continuous auditing, risk management, and working-capital control into a unified analytical framework, organizations can enhance transparency, improve resource utilization, and create a more responsive and resilient control environment in increasingly complex digital supply chains.

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