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METHODS FOR BUILDING ANALYTICAL REPORTS ON FINANCIAL FLOWS IN INTERNET COMMERCE

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Анотація

У тезах досліджено методи побудови аналітичних звітів про фінансові потоки у сфері інтернет-торгівлі. Систематизовано сім основних методологічних підходів – від агрегування та часових рядів до сценарного моделювання та предиктивної аналітики – і класифіковано їх за складністю реалізації та функціональним призначенням. Визначено ключові показники ефективності (KPI) для моніторингу фінансових потоків онлайн-платформ, зокрема GMV, коефіцієнт виплат, середній чек та цикл розрахунків.

Ключові слова: інтернет-торгівля, фінансові потоки, аналітична звітність, виплати за замовлення, KPI, сценарне моделювання, ETL, архітектура аналітичної системи.

Abstract

The research paper investigates methods for building analytical reports on financial flows in the field of internet commerce. Seven core methodological approaches are systematized – from aggregation and time-series analysis to scenario simulation and predictive analytics – and classified by implementation complexity and functional purpose. Key performance indicators (KPIs) for monitoring financial flows of online platforms are identified, including GMV, payout ratio, average order value, and settlement cycle.

Keywords: internet commerce, financial flows, analytical reporting, order payouts, KPI, scenario modelling, ETL, analytical system architecture.

Introduction

The sustained expansion of e-commerce has placed financial analytics at the center of strategic business management. Global online retail sales exceeded USD 5.8 trillion in 2023 and are forecast to surpass USD 8 trillion by 2027, driven by increasing consumer adoption, mobile commerce, and cross-border trade [1]. This growth generates transaction volumes that are several orders of magnitude larger than those characteristic of traditional retail, creating both opportunities and challenges for financial reporting.

Financial flows in internet commerce are structurally more complex than their offline counterparts. A single e-commerce transaction typically involves a buyer, one or more marketplace sellers, a payment gateway, a logistics operator, and potentially an affiliate marketing partner. Each participant contributes to or extracts from the gross transaction value according to contractual rules, resulting in a chain of payout calculations that must be executed accurately, transparently, and in compliance with applicable regulations [2].

The goal is using the principal methods for building analytical reports on financial flows in internet commerce, to propose a structured architectural framework for implementing such reporting systems, and to define the core key performance indicators that should form the foundation of e-commerce financial dashboards. The analysis draws on current literature in data warehousing, financial analytics, and software requirements engineering.

1. Structure and Characteristics of Financial Flows in Internet Commerce

Understanding the structural characteristics of financial flows is a prerequisite for designing effective analytical reports. In e-commerce contexts, financial flows can be categorised into three primary types that correspond to distinct business processes and stakeholder interests.

Revenue flows represent inbound monetary transfers from customers to the platform. They are characterised by high frequency, heterogeneous order compositions, and dependency on external factors such as promotional campaigns, seasonal demand patterns, and payment gateway availability. Revenue flows provide the gross baseline from which all downstream calculations are derived [2].

Payout flows represent outbound disbursements from the platform to supply-side participants. Unlike revenue flows, which are triggered by customer purchase decisions, payout flows are governed by contractual

business rules that specify the timing, calculation basis, and applicable deductions for each category of partner or vendor. The complexity of these rules increases non-linearly with the number of partner tiers, product categories, and fulfilment models (e.g. marketplace, direct fulfilment, dropshipping) supported by the platform [5].

Settlement flows represent the net residual after reconciling inbound revenue against outbound payouts, returns, refunds, and operational costs. Accurate settlement reporting requires that all contributing flows be attributed to the same reference period under a consistent accounting basis. The choice between accrual-basis and cash-basis accounting significantly affects the reported settlement balance and must be explicitly documented in any analytical system [6].

A critical temporal characteristic of e-commerce financial flows is the systematic displacement between payment capture and payout disbursement. Payment is typically captured at order placement or delivery confirmation, while payout eligibility is conditional on the expiry of the return or dispute window, which may range from 7 to 30 days depending on jurisdiction and product category. This displacement creates a standing "float" that must be tracked and reported separately from settled transactions to avoid distorted financial reporting [3].

2. Methods of Analytical Report Construction

The construction of comprehensive financial reports in e-commerce draws on a range of methodological approaches that differ in their analytical scope, implementation requirements, and the type of business questions they address. Table 1 presents a systematic classification of seven primary methods.

Table 1. Classification of methods for analytical reporting on e-commerce financial flows

Method	Core Technique	Primary Use Case	Complexity
Aggregation & Grouping	SQL GROUP BY, pivot tables	Period/category/channel summaries	Low
Time-Series Analysis	Moving averages, decomposition	Trend detection, seasonality	Medium
Cohort Analysis	Segment cohorts, retention curves	Customer lifecycle, LTV	Medium
Funnel & Conversion	Stage-based flow tracking	Drop-off detection, optimisation	Medium
Cash-Flow Modelling	DCF, NPV, payment scheduling	Payout planning, liquidity mgmt.	High
Scenario Simulation	What-if analysis, Monte Carlo	Risk assessment, policy testing	High
Predictive Analytics	Regression, ML forecasting	Demand & revenue forecasting	Very High

Aggregation and grouping methods constitute the foundational layer of financial reporting. Standard SQL GROUP BY operations and pivot-table structures consolidate raw transactional records into period, channel, or category summaries. While technically straightforward to implement, the analytical quality of their outputs depends critically on the completeness and consistency of the underlying data model, particularly the taxonomic structure used for product categorisation and partner classification [7].

Time-series analysis methods extend basic aggregation by incorporating temporal dependencies inherent in financial data. Decomposition techniques separate trend, seasonal, and irregular components, enabling analysts to distinguish genuine performance shifts from normal cyclical variation. For e-commerce platforms operating in markets with strong weekly rhythms (peak weekend order volumes) and annual seasonality (holiday shopping periods), explicit seasonal adjustment is essential to support valid period-over-period comparisons [6].

Cohort analysis provides a dynamic perspective on financial flows that cross-sectional reporting cannot capture. By grouping transactions according to a shared initiating event (e.g. the month of the vendor’s first order), cohort methods reveal how payout rates, return rates, and average order values evolve over the relationship lifecycle. This is particularly valuable for marketplace operators seeking to evaluate the long-term financial impact of partner onboarding programmes [4].

Cash-flow modelling and scenario simulation represent the highest-complexity tier of analytical methods, but also the one with the greatest strategic value. Discounted cash-flow (DCF) models project future payout obligations based on current order pipelines, allowing treasury functions to anticipate liquidity requirements. Scenario simulation – whether implemented as deterministic what-if analysis or probabilistic Monte Carlo

modelling – enables decision-makers to quantify the financial consequences of policy changes, such as a modification to commission rates or the introduction of a new return policy, before implementing them in production [8].

3. Key Performance Indicators for Financial Flow Monitoring

A rigorous analytical reporting framework must be anchored in a precisely defined set of key performance indicators. Table 2 presents seven KPIs that collectively characterise the financial dynamics of an e-commerce platform from both revenue and payout perspectives.

Table 2. Core KPIs for e-commerce financial flow reporting

KPI	Full Name	Business Meaning	Formula / Definition
GMV	Gross Merchandise Value	Total transaction value before deductions	$\Sigma(p_i \times q_i)$
Net Revenue	Revenue after returns & discounts	Actual earned revenue	$GMV - R - D$
Payout Ratio	Disbursed share of GMV	Partner economics health	$(Payouts / GMV) \times 100\%$
AOV	Average Order Value	Mean transaction size	GMV / N_{orders}
Return Rate	Order cancellation / return %	Product & fulfilment quality	$(N_{ret} / N_{total}) \times 100\%$
Net Payout / Order	Average net disbursement per order	Cost-per-order benchmark	$Net\ Payouts / N_{orders}$
Settlement Cycle	Avg. days from capture to payout	Cash-flow timing efficiency	$\Sigma(t_{payout} - t_{capture}) / N$

Gross Merchandise Value (GMV) functions as the primary top-line metric from which all payout calculations are expressed as ratios. It provides a platform-neutral measure of commercial activity that enables comparison across periods, product categories, and geographic markets. However, GMV in isolation is an insufficient basis for financial management, as it does not account for the share of value that must be disbursed to platform participants [2].

The Payout Ratio translates aggregate GMV into a measure of partner economics. A rising Payout Ratio may indicate increasing partner leverage or changes in the product category mix toward higher-margin categories for vendors. Monitored alongside Net Revenue, it enables platform operators to assess the sustainability of their financial model. Industry benchmarks for marketplace Payout Ratios typically range from 65% to 85% of GMV, depending on category and fulfillment model [1].

The Settlement Cycle KPI, defined as the average number of days between payment capture and payout disbursement, bridges financial reporting and operational performance. Prolonged settlement cycles impose working capital costs on platform partners and can damage supply-side relationships, while excessively short cycles may conflict with fraud prevention and return management objectives [5]. Optimising this indicator requires careful alignment between the analytical reporting layer and the operational payment scheduling system.

Conclusions

This paper has systematised the principal methods for constructing analytical reports on financial flows in internet commerce and proposed a structured five-layer architectural framework for implementing such reporting systems. Seven methodological approaches have been classified by complexity and use case, ranging from foundational aggregation and grouping methods to high-complexity scenario simulation and predictive analytics. The selection of appropriate methods for a given implementation should be guided by the analytical maturity of the organisation, the volume and quality of available transactional data, and the strategic planning horizon of the intended use cases.

Seven core KPIs have been defined that collectively characterise e-commerce financial dynamics from both revenue and payout perspectives. The inclusion of the Settlement Cycle indicator alongside the more commonly reported GMV and Net Revenue metrics reflects the operational significance of payment timing in marketplace business models. The proposed KPI set provides a balanced framework that supports both short-term operational monitoring and medium-term financial planning.

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