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Inventory Accuracy, Replenishment, and Order Fulfilment Efficiency in Blinkit Dark Stores

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Abstract - The purpose of this study is to explore the relationship between inventory accuracy, replenishment discipline and order processing practices in a Blinkit dark store in Siolim, Goa. It adopts a qualitative approach through a case study and is based on: 1) the OJT project report, 2) four fortnightly progress reports, and 3) the On-the-Job training that the author was doing from 28th May to 28th August 2026. The inquiry covers the operating sequence from receipt and put-away to the inventory visibility, cycle counting, replenishment, First-Expiry-First-Out (FEFO), picking, packing and dispatch handover. The records track the activities of discipline on SKU, replenishment and FEFO, as well as process observations to determine possible bottlenecks such as waiting, excess movement, and SKU searching. Published studies of warehouse operations and how warehouse inventory records may be inaccurate are used to interpret the impact that these conditions can have on findability, picker effort and fulfilment reliability. A measured performance gain and causal estimates are not reported as no order dataset was provided with the paper which contains time stamps, nor was an internal KPI extract provided. The main value-added is an operational diagnosis integrated and a practical improvement plan focused around accurate SKU placement, organized cycle counting, pick-face readiness, exception logging and transparent pack ready handoffs. Prospective baseline and pilot measurement indicators are suggested.

Keywords - quick commerce, dark stores, inventory record accuracy, replenishment, order picking, FEFO, operational efficiency

I. INTRODUCTION

Quick commerce is based on small fulfillment centres located near the local demand. While customers access a digital application, each order requires interconnected physical work within the store itself, such as receiving, put away, inventory visibility, replenishment, picking, packing, and transferring to a delivery partner. Dark stores and micro-hubs are defined as a unique fulfilment tier in quick-commerce supply chains [1] and operational efficiency and logistics as key areas of dark-store research, based on recent systematic review [2].

Availability of inventory within a dark store is not just about having a stock somewhere in the store. It must be recorded accurately, directed to a suitable location, be present in the pick face when needed, and be processed according to the expiry requirements. In such cases, it may be necessary for a picker to look for, request, or report exceptions. This time lag can continue all the way downstream to packing and dispatch. The warehouse context also considers the receiving, storage, order picking, and shipping operations as related decisions in research [3, 4].

The study is an operational analysis carried out by the author at Blinkit Commerce Private Limited, Siolim, Goa from 28th May to 28th August 2026. The four fortnightly

progress reports include familiarisation with receiving and put-away; inventory visibility, cycle counting and SKU-location discipline; exposure to replenishment and FEFO; observation of picking, packing and dispatch; review of process bottlenecks including waiting, excess movement and SKU searching. These are, instead, qualitative records of the process, not a representative sample of stores.

The study has four objectives: firstly, to map the end-to-end store workflow; secondly, to understand inventory controls and replenishment that contribute to availability; thirdly, to interpret the store bottlenecks identified during OJT; and fourthly, to propose practical solutions with measurable indicators that could help improve the store. The main argument of its is that the efficiency of fulfilment operations can only be considered as a series of interdependent processes

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and cannot be expressed by a single indicator, such as picking speed. In addition, analysis of the quick-commerce activity in Indian cities reveals that dark-store operations are associated with the urban freight and last-mile delivery environment further reinforcing the need to separate the store time from the delivery time downstream.

II. LITERATURE REVIEW AND THEORETICAL BACKGROUND

A. Literature Review

Studies on the fast commerce indicate that dark stores, as micro-fulfillment points, are merging local stock and closely managed last-mile delivery operations. Schorung discusses the organization of the supply chain for quick commerce, such as dark stores, retailer collaboration, third-party logistics, and the speed of delivery-related transportation [1]. The review groups conducted by Anaswara and Rajeswari cover the areas of research conducted in dark-stores related to logistics and operational efficiency, consumer behaviour and economic factors [2]. This literature provides an explanation of why store floor is a meaningful unit for studying fulfilment and demonstrates that there is a wider network and rider coordination influence on store level performance.

Receiving, storage, picking and shipping are core decisions that are identified in the warehouse literature that should be coordinated [3]. De Koster, Le-Duc, and Roodbergen discuss the order picking design and control, identifying some key levers to enhance the efficiency of order picking, such as storage assignment, routing, zoning, batching, and order release [4]. For e-grocery stores, Seghezzi, Siragusa, and Mangiaracina consider a method where pickers would be assigned to a specific area in the back of the store to pick items that are also frequently needed online [5]. The findings of these studies indicate that both the organisation of stock and the organisation of locations are important factors in determining the performance of the pickers, and that this performance depends on more than just picker speed.

Another significant research stream is record accuracy of inventories. DeHoratius and Raman prove that inaccuracies in the records is a significant retail execution issue and explore the contribution of auditing and store conditions [6]. Chuang and Oliva

investigate the causes and labour effects of inventory record inaccuracy (IR) [7] and Barratt, Kull, and Sodero study how employee-system interactions can influence IR over time in multi-channel distribution centres (DCs) [8]. Destro et al. examine the correlation between the inventory record inaccuracy, cycle counting, picking productivity, lost sales and capacity utilization [9]. The effectiveness of visibility technologies in reducing record inaccuracy is further observed in the field research on radio-frequency identification, depending on the product category [16]. The study [14] explores the relationship between perishability, replenishment frequency and inventory audits in the grocery context in a further study of grocery-retailing. The results are consistent with the approach of incorporating count routines and exception corrections into the daily fulfillment design and suggest that the extent of any gain should be determined with case-specific data.

There is a disconnect between the "network" discussion of dark stores and "process" controls for a specific order. To fill in this applied gap, the present paper bridges the documented OJT themes (SKU searching, excess movement, waiting, inventory visibility, replenishment, handoffs) with concepts developed in warehouse and inventory research. It does not attempt to measure the performance of Blinkit because there were other studies that were used as lenses to analyze the case. Also indicated by Indian work on third generation e-commerce, Q-commerce is a driver of particular neighbourhood level freight flows and externalities, but not a replacement for the measurement of individual store processes [15].

B. Theoretical Framework and Background Theory

The conceptual base includes Operations and Supply Chain Management, lean flow, inventory record accuracy and service-process control. Value-stream thinking identifies the value-adding work that moves the order forward, and the non-value adding work that includes search, repeated travel, correction and needless waiting. The concept of warehouse layout, storage assignment and routing theory provides insight about the impact the location discipline and fast moving SKU positioning has on travel and search effort [4] - [6]. Also, research on human factors in manual order picking indicates the need to take physical and cognitive loads into consideration in addition to traditional productivity measures [13]. Inventory record accuracy theory is the basis for the need to verify the accuracy of the inventory system quantity and location with physical reality [7] - [10].

ABC-style prioritisation can focus more frequent review on high velocity or high impact SKUs, and FEFO introduces its own freshness rule for items that are prone to expire. These are NOT mutually exclusive controls – value/velocity tells the intensity of the control, the expiry sequence tells which batch to issue first. Lastly, a handoff view addresses the movement between being picked up and being ready for packing and rider handover as an operational interface that needs to be explicitly represented as a status and ownership. The combined framework is applied to the organisation of observations and improvement actions, not to claim unmeasured causal effects.

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III. MATERIALS AND METHODS

A. Objectives of the Study

1. To define the dark-store picking, packing, dispatch handover & put away workflow.

2. Reviewing inventory visibility, cycle counting, SKU-location discipline, replenishment and FEFO as operational controls.

3. To recognize and recognize process constraints during OJT, especially searching, excess movement and waiting.

4. To suggest realistic store level changes and set targets for measuring future changes.

B. Analytical Approach

The analytical approach covers end-to-end mapping, bottleneck review, root cause reasoning and the design of KPIs. The workflow was divided into operational nodes. For each node, the purpose, information or material input, required controls, potential exceptions and downstream impacts were considered. Entries for the progress report were then clustered into themes: Inbound process familiarisation; Stock visibility, location visibility; Cycle counting; Replenishment and FEFO; Picking and packing; Dispatch co-ordination. These themes were interpreted using published literature on warehouse and inventories [3]–[9].

The analysis is divided into three categories: (i) activities or issues specifically identified in the OJT material, (ii) operational implications drawn from the literature and, (iii) suggestions for improvement that need to be further tested through a pilot in the future. The difference should be noted because without a baseline and post-change measurement, qualitative observation can only give an indication of where a process needs to be focused on rather than providing a quantified cycle time reduction.

C. Research Methodology and Time Frame

The study used a qualitative, descriptive, analytical case study approach for the period of 28 May to 28 August 2026 when the author went for OJT at Blinkit Commerce Private Limited, Siolim, Goa. The evidence base comprised the OJT report and four fortnightly progress notes, practical involvement in the processes assigned, and discussions about the processes during the placement. The progress reports list the events in the chronology and the problems taken up under the placement.

The unit of analysis is an operational process or handoff, not a customer or an individual employee. No survey sample, time-stamped order data set, audited SKU-count data set, cost ledger or store-level KPI extract were supplied with the materials. It is therefore not an inferential study, does not estimate correlations, and is not representative of networks. Only a general process level is used for the internal operating details. Trustworthiness was achieved by cross checking themes in the main OJT report and in the four dates progress reports, while maintaining the balance between documented observation and analytical inference, and by using published studies as background, not as alternative measures of Blinkit.

IV. DATA ANALYSIS AND DISCUSSION

A. End-to-End Dark-Store Workflow Analysis

TABLE I. INVENTORY AND ORDER FULFILMENT WORKFLOW ANALYSIS

Process node	Main activity	Required control	Risk to manage
Receiving	Verify SKUs, quantities, condition and relevant dates.	Receipt record and discrepancy ownership.	Receipt mismatch can distort availability.
Put-away	Move received stock to assigned locations.	Location discipline and timely system update.	Misplaced stock causes search.
Inventory visibility	Reconcile physical and system stock; cycle count.	Investigate discrepancies and correct records.	Record mismatches can create pick exceptions.
Replenishment and FEFO	Refill pick faces; rotate expiry-sensitive items.	Clear trigger, owner and expiry sequence.	Empty pick face or incorrect rotation.
Picking and packing	Retrieve items, confirm contents, prepare order.	Readable locations and completeness check.	Searching, rework and movement delay orders.
Dispatch handover	Confirm order readiness and transfer parcel.	Clear ready status and handover confirmation.	Waiting or dispatch congestion.

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The sequence of workstreams from receiving and put-away through to stock control, replenishment, picking, packing and dispatch is supported by the interpretation of the records from the OJT. They also specifically document SKU/Location discipline and Bottleneck review, which involves searching, excess movement and waiting. This tabulation is not meant to be a quantitative assessment of the prevalence of these themes but simply a guide to operational risks that should be considered when conducting regular management.

B. Plant Operations and Standard Work Requirements

TABLE II. OPERATIONAL CONTROL POINTS AND STANDARD WORK

Operational Area	**Control Point / Standard Work**	**Purpose**	**Failure Mode to Watch**
Inbound verification	Confirm SKU, quantity, condition, and relevant expiry/batch data before put-away.	Protects system accuracy at the first control point.	Unrecorded discrepancy or unclear ownership.
Location management	Place items in the designated location and maintain a readable location identity.	Improves findability and reduces backtracking.	Physical stock in a different location from the system record.
Cycle counting	Prioritise high-velocity/high-impact SKUs and investigate repeat mismatches.	Finds errors before they affect subsequent picks.	Correction without a recorded cause.
Replenishment	Use a defined trigger, role, and confirmation that pick-face stock is available.	Prevents avoidable pick interruption.	Stock exists in reserve but is not ready at the pick face.
Expiry management	Apply FEFO to expiry-sensitive inventory and keep date visibility clear.	Supports product freshness and reduces avoidable expiry exposure.	Newer stock positioned ahead of earlier-expiry stock.
Order handoff	Use consistent pick complete, pack ready, and handed-over status definitions.	Separates store preparation from dispatch delay.	Packed order and rider status not synchronised.

The suggested standard work is supposed to eliminate the differences in work from one shift to another and will make it easier for the responsible role to see the nature of the process exception. The cycle counting process should not be limited to an adjustment, but should also involve a review of receiving, put-away, replenishment, damage or unrecorded movements that may have occurred and should be compensated for. Similarly, a replenishment activity must be accomplished by confirming the right SKU and the right quantity at the designated pick location.

C. Bottleneck and Root-Cause Analysis

TABLE III. BOTTLENECK SIGNALS AND ROOT-CAUSE CHECKS

Theme	**Evidence status**	**Cause to verify**	**Implication**
SKU searching	Observed bottleneck theme	Wrong location/label or system mismatch	Search and exception work

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Excess movement	Observed bottleneck theme	Slotting or backtracking	Lower capacity
Waiting between tasks	Observed bottleneck theme	Ownership or delayed handoff	Packing delay
Inventory discrepancy	Inventory visibility / counting workstream	Unrecorded receipt or movement	False availability
FEFO/replenishment	Documented workstream	Weak triggers or expiry sequence	Pick interruption / waste

The first 3 themes in column 1 are included in the progress report as potential bottlenecks and the 3rd column (explanatory causes) are hypotheses for root cause verification, not confirmed incidents. The inventory discrepancy, replenishment, and FEFO are recorded as areas of work, and the downstream consequences of these are based on the process relationship and published literature on inventory record inaccuracy [6]–[9]. The evidence status provides the written record of the difference between observation and inference.

D. Operational and Measurement Improvements

TABLE IV. OPERATIONAL IMPROVEMENT AND FUTURE VALIDATION MEASURES

Domain	**Suggested Initiative**	**Operating Mechanism**	**Indicator for Pilot**
SKU/location accuracy	Verify location identity for high-velocity SKUs; record repeat mislocations.	Improves findability and directs control effort to high-impact items.	Location accuracy; SKU search exceptions per 100 pick lines.
Cycle counting	Use risk/velocity-led cycle counts and a reason code for every mismatch.	Turns count results into root-cause action instead of isolated correction.	Inventory record accuracy; repeat discrepancy rate.
Pick-face replenishment	Define a trigger, owner, response step, and completion confirmation.	Moves required stock to the pick face before an avoidable pick interruption.	Median trigger-to-ready time; unavailable pick-face events.
FEFO and freshness	Make expiry date visible and verify issue sequence for expiry-sensitive SKUs.	Aligns stock rotation with freshness requirements.	FEFO compliance rate; expiry-related exception/waste log.
Picking and handoff	Standardise pick complete, pack ready, and rider handover statuses.	Clarifies task completion and separates store delay from later dispatch delay.	First-pass order accuracy; pack-ready-to-handover lag.

Explanation of Table IV: Indicators are suggested for measurement in the future; the values for the indicators provided in the OJT records do not include the required values to calculate the indicators. A pilot should first establish each denominator, take a baseline over similar shifts, implement a small change to one of the elements and then take a measurement of an indicator at the end of the shift. Always check speed indicators with accuracy and freshness indicators, otherwise improvement appears to be achieved without correct or good quality orders.

E. Operational Measurement and Pilot Design

The inventory record accuracy can be determined by dividing the number of records audited that agree with the actual SKU, location, and quantity by the total number of records audited then multiplying by 100. The exception rate can be expressed as the number of pick lines that are affected by exceptions divided by the number of pick lines, and then multiplied by 100. The percentage of packed orders delivered that are correct the first time is known as first-pass order accuracy. Replenishment response time is defined as the time between a defined low stock trigger and a confirmed pick face ready event; pack ready to handover lag is defined as the time between the two events that are pick face ready and handover. These definitions are recommendations for a future dataset, and NOT the results of Blinkit.

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For the small pilot the baseline collection and brief exception taxonomy should be started. The following information shall be documented for each event: Time and date of event, process stage involved, SKU or order number (if applicable), type of exception, role responsible, resolution, and if exception reoccurred. A pilot can then test one or two changes (replenishment trigger or high velocity location checks), rather than multiple changes simultaneously. The same shifts or similar demand periods should be compared and any improvement should be evaluated in conjunction with the order accuracy and freshness. This learning design allows for practical learning but does not imply that the result is causal due to the observation.

V. FINDINGS, CONCLUSIONS AND SUGGESTIONS

A. Findings

The analysis of the OJT brings four major findings. First, the documented workstreams create a seamless flow: put-away and inbound handling signal the status of stock; cycle counting compares the physical stock with the system; replenishment and FEFO ensure that the pick face is ready and that the stock rotates; and picking, packing and handover turn stock into orders. Secondly, inventory and location discipline are fulfilment controls since they can lead to picking search and correction work in case they are not achieved [4], [6], [9].

Third, the progress report clearly states the following as point of blockage themes: waiting, excess movement and SKU searching. These signals should be explored and not assumed to be caused by poor labour productivity, by carrying out location checks, movement observation, task ownership and exception logs. Fourth, a proactive improvement, which is faster pick is not enough, if order accuracy, expiry handling, and handover reliability are compromised.

B. Conclusions

According to the case, in a dark store for a quick-commerce, operational efficiency should be managed as an E2E flow. These are all dependent on each other and all relate to inventory record accuracy.These are all interdependent to one another and also to inventory record accuracy, SKU-location discipline, replenishment, FEFO, picking, packing, and dispatch. A local failure can cause work to be done downstream, but an effective upstream control can eliminate search, rework, and unnecessary waiting. This is in line with the warehousing working and order picking studies [3]–[9].

This study's contribution is an applied process diagnosis for the OJT environment Blinkit and a set of standard-work and measurement proposals. The evidence base does not have order-level date time stamps or audited count data so no numerical improvement or causal effect can be drawn. The next step to be taken is quantitative pilot to test the value of the proposed changes.

C. Suggestions

In store management: perform quick reviews of repeated exceptions for picking, if there are high impact location mismatches, and missing/replenishment items which have not been resolved. Clearly identify an owner and close each issue with a documented cause.

For inventory operations: focus on SKU velocity, operational importance and discrepancies history - prioritise cycle counts. Maintain physical location identity and system record; investigate errors repeatedly, do not repeatedly adjust.

To replenish and for freshness: set the replenishment trigger and completion confirmation for the pick face. Use FEFO for items that are sensitive to expiry dates and maintain the visibility of the expiry date during replenishment and put-away.

For picking, packing, and dispatch: define order statuses in a standardised way and consider each of the following elements together: exception to be searched, order accuracy at first attempt, time to get orders ready for packing, to hand over. Baseline should be gathered prior to setting targets at the store level.

D. Implications

The framework offers a practical link between inventory management and reliable fulfilment for the managers. Simple location rules, clear ownership and exception coding make standards easier to follow for frontline teams. Academic study will be used to illustrate the role of structured workplace records in the diagnosis of a useful case, which will also set the boundaries for qualitative evidence. Comparison of baseline and pilot results across multiple stores can be done by shift, demand intensity, SKU class, and exception type for future work.

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