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# An Analytical Study on Dark Store Operations, Inventory Management, and Order Fulfilment at Blinkit

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***Abstract*** **- This paper discusses the impact of inventory accuracy, replenishment policies, and order fulfillment in an operational perspective for Blinkit dark-store system in Kadamba, Goa. It is a qualitative case-study method using a report that was prepared for the On-the-Job Training (OJT) conducted in the period of 28 May to 28 August 2026. Process descriptions and documented observations are analysed based on the research conducted on warehouse processes, inaccuracies in inventory records, order picking and e-fulfilment. The analysis covers from receiving and put-away to inventory visibility, cycle counting, replenishment, First-Expiry-First-Out (FEFO), picking, packing and dispatch. The OJT report lists "searching" and "excess movement, and "waiting" as non-value activities, and also mentions the inter-dependence of SKU-location discipline and order readiness. The study does not make a claim for statistical or causal performance improvements, because the order records supplied in the report are not time-stamped and there is no extract of an internal key performance indicator (KPI) for the orders, and no audited stock-count data. Its contribution is an applied diagnostic frame that makes the link between inventory control and fulfilment execution, in addition to four operational analysis tables, and a proposed KPI measurement plan for future validation.**

***Keywords*** **-** quick commerce, dark stores, inventory accuracy, cycle counting, replenishment, order picking, FEFO, operational efficiency

## I. INTRODUCTION

Quick commerce relies on nodes of fulfilment being located near the customer demand. Customers have one digital transaction, but the order goes through many physical interactions, such as receipt verification, put-away, inventory visibility, replenishment, picking, packing and transferring to delivery partner. From a research perspective, dark stores and micro-hubs are a new layer in the food retail logistics and are connected to last mile delivery and urban freight flows [1]. This makes the dark store a suitable unit to explore the role of normal service operations to sustain the fast service promise.

The OJT project "An Analytical Study on Dark Store Operations, Inventory Management, and Order Fulfilment at Blinkit," provides real-world insights into the different aspects of dark stores and considers inventory, store operations, and fulfilment as interrelated systems [11]. The study aims to analyse one operating context at Kadamba, Goa throughout the OJT period of 28 May to 28 August 2026. It is not an audit across the network, and does not claim to be able to view Blinkit's confidential planning algorithms or performance.

The primary research problem is: What is the best way to structure and organise inventory and process controls at the store level to minimise unnecessary searching, movement, waiting, and exceptions to the stock on-hand or expiry management within the store while maintaining stock availability and expiry control? The research goals are: (i) to map the order-fulfilment flow, (ii) to evaluate the impact of inventory visibility, cycle counting, replenishment and FEFO, (iii) to explain the findings of the order-fulfilment themes in the OJT report and (iv) to propose practical ideas or measurable indicators that can be implemented in a future pilot.

The paper makes a contribution by relating well-known concepts of warehouse and inventory to the practical process map of the dark-store process. The focus is on diagnosis – the paper separates documented observations from possible causes and proposed corrective actions, and doesn't make a quantitative claim that is not backed by case evidence.

## II. LITERATURE REVIEW AND THEORETICAL BACKGROUND

### *A. Literature Review*

In the warehouse research, the receiving, storage, order picking and shipping are not considered as independent operations, but as interconnected operations [2]. De Koster, Le-Duc, and Roodbergen examine design and control decisions within the order picking process such as layout, storage assignment, routing, batching and zoning and demonstrate that picking performance is influenced by the



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design of the work system [3]. These concepts are applicable to a dark store, where the promised delivery time is short and the search and travel time can be avoided is of special concern.

Another, but related line of research is inventory record accuracy. DeHoratius and Raman point out that inventory-record inaccuracy is a significant retail execution issue and that there is a correlation between the three factors of auditing practices, store conditions, and inventory-record accuracy [4]. Kök and Shang study the impact of inventory inaccuracy on replenishment decisions and discuss the implications of cycle-count policies, concluding that the counting frequency should depend on the impact of the service at the downstream, and the operating conditions [5]. The process of product-location decisions for supporting picking more efficiently is also explained by Islam and Uddin (2012) in the context of correlated storage assignment in their review [7]. The collection of works is a supplement to the use of physical quantity, system records and location accuracy as interrelated control requirements.

Studies on back-end order preparation and last-mile distribution also reveal that these two aspects need to be prepared together [6] and e-fulfilment studies emphasize the coordination burden arising from multiple e-fulfilment channels and speed of order processing [10]. Schorung's research on quick-commerce business models, and its relationship with delivery activity, offers sector background on dark stores [1]. In addition to traditional efficiency measures, order picking systems should consider human factors, say Grosse, Glock and Neumann [8].

In this targeted review, warehouse studies provide an insight into the mechanisms that make up the warehouse, and quick-commerce research provides an insight into the wider operating context. The gap that was addressed was how to adapt these mechanisms to a store-level diagnostic and measurement plan that utilizes documented OJT observations, but not to suggest that prior studies measured Blinkit's performance.

### *B. Theoretical Framework and Background Theory*

This is a framework that integrates four concepts. The first is inventory record accuracy, which is when the system quantity is consistent with the actual stock, and the second is location accuracy, which is when the item is located at the recorded location. These are similar (not equivalent) controls [4, 5]. Second, cycle counting can be repeated to find and fix discrepancies over time. The priorities listed for counting do not need to be applied uniformly, but could be based on item velocity, operational importance, and known error history [5].

Third, lean operations differentiate between work that creates value and search, backtracking, repeated handling, corrections, and waiting. Order-picking research has prompted research of layout, slotting, and routing for potential travel and time loss [3, 7]. In contrast, FEFO pushes out stocks based on the earliest expiration date, which is fourth:
replenishment ensures pick-face availability. These controls need to be built in to location discipline and into the standard work done on a day-to-day basis. The final stage from the handoff to packing and delivery is part of the same service process so that the local improvement need to be evaluated based on the downstream impact and not just on picking speed [6].

## III. MATERIALS AND METHODS

### *A. Objectives of the Study*

1. Map the dark-store process from receiving and put-away to picking, packing, and dispatch handover.
2. Examine inventory visibility, SKU-location discipline, cycle counting, replenishment, and FEFO as operational controls.
3. Classify documented process concerns and separate observed themes from root-cause hypotheses.
4. Propose store-level improvements and indicators for a subsequent baseline-and-pilot study.

### *B. Analytical Approach*

Process mapping, thematic grouping, bottleneck review, root-cause reasoning, and the design of KPI's were used in the analysis. The workflow was broken down into operating nodes. The analysis for each node accounted for activity, required control, potential exception, and downstream implication. Themes from the OJT report were interpreted based on the studies of inventory record inaccuracy, cycle counting, warehouse design and order picking [2]–[8].

Each statement was classified as a type of statement, namely: (i) a process or observation that is explicitly described in the OJT report; (ii) an operational implication supported by the process sequence and published research; and (iii) a proposed control or test that needs to be validated with future store data. The analysis is qualitative with no statistics estimating relationships.

### *C. Research Methodology and Time Frame*

Research method used is descriptive analytical single case-study. The case is the OJT experience in the store level reported by the Aanchal Amodkar from Blinkit Commerce Private Limited, Kadamba, Goa from 28 May to 28 August 2026 [11]. The evidence base is composed of the descriptions of the operational participation, process observations, workstreams, and analytical records that are documented in the OJT project report, which are supplemented by a focused review of the academic literature. The unit of analysis is the operational process/handoff, not the customer or an employee.

There was no order dataset with time stamps supplied, no audited SKU-count file supplied, no store level KPI extract supplied, and no cost ledger supplied in the supplied OJT report. Thus, it is not reported here what kind of sample sizes, correlations, measured reductions, or network-wide results were reported in the study. This boundary is significant: Process observation can determine if measurement and control are necessary, effectiveness needs to be determined by a baseline and a pilot.

## IV. DATA ANALYSIS AND DISCUSSION

### *A. End-to-End Dark-Store Workflow*

The work sequence described in the OJT report is summarised in Table I and related to operational control for reliable fulfilment. The risks listed in the table are implications to management review and are not intended to be the frequency or severity of the risk being ranked.



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**TABLE I. END-TO-END DARK-STORE WORKFLOW ANALYSIS**

| Process node | Required control | Risk to manage |
|---|---|---|
| Inventory visibility and cycle count | Compare recorded and physical stock; document discrepancy cause and correction. | System quantity may not represent pickable stock. |
| Replenishment and FEFO | Use a clear replenishment trigger and issue earliest-expiry stock first where applicable. | An empty pick face can interrupt picking; weak expiry visibility can increase waste risk. |
| Picking | Follow SKU location, confirm the item, and record exceptions. | Searching, backtracking, or an incorrect pick can consume processing capacity. |
| Packing | Check order completeness and prepare the parcel for dispatch. | Errors or missing items may trigger correction and repacking. |
| Dispatch handover | Signal pack-ready status and coordinate order transfer to the delivery partner. | Unclear readiness or ownership can add waiting at the handoff. |

**Interpretation:** Flowchart demonstrates that order completion is reliable not only because of movement of goods but also because of the reliability of information. Location error can occur in picking and can be upstream in put-away or inventory update. The process should, therefore, be reconsidered, and not all exceptions be put at the pickers door.

### *B. Inventory Control and Standard Work*

The theoretical concepts are presented in Table II as routines that can be implemented at store level. The level of review should be prioritised according to ABC or velocity, and should be distinct from FEFO (for expiry sensitive stock). Neither eliminates the need to keep track of the location and transactions.

**TABLE II. INVENTORY CONTROL POINTS AND STANDARD WORK**

| Control area | Recommended standard work | Measurement |
|---|---|---|
| SKU/location discipline | Use consistent location labels and confirm location when stock is moved. | Location accuracy; misplaced-SKU exceptions. |
| Cycle counting | Prioritise high-velocity, high-impact, and previously discrepant SKUs; correct root causes as well as quantity. | Inventory record accuracy; repeat-discrepancy rate. |
| Velocity-based replenishment | Set a clear trigger and owner for restoring pick-face stock, informed by demand and replenishment lead time. | Replenishment response time; pick-face stockout count. |
| FEFO execution | Keep expiry information visible and pick the earliest-expiry eligible batch first. | FEFO compliance on audited eligible picks. |
| Exception logging | Record searching, wrong location, stock mismatch, substitution, repacking, and handoff delay consistently. | Exceptions per 100 orders; share of repeat causes. |
| Shift review | Review the top exception categories and assign an owner and due time for corrective action. | Open actions closed; repeat-exception trend. |

**Interpretation:** Lightweight control system that can be used during busy shifts. Only the managerial value lies in making the gap apparent, in putting someone to blame and in verifying that the same cause exists again. Without a root cause correction, counting can temporarily restore balance to the system, but won't stop the next mismatch.

| Process node | Required control | Risk to manage |
|---|---|---|
| Receiving | Verify SKU, quantity, condition, and relevant dates; resolve receipt differences. | An uncorrected receipt mismatch can affect availability records. |
| Put-away | Place stock in an assigned location and update the system promptly. | Misplaced stock can create searching even if the item is physically present. |

### *C. Bottleneck Signals and Root-Cause Checks*

It is known that searching, excess movement and waiting are possible causes of non-value adding time [11] are discussed in the OJT report. That's the evidence status for which is indicated in the first column of Table III. The possible causes are in the next column and represent hypotheses to be tested, not actual incidents. This separation avoids a qualitative project that goes over the top with what was seen.

**TABLE III. BOTTLENECK SIGNALS AND ROOT-CAUSE CHECKS**

| Signal | Evidence status | Cause to verify | Potential response |
|---|---|---|---|
| SKU searching | Identified as a potential bottleneck in the OJT report. | Check whether the physical item, system location, and label agree; review put-away and stock- | Standardise location labels; confirm location during put-away; log repeat search causes. |



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| | | movement updates. | |
| Excess movement | Identified as a potential bottleneck in the OJT report. | Observe picker routes and replenishment trips; verify whether fast-moving SKUs are positioned for efficient retrieval. | Review slotting for high-velocity items and avoid unnecessary backtracking. |
| Waiting between activities | Identified as a potential bottleneck in the OJT report. | Record the point and duration of waiting; check task ownership, pick-face availability, pack queue, and rider readiness. | Define status signals and escalation ownership for replenishment, pack-ready orders, and rider handover. |
| Inventory discrepancy | Inventory visibility and cycle counting are documented work areas; the frequency of mismatch is not quantified. | Compare physical stock with system records and review receipt, movement, damage, and transaction history. | Correct records promptly and classify the root cause to prevent recurrence. |
| FEFO or replenishment exception | Replenishment and FEFO are documented control areas; exception rates are not reported. | Check expiry visibility, pick-face replenishment triggers, and whether batches are sequenced correctly. | Use simple checklists and targeted audits for expiry-sensitive and high-velocity items. |

***Interpretation:*** *Broad symptoms are converted to testable questions in the table. For instance, before concluding that an employee is speeding when a picker search is performed, the recorded location and stock movement should be confirmed. Likewise, the time spent on dispatching should not be mixed in with picking and packing time, because a store may optimize picking and packing and thus pass congestion to dispatching.*

### *D. Proposed KPI and Validation Framework*

This report does not contain operational data in the form of numbers. Table IV is thus a future measurement plan and not a result of the OJT. All indicators should be measured over a uniform time interval and, if feasible, broken down into shifts and/or demand levels.

**TABLE IV. PROPOSED KPI FRAMEWORK FOR FUTURE VALIDATION**

| Indicator | Definition or calculation | Management use |
|---|---|---|
| Inventory and location accuracy | Inventory accuracy = correct counts ÷ audited count lines × 100; location accuracy = SKUs found in listed bins ÷ SKUs checked × 100. | Checks physical/system agreement and findability separately. |
| Pick exception rate | Orders with at least one pick exception ÷ orders released × 100. | Captures shortages, mislocations, and corrective search. |
| Replenishment response time | Elapsed time from replenishment trigger to pick-face restock completion. | Tests whether replenishment keeps pace with picking demand. |
| FEFO compliance | Eligible audited picks using earliest-expiry stock ÷ eligible picks audited × 100. | Measures expiry-control execution. |
| Processing and handoff time | Track release-to-pack-ready and pack-ready-to-rider-handover intervals separately. | Separates internal store processing from dispatch waiting. |

**Interpretation:** Baseline should be taken before process changes are made. The practical pilot can then introduce location verification, targeted cycle counts, visual replenishment cues and exception logging in one store area. There is a need to apply the same definitions to baseline and pilot periods and to interpret results in conjunction with order volume, shift conditions and staffing levels to avoid confusing a change in order volume with an improvement.

## V. FINDINGS, CONCLUSIONS AND SUGGESTIONS

### *A. Findings*

There are two points to note: First, inventory accuracy is a service-process control, not just a stock-reporting activity. Wrong quantity or place information may create a pick exception, which can cause a delay in the subsequent pick and pack operation and dispatch. This is on par with inventory-record research which is correlated with inaccuracy and replenishment/service issues [4] and [5].

Second, some non-value-adding activities are found in the OJT report: searching, excess movement and waiting [11]. They are practical for diagnosis and can be noted and recorded at the point at which they happen. No indication is given of how often they occur or how long they last and no ranking of the actual impact can be made.

Third, cycle counting, location discipline, replenishment,



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and FEFO address different issues, and should be treated as complementary controls. Cycle counting verifies the accuracy of the physical system; location discipline ensures findability; replenishment ensures pick-face readiness; and expiry sequence is protected by FEFO. Fourth, according to groceries research [6] [10], there should be explicit handoff status between picking, packing and transfer to delivery-partner, in order to ensure end-to-end efficiency.

### *B. Conclusions*

The analysis of the qualitative case supports an integrated approach to the efficiency of dark-stores. Performance relies on physical stock alignment, inventory information, worker movement and replenishment decisions, as well as handoff coordination. If the narrow focus is on picking speed then the causes of the problem can get missed which may be caused by receiving, put-away or stock-record up dates. The best improvement path is then to standardise critical controls, record exceptions in a consistent manner and utilize the data to conduct a root cause analysis.

The paper does not prove that a particular control has already shortened the time for Blinkit processing or increased Blinkit fulfilment rates. To achieve those outcomes, baseline and post-implementation data are needed that are time-stamped. The study's defensible contribution is a diagnosis of the process and a testable improvement plan based on the OJT report and operations and supply chain literatures that have been peer reviewed.

### *C. Suggestions*

- For inventory operations: Add location labels in consistent locations, validate put-away locations, and focus on cycle counts for high velocity SKUs or those with frequent discrepancies.
- For replenishment; set up clear pick face triggers, and establish name ownership; use demand/velocity review and awareness of lead-time instead of a blanket rule.
- For expiry-sensitive products: Expiry information to be visible, use of FEFO in storage and picking, and audit of compliance to eligible products.
- Pick and pack exceptions search, mis-location, short pick, correction and repacking exceptions by common categories – select process changes.
- Define a clear "pack-ready" state for each item and handover process, and measure the handover from "pack-ready" to "rider-ready" process separately from store processing time for dispatch coordination.
- For management review: test changes in a small pilot after setting a baseline, and review trends in KPIs with background information on demand, staffing and shift conditions before scaling up.

### *D. Implications and Future Work*

The framework is aimed at helping store management carry out regular inspections of controllable process causes, and not only rely on “speed” as the corrective action. When it comes to academic work, it translates a practical OJT case into measurable propositions. Order-level event times, SKU-count result (audited), replenishment trigger time, replenishment completion time, FEFO audit list, Order exception logs should be gathered in future research. A before/after pilot can then be used to determine if there are measurable changes related to location control and exception led cycle counting. Any generalization on Blinkit's network would need to be made in the context of a multi-store comparison.

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