A KNIME Inventory-Analysis Workflow for Dung Thanh Electronics

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***Abstract*—This undergraduate thesis develops a KNIME Analytics Platform workflow for inventory analysis at Dung Thanh Electronics. The workflow loads separate data files, cleans and transforms product records, applies ABC/XYZ classification and safety-stock calculations, and prepares email alerts for items approaching a shortage threshold. The manuscript demonstrates the workflow and argues that it could support purchasing decisions. Its conclusion states that the files are not integrated in real time with an enterprise system and that demand forecasting remains formula based rather than machine learned. The source does not provide an audited stockout comparison, time-study results, or verified savings. This summary presents an implemented analytical prototype and its limits, rather than proven optimization of inventory cost or service level.**

***Index Terms*—KNIME, inventory analysis, ABC/XYZ classification, safety stock, email alerts**

I. Introduction

An electronics retailer must balance availability against money tied up in slow-moving stock. Dung Thanh's historical files offer a basis for classifying items and setting reorder thresholds, but manual consolidation is cumbersome. The thesis asks whether a visual analytics workflow can standardize these steps. Its scope is a case prototype using historical data, not a live replenishment experiment [1]. Earlier ICTU undergraduate theses on related topics provide context [5], [6], [7], [8], [9], [10], [11]. These works were selected for this English summary and are not attributed to the source thesis bibliography. Published background sources on the methods and domain of this project provide context for the English summary [2], [3], [4].

II. Methods

The student assembles data files in KNIME, cleans fields, computes inventory indicators, groups products using ABC and XYZ logic, estimates safety-stock thresholds, and configures email warnings. The source illustrates the processing nodes and output views. This summary checks the workflow against the methods chapter and conclusion. The manuscript does not connect directly to live ERP or accounting feeds, run an out-of-sample forecast test, or define a controlled operational baseline [1].

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III. Results

The reported output is a functioning KNIME workflow that transforms historical product data into classification and stock-level views and generates warning messages for selected low-stock items. The result gives staff a repeatable analytical procedure. The thesis states that this can reduce manual effort and improve decisions, but it does not quantify the extent of error reduction, saved work time, stockouts avoided, or inventory carrying cost. Those benefits remain expectations to test in operation [1].

IV. Discussion

ABC/XYZ and safety-stock rules can clarify prioritization, but their usefulness depends on clean item identifiers, demand variability, lead times, and updated costs. Files disconnected from operational systems may quickly become stale, and simple formulas may miss abrupt market changes. A future evaluation should reconcile SKUs to source systems, archive rule versions, compare forecasts with realized demand, and measure stockouts and holding cost over matched periods. Earlier ICTU inventory and asset-management projects provide local technical context [1].

V. Conclusion

The thesis demonstrates a KNIME workflow for classification, safety-stock analysis, and email warnings at Dung Thanh Electronics. It is a useful prototype. Real-time integration and measured operational outcomes are needed before claiming optimized inventory performance [1].

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