DESIGN OF A SINGLE PLATFORM FOR INTEGRATING ERP AND RFID SYSTEMS FOR IMPROVED PROCUREMENT PERFORMANCE: A CASE STUDY IN THE RUBBER GLOVE MANUFACTURING INDUSTRY

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DECLARATION

I declare that this is my work. This dissertation does not incorporate without acknowledgment any material previously submitted for a Degree or Diploma in any other University or institute of higher learning. To the best of my knowledge and belief, it does not contain any previously published material written by another person except where the acknowledgment is made in the text.

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ABSTRACT

This study pertains to the limitations of existing Enterprise Resource Planning (ERP) systems and customized systems in Sri Lankan rubber glove manufacturing companies. Manual warehouse management processes lead to inventory inaccuracies leading to high disposal costs, packing material quantity adjustments after annual stock verification, and monthly disposal percentages. Therefore this research aims to design a single platform for integrating ERP and Radio-Frequency Identification (RFID) systems for improved procurement performance taking the rubber glove manufacturing industry in Sri Lanka as a case study. Since the range of inventory items handled in the warehouse is vast, the discussion is only limited to packing materials management. To achieve this aim literature review, semi-structured questionnaires, pilot tests, and semi-structured interviews are used as data collection methods. The validation framework on system performance and procurement performance was developed based on literature reviews. The design of the implemented integrated ERP and RFID system was done based on requirement analysis and literature review. A semi-structured questionnaire was distributed among the rubber glove manufacturers in Sri Lanka and their packing material suppliers, to gather feedback on their ability to attach RFID tags to products and subsequently upload the data into the system following RFID tag reading. The collected survey data were analyzed using descriptive data analysis techniques via SPSS software and the output of the implemented system was observed and recorded during the pilot test. Finally, top management feedback was gathered on the impact of the proposed system on procurement performance.

Integrating RFID technology with ERP systems in the rubber glove manufacturing industry significantly streamlines processes, enhances data accuracy, and improves efficiency. The "Supply Chain Smoother" system, tested at ABC Rubber Glove Manufacturing Company, demonstrated notable improvements in procurement performance as per the analysis and evaluation based on proposed system indicator clusters and procurement performance indicator clusters, proving its critical role in optimizing operations and reducing costs.

Keywords: ERP, RFID, Integrated systems, Procurement performance, Inventory accuracy, Rubber glove manufacturer

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LIST OF ABBREVIATIONS

Abbreviation	Description
IT	Information Technology
IoT	Internet of Things
WMS	Warehouse Management Systems
ERP	Enterprise Resource Planning
CPS	Cyber-Physical Systems
AGVs	Automated Guided Vehicles
JIT	Just In Time
RFID	Radio Frequency Identification
KPI	Key Performance Indicators
GRN	Good Receipt Note
PMS	Packing Material Stores
TSP	Trimming, Sorting, and Packing
IB	Inner Bag
OB	Outer Bag
IC	Inner Carton
OC	Outer Carton
HD	Header Card
SKUs	Stock Keeping Units
PO	Purchase Orders
AI	Artificial Intelligence
UHF	Ultra High Frequency
WIP	Work-In-Progress
SCM	Supply Chain Management
AIM	Application Implementation Methodology
BAPI	Business Application Programming Interface
AMT	Advanced Manufacturing Technology
WM	Wireless Manufacturing
ES	Enterprise Systems
PI	Perpetual Inventory
DC	Distribution Center
MRP	Material Requirements Planning
API	Application Programming Interface
UI	User Interface