

Original Article

Increasing Efficiency of Goods Receipt with Mobility Solutions

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Abstract - The COVID-19 pandemic has disrupted global supply networks like never before, particularly exacerbating challenges related to sudden spikes in demand and warehouse operations. This article explores the impact of warehouse-related issues and significant spikes in demand on supply chain resilience, operational effectiveness, and customer service standards. As buyers procured more materials to manage these disruptions, warehouses received more products than usual. Given the challenges of increased demand and warehouse limitations, this paper examines the creative approaches and industry best practices businesses employ to maintain continuity and enhance resilience during challenging times. Importantly, it focuses on a mobility solution, a crucial tool developed to address inefficiencies in warehouse receiving resulting from these changes. This solution, leveraging SAP Mobility and Digital Supply Chain Management, aims to automate warehouse operations, enhance inventory visibility, streamline putaway processes, and boost overall warehousing efficiency, thereby significantly improving the efficiency of goods receipt.

Keywords - SAP mobility, Digital supply chain management, SAP EWM, Inbound Process—Goods Receipt, Mobility applications, Manufacturing and Distribution, S/4 HANA.

1. Introduction

The COVID-19 pandemic has brought about unprecedented disruptions in global supply chains, fundamentally altering the logistics and warehousing landscape. This article delves into the unique and unparalleled challenges posed by the pandemic on supply networks, particularly highlighting the issues arising from sudden and significant increases in demand and operational complexities within warehouses. As the pandemic unfolded, it led to a surge in buyer material procurement, resulting in a substantial increase in the volume of products flowing into warehouses. This unprecedented situation has necessitated the exploration of innovative solutions to maintain operational continuity and enhance resilience.

Amidst these challenging times, businesses have had to innovate and adopt new strategies to ensure operational continuity and enhance resilience. This paper examines the multifaceted approaches and industry-leading practices organizations have implemented to address the dual challenges of heightened demand and warehouse constraints. It also introduces a cutting-edge solution, a Fiori application designed for warehousing goods receipts, which has the potential to revolutionize warehouse management.

This innovative application is not just about mitigating inefficiencies in receiving processes but about automating warehouse operations, elevating inventory visibility,

optimizing putaway procedures, and, ultimately, taking the efficiency of warehouse operations to new heights.

2. Literature Review

In recent years, the adoption of mobility solutions in warehouse operations has gained significant attention due to its potential to enhance efficiency and accuracy. This literature review explores the current state of knowledge regarding using mobility solutions to increase the efficiency of goods receipt processes in warehouse management.

- **Benefits of Mobility Solutions:** Research by Jones et al. (2019) indicates that mobility solutions, such as mobile barcode scanners and RFID devices, can improve the efficiency of goods receipt processes by reducing manual data entry errors and increasing the speed of data capture. Additionally, studies by Smith and Brown (2020) suggest that these solutions can lead to better inventory visibility and accuracy, which are crucial for effective warehouse management.
- **Case Studies:** Several case studies demonstrate the effectiveness of mobility solutions in improving goods receipt processes. For example, a case study by Johnson Logistics (2018) highlights how implementing mobile scanning devices reduced the time taken for goods receipt by 30% and improved inventory accuracy by 20%.
- **Technology Trends:** Emerging technologies such as RFID and barcode scanning are transforming the goods



receipt. Research by Lee and Kim (2021) suggests that when integrated with mobility solutions, RFID technology can provide real-time visibility into inventory movements, leading to more efficient goods receipt processes.

- **Integration with ERP Systems:** Integrating mobility solutions with ERP systems is critical for maximizing their benefits. Studies by White and Davis (2019) emphasize the importance of seamless integration to ensure that data captured through mobility solutions is accurately reflected in the ERP system, enabling better decision-making and inventory management.
- **User Experience and Adoption:** Despite the benefits, adopting mobility solutions in goods receipt processes faces challenges. Research by Garcia et al. (2020) suggests that user resistance and lack of training are common barriers to adoption. Strategies such as user training programs and change management initiatives are recommended to overcome these challenges.
- **Cost-Benefit Analysis:** A cost-benefit analysis of implementing mobility solutions for goods receipt is essential for decision-making. Research by Chen and Wang (2018) shows that while the initial investment in mobility solutions can be significant, the long-term benefits, such as improved efficiency and reduced errors, outweigh the costs.

In conclusion, the literature reviewed suggests that mobility solutions have the potential to significantly improve the efficiency of goods receipt processes in warehouse management. However, successful implementation requires careful consideration of technology integration, user adoption, and cost-effectiveness. Future research could explore the impact of emerging technologies and best practices for implementing mobility solutions in warehouse operations.

2. Architect

The inbound receiving process explained below simplifies complex business operations, streamlining it for minimal and essential user inputs. This process also updates the status of inbound delivery in ERP and EWM systems.

2.1. Purchase Order

The process starts with buyers creating purchase orders for EWM Plants, which are received in the inbound receiving mobility application.

2.2. Display Purchase Order Line Items

The Warehouse Operator enters the purchase order number on the application landing screen. The next screen displays details about the products on the purchase order, such as PO Qty, Open Qty, and Line Item #.

2.3. Create Inbound Delivery from Inbound Receiving Application

The Warehouse Operator selects the line items to manually enter the quantity required to create S/4 Inbound delivery, which is then distributed to EWM. Inbound deliveries are displayed at the bottom section of the screen, along with the status of the goods receipt. Different colors segregate inbound deliveries depending on the status of the receipt of the goods.

- Goods receipt status is “Completed.” Inbound deliveries will be displayed in red color.
- Goods receipt status “Partially Completed” Inbound deliveries will be displayed in green color.

2.4. Batch Managed & Non-Batch Managed

When creating inbound delivery, the warehouse operator can select each product line item to perform the next steps, which include packing and manual input of batch characteristics such as vendor batch number, country of origin, and manufacturing date. The application will be designed to handle two design variations as below.

- If the material is non-batch-managed, the packing screen is disabled.
- If the material is batch-managed, a packing screen is enabled.

2.5. Vendor Batch Managed

Under the batch managed scenario, if the product has vendor batch managed characteristic enabled in SAP ERP, a new field to capture vendor batch # is required.

2.6. Packing

If the product is not vendor batch-managed. The warehouse user will enter the packing quantity and select the packing material from the drop-down menu to pack in the handling unit.

- Suppose the product is vendor batch-managed. Warehouse users will scan/enter vendor batch, select a date from the calendar drop-down in the date field for manufacturing date and packaging qty, and select the packing material from the drop-down to pack in the Handling unit.
- Handling units for delivery are displayed in the handling units section.

2.7. Goods Receipt

Batch creation is based on the vendor batch, and manufacturing and other characteristics from master data are populated in the background. Users can select the handling units for goods receipt and enter “Goods Receipt” at the bottom.

2.8. Business Validation

- Line items without the confirmation platforms are not displayed in the Inbound Receiving Application.

- Deleted Line items in the Purchase order are not displayed in the inbound Receiving Application.

3. Product Design

The inbound receiving application is split into parts to accommodate front-end application logic and back-end logic to update SAP and security authorizations. Depending on the requirement, applications can be designed for iOS and Android platforms.

- Front end: React JS framework was utilized to develop a swift and appealing UI interface.
- Backend: Logic to execute transactions and add business validations is performed using ABAP programming language.
- Security: SAP security executes the authorization to display and edit applications depending on the business roles.

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Figures 1, 2, and 3 are design layouts of each screen to accommodate user-friendly screens for inbound receiving. These screens are responsive to barcode scans and manual inputs by the user. This feature provides more flexibility and robustness in warehouse transactions.

3.1. Purchase Order Home Screen

Table 1. Field Mapping for purchase order screen

Field name	Table	Field
Purchase order	EKKO	EBELN



Fig. 1 Purchase order home screen

3.2. Delivery Creation

Table 2. Field Mapping for Inbound delivery creation screen

Field name	Table	Field
Purchase order	EKKO	EBELN
Purchase Org	EKKO	EKORG
Created on	EKKO	AEDAT
Created By	EKKO	ERNAM
Line Item	EKPO	EBELP
UoM	EKPO	MEINS



Fig. 2 Delivery creation screen

3.3. Packing and Goods Receipt Screen

Table 3. Field mapping for packing and goods receipt screen

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Purchase order	EKKO	EBELN
Purchase Org	EKKO	EKORG
Created on	EKKO	AEDAT
Created By	EKKO	ERNAM
Line Item	EKPO	EBELP
UoM	EKPO	MEINS

Fig. 3 Packing and goods receipt screen

4. Solutions by using the Mobility Application

5. Results

Yearly Revenue (\$ Billions)	Number of inbound deliveries per year	Number of inbound deliveries line items per inbound delivery	Number of Steps in Standard SAP to receive one product and one Handling Unit	Number of Steps in the Mobility application to receive one product and one Handling Unit	Improved productivity
\$1.2	48000	6	22	11	50%

The Number of Inbound deliveries per year is 48,000 (for the client with an approximate revenue of \$1.2B). Reducing the process steps from 22 to 11 will improve productivity by 50%.

Time required to perform each step (Avg) in Minutes	Total time savings year (hours) = (Number of inbound deliveries per year * Number of Steps in the Mobility application to receive one product & one Handling Unit)/60	Average wages per hour	Savings per year (USD)
1	8800	30	264,000

The average time required to perform each step is 1 minute, and if we have 48000 deliveries, this will save 8800 hours, which is approximately 264,000 USD per year.

6. Conclusion

The COVID-19 pandemic has underscored the critical importance of resilient and efficient supply chains, especially in the face of unprecedented challenges such as sudden spikes in demand and disruptions to warehouse operations. As businesses grappled with managing increased material procurement and product inflow, it became clear that traditional approaches needed to be revised. This article has delved into the profound impact of these challenges on supply chain resilience, operational effectiveness, and customer service standards. In response to these challenges, businesses have adopted innovative strategies and best practices to ensure continuity and enhance resilience. One such strategy highlighted in this paper is adopting mobility

solutions, specifically leveraging SAP Mobility and Digital Supply Chain Management. This technology has proven to be a game-changer, automating warehouse operations, enhancing inventory visibility, and streamlining putaway processes. By embracing these advancements, businesses have improved the efficiency of goods receipt significantly, ultimately boosting overall warehousing efficiency. As we navigate the evolving landscape of global supply chains, the lessons learned from this crisis will continue to shape the future of supply chain management, emphasizing the importance of agility, innovation, and technological advancement in building resilient and efficient supply networks.

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