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E-Commerce Distribution: Where the Click Hits the (Dock) DOOR

Presented by:
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Agenda

- **Challenges** warehouses must address in the age of e-commerce
- **Strategies** to address these challenges
- **Technology** spotlights
- **Repurposing** capital
- **Choosing** the right solution
About Commonwealth Supply Chain Advisors

Commonwealth Supply Chain Advisors is a boutique consulting firm that is laser focused on helping companies improve their supply chain performance.
Challenges: E-Commerce Brings New Challenges…

New pressures have arisen in the age of e-commerce that create challenges for modern distribution centers:

1. The rise of *omni-channel commerce*
2. The need for *flexibility* in the warehouse
3. Enhanced *customer service* expectations (faster order turn-around times)
4. *Seasonality on steroids!*
5. Long *lead times* for automation
6. The desire for *automation portability*
7. The desire to *repurpose capital investments*
8. Lack of available *labor*
**Challenges:**

1. The Rise of Omni-Channel Commerce

- Order fulfillment for numerous sales channels in parallel
- Diverse order profiles
- Diverse service level requirements
- Wide range of state-to-state compliances
- Value-added service requirements
- Increase in returns processing
Challenges:
2. The Need for Flexibility in the Warehouse

Changing market dynamics make it risky to lock into a rigid design for the distribution center:

- Unpredictable channel growth
- SKU proliferation
- Challenging value-added services
- Changing regulatory climate (traceability, lot segregation, etc.)
- Unavailability of labor
Challenges:
3. Enhanced Customer Service Expectations

• Amazon has permanently changed consumer expectations
  • “Free” two day shipping
  • Same day delivery
  • Amazon Locker
  • Key-in-car Delivery
  • Amazon Scout – robotic delivery

• Wide product selection
• Endless availability of inventory
• Located in major DC areas
• Pay labor premium

Source: Amazon
**Challenges:**

4. **Seasonality on Steroids**

For retailers, distributors and manufacturers, “cyber-week” in late November can cause outbound warehouse volumes to increase 10x – 20x.
Challenges: 5. Long Lead Times

- Even large companies tend to plan poorly for automation projects
- E-Commerce growth reaches “tipping points” which creates the perception of a sudden, urgent need for warehouse automation
- Many material handling equipment manufacturers are reporting lead times of 12 – 24 months for some types of equipment
- It can take 24 months or longer to design, procure, and implement a new warehouse system

Companies coming off a busy fourth-quarter and wanting to start to automate probably won’t be ready until two more holiday cycles
Challenges:
6. The Desire for Automation Portability

• Companies anticipating relocating to a larger distribution center are reluctant to “bolt-down” immovable automation

• Companies anticipating a network re-design are similarly reluctant to invest in fixed automation
Potential Solutions

Leading companies are adopting new strategies to address these challenges:

- Leveraging omni-channel warehouse automation
- Repurposing capital investments
- Eliminating post-pick touches
- Reducing order turn around times
- Managing seasonality
- Flexible labor system
- Using flexible and portable designs
Potential Solutions:
Deploy Omni-Channel Processes and Automation

Batch Picking

Channels: Retail & Wholesale
- Batch Pick
  - Induct to unit sorter
  - Sort by store
  - Pack and ship
  - Deliver

Channel: Direct-to-Consumer
- Batch Pick
  - Convey
  - Sort by order
  - Pack and ship
  - Deliver
**Potential Solutions:**
Deploy Omni-Channel Processes and Automation (cont’d)

### Picking by Order

#### Pick Strategies

- **Vehicle-Based Picking**
  - Slow
  - Labor intensive
  - Flexible
  - Minimal batching
  - 50 – 100 line/hr/picker

- **Conveyor-Based Picking**
  - Additional touch
  - Labor intensive
  - 100 – 175 lines/hr/picker

- **Goods-to-Picker Systems**
  - Fast
  - Flexible
  - Expensive
  - 150+ lines/hr/picker

#### Pick Methodologies

**Cluster picking**
- **Types:**
  - Conveyor-based cluster picking
  - Cart-based cluster picking
  - Pallet-truck-based cluster picking
  - Order-picker-based cluster picking
- **Features:**
  - Early out
  - Dynamic re-batching

**Zone picking**
- Sequential zone pick (pick and pass)
- Simultaneous zone pick (pick and consolidate)
  - VNA pick for slow movers
  - AS/RS pick for slow movers
  - Diverse size items
- Conveyor based vs. cart based
Technology Spotlight: Unit Sorters

• Channels best suited for:
  • Wholesale
  • Retail
  • E-Commerce

• Order profiles best suited for:
  • 10+ lines per order
  • High commonality of line items across orders

• Process:
  • Case picked SKUs are conveyed to the sorter
  • A worker removes an item from the carton and places it on a tray on the sorter with the barcode facing up
  • A scanner scans the barcode and associates it with the sorter tray number
  • The sorter conveys the SKU past a series of chutes and “tilts”, “dumps” or “diverts” to convey the item into the correct chute
  • Each chute typically represents a store order

Tilt-Tray Sorter
Source: Beumer
Technology Spotlight: Put Walls

• Channels best suited for:
  • Direct-to-consumer

• Order profiles best suited for:
  • 1 – 5 lines per order

• Process:
  • Multiple e-commerce orders are batch picked to totes
  • Totes is conveyed to a specific put wall
  • A worker removes an item from a pick tote and scans it
  • A light is activated on the put wall to indicate where the product should be placed
  • The worker pushes a button on the light bar to indicate that the “put” was completed
  • Light bar light displays a complete message when order is consolidated
  • Packer, on the opposite side, removes the items and packs the order
Potential Solutions: Eliminate Post-Pick Touches

Eliminate Post-Pick Touches

- Pick directly to the shipping container
- Eliminate packing slips and other paper inserts
- Be judicious with the use of specialized packing, tissue paper, etc.
- These add significant amounts of labor to the packing process and make automation difficult

Source: The Packaging Source

Source: Edraw
Technology Spotlight: Pocket Sorter

• Channels best suited for:
  • Direct-to-consumer

• Order profiles best suited for:
  • Less than 10 lines per order

• Process:
  • Product is conveyed to the sorter induction station
  • A worker removes an item from a pick tote and scans it
  • The worker places the item in a pocket on the sorter
  • Each pocket travels on an independent path on the system, allowing:
    • Conveying
    • Buffering & consolidation
    • Sorting

Source: Knapp
Source: Dürkopp Fördertechnik
Technology Spotlight: Goods-to-Picker Systems 1.0

Goods-to-picker 1.0: The first generation of goods-to-picker systems included technology such as:

- Carousel Systems
  Source: Kardex Remstar

- Mini-Load AS/RS Systems
  Source: Daifuku

This technology is still very viable in many applications.
Technology Spotlight: Goods-to-Picker Systems 2.0

Goods to picker 2.0: In recent years, new innovations have been made including:

Rates can approach 1100/hr

2.0 Benefits Can Include:
- Faster pick rates
- Easier system replenishment
- Less need for “perfect slotting” (in some cases)
Technology Spotlight: Hybrid Solutions

E-Commerce can resemble Retail – allowing investments to be multi-purposed

Make e-commerce look like a retail to the picking process
Potential Solutions: Managing Seasonality

 Sometimes you DO have to “build the church for Easter Sunday”

• It usually makes sense to size the STORAGE portions of the warehousing system for AVERAGE periods

• It is often relatively easy to rent offsite overflow storage for short periods of time to get through the busy season

• However, it is often impossible to avoid sizing the THROUGHPUT portions of the warehousing system for PEAK periods

• For high-volume warehouses seeking to avoid massive seasonal staff increases, an automated system which can handle peak distribution capacity + growth is usually a requirement
Potential Solutions: Managing Seasonality

Alternatives to highly automated warehousing systems to manage peak periods:

- Utilize scalable picking technology
- Utilize technology with fast learning curves
- Temporary Shelving / Put wall
- Requires labor

Smart Carts
Source: FastFetch
- Combines technology like voice, lights, and barcode scanning for fast and accurate picking.

Robot-Assisted Picking
Source: Locus Robotics
- Robots carrying picking containers travel to bins where picks are required.
- Pickers look for robots in their zone and perform picks.

Voice-Directed Picking
**Potential Solutions:**
Flexibility & Portability in System Design

- Material handling systems need to be flexible to adapt to changing conditions:
  - Seasonal peaks
  - Unpredictable channel growth
  - SKU proliferation

- Key warehouse technologies which are FLEXIBLE include:
  - Vehicle-based picking systems (smart carts, robot-assisted picking)
  - Goods-to-picker system
  - Space to expand equipment

*Flashpick*
Source: TGW
Conclusion: Which System is Right for My Company?

- Don’t fall in love with technology too quickly
- Be data driven
- Every distribution center is different:
  - Product handling characteristics
  - SKU velocity profiles
  - Order profiles
  - Sales channels
  - Customer compliance requirements
  - Value-added services
  - Customer service expectations
- What works for one company could be catastrophic for another
- Conduct a thorough assessment of potential solutions using trusted independent advisors
- Carefully assess risk: The project WILL take longer and be more expensive than expected. Make sure the benefits still outweigh the costs even in a worst-case scenario.
- Don’t create rigid, self-imposed deadlines. Late implementations are better than failed implementations.
Additional Resources

Commonwealth’s Resource Library is full of resources on supply chain strategy and warehouse design/optimization. Go to www.commonwealth-sca.com to access:

White Paper: Five Ways to Meet the Challenges of E-Commerce Distribution
Presentation: Beating Murphy’s Law When Introducing Distribution Center Technology
White Paper: The Picking Playbook
White Paper: The Packing Playbook
White Paper: Distribution Center Design Series – Part I: Developing a Storage Design Tool
White Paper: Distribution Center Design Series – Part II: Developing a Throughput Design Tool and Determining a Pick Strategy
White Paper: How to Choose the Right WMS - Part I: Distribution Center Process Optimization
White Paper: The Ultimate WMS Preparation Guidebook
White Paper: Selecting the Right WMS
White Paper: Six Tips to Avoid a Failed WMS Implementation
Thank You

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