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

Presented by:

Commonwealth Supply Chain Advisors

 **Commonwealth**
Supply Chain Advisors LLC

Presenter



Kevin Thuet

Mr. Thuet is a Senior Consultant at Commonwealth Supply Chain Advisors. Over his career, he has helped hundreds of companies reduce their distribution labor costs, improve space utilization, and meet their customer service objectives. He has been in both the equipment supply and consulting side of Material Handling for 30 years, in that position he has designed over 600 Distribution and Manufacturing facilities in the USA and 20 foreign countries. Mr. Thuet has authored dozens of white papers on supply chain topics, and his opinions have been featured in publications such as DC Velocity, Modern Materials Handling, and others.

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.



Distribution Center Design



Network Optimization



Warehouse Management Software (WMS) Services



Transportation Optimization

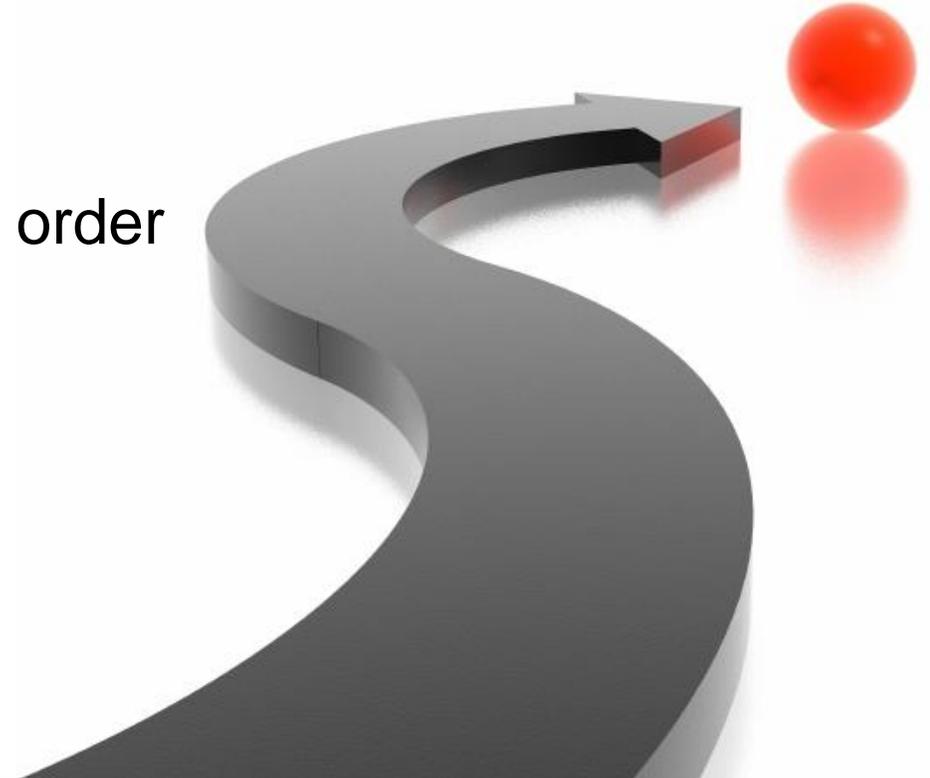


Outsourcing Strategy

Challenges: **E-Commerce Brings New Challenges...**

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

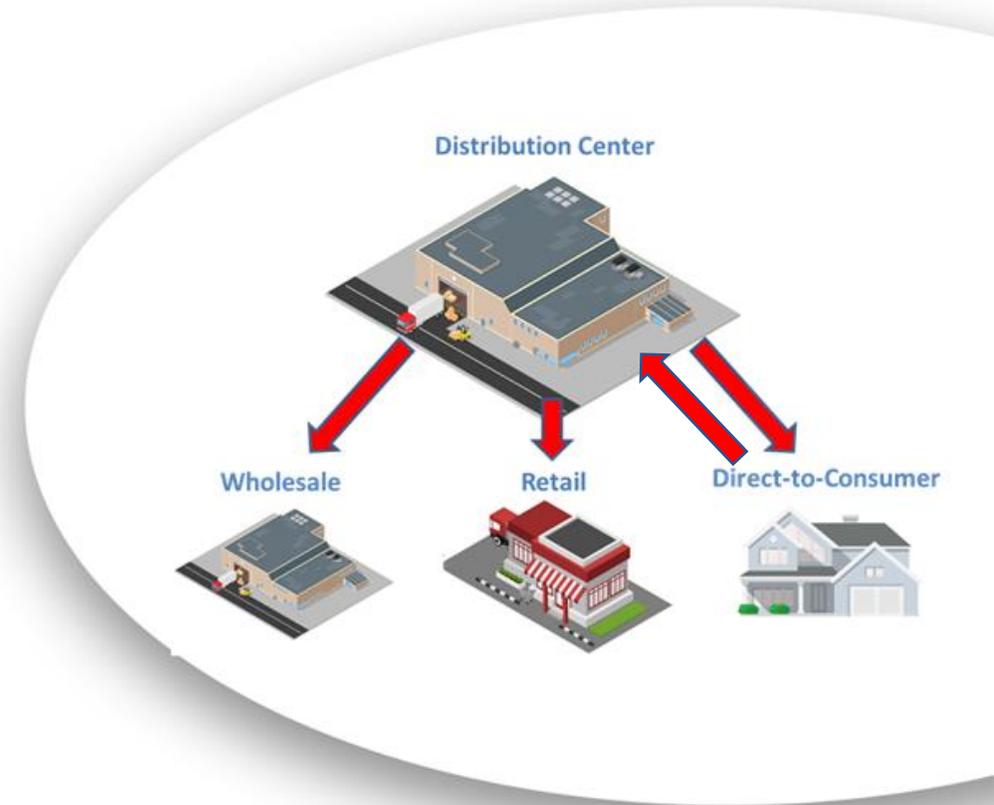
1. The rise of ***omni-channel commerce***
2. The need for ***flexibility*** in the warehouse
3. Enhanced ***customer service*** expectations (faster order turn-around times)
4. ***Seasonality on steroids!***
5. Long ***lead times*** for automation
6. The desire for ***automation portability***
7. The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



Source: Dematic

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



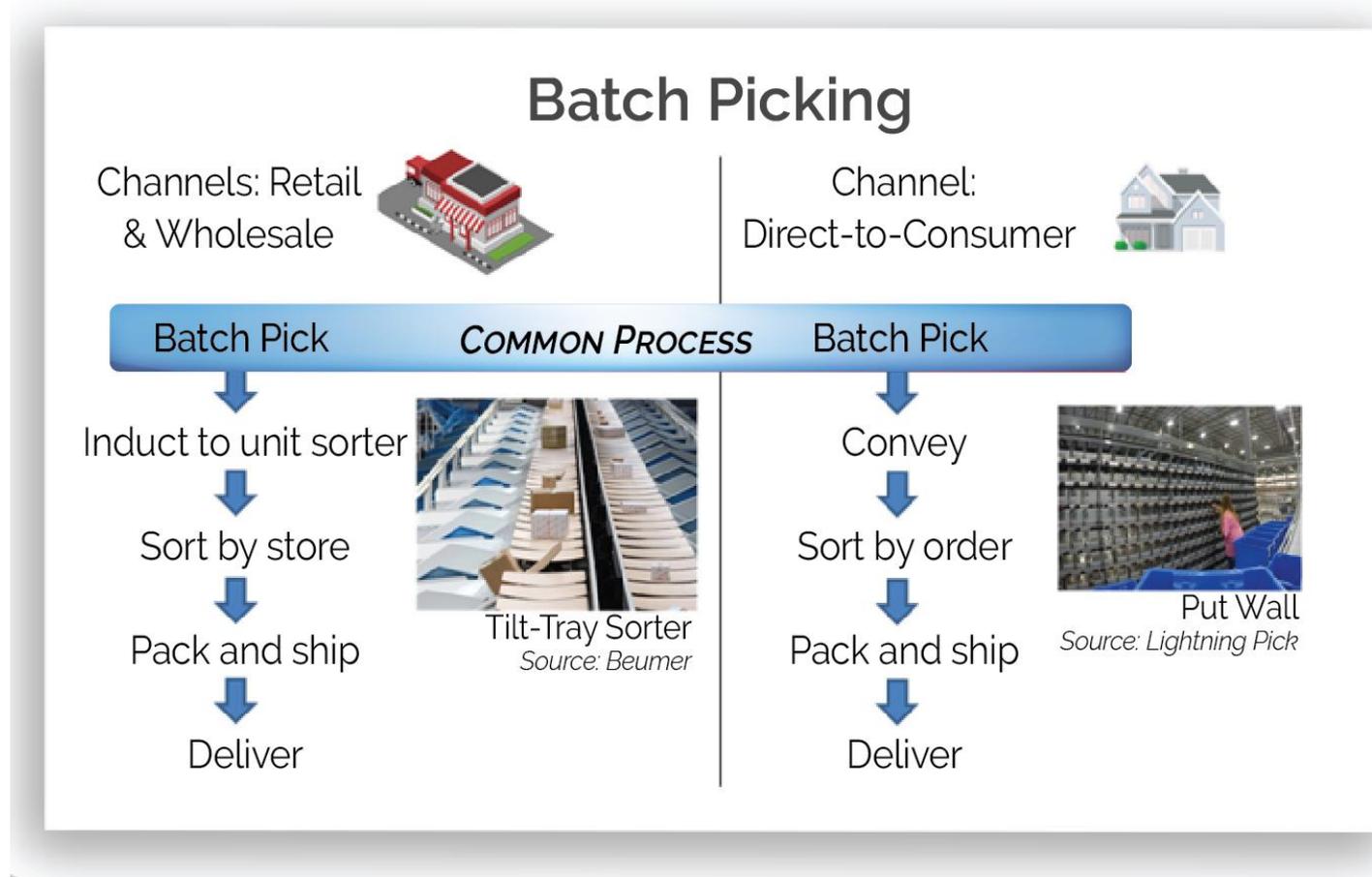
Potential Solutions

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



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



Source: Dematic

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



Put Wall

Source: Lightning Pick

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



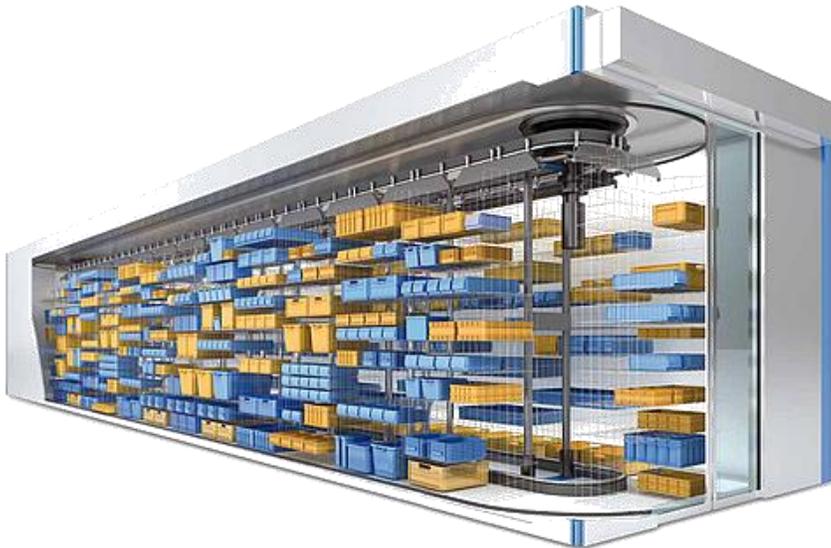
Source: Knapp



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

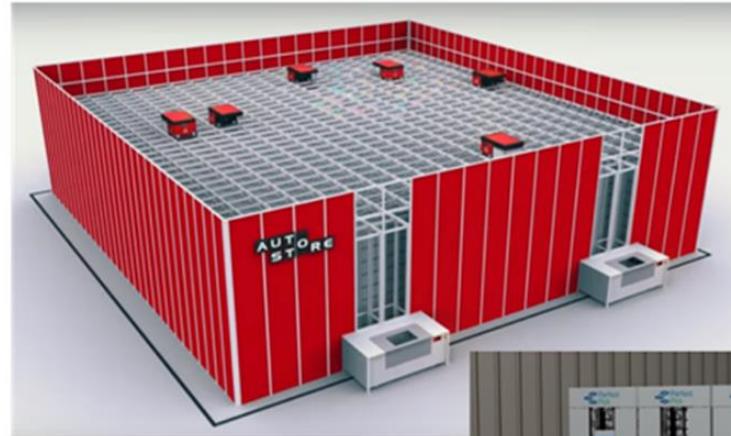
Goods to picker 2.0: In recent years, new innovations have been made including:

2.0 Benefits Can Include:

- Faster pick rates
- Easier system replenishment
- Less need for "perfect slotting" (in some cases)



Multishuttle®
Source: Dematic



AutoStore
Source: Swisslog

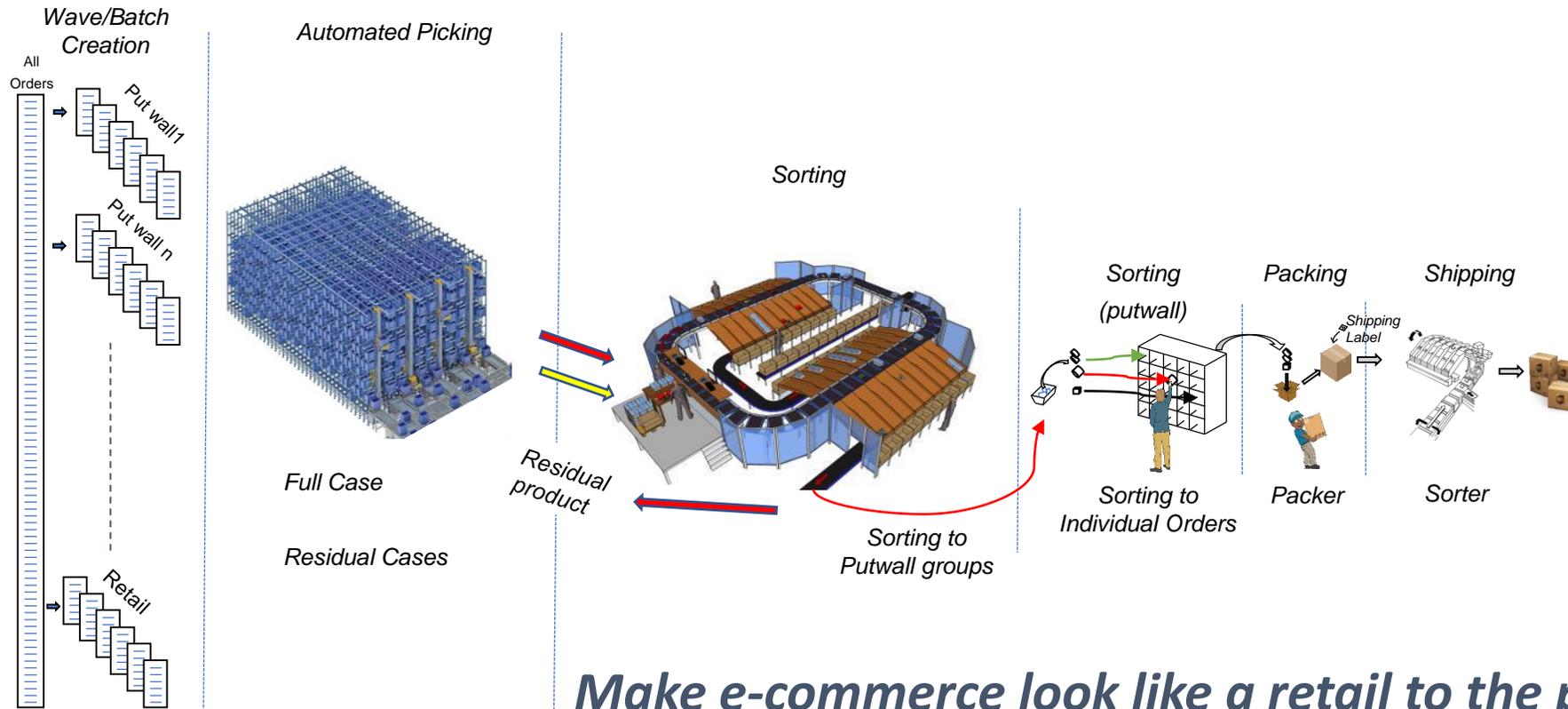


Perfect Pick®
Source: OPEX

Rates can approach 1100/hr

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

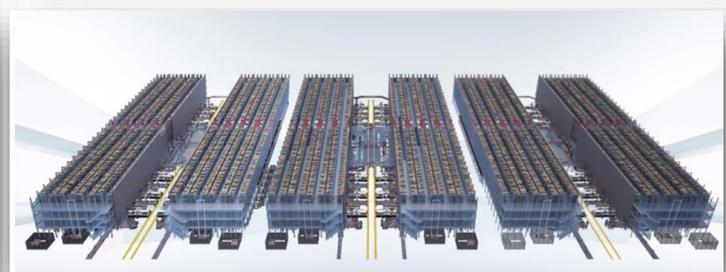
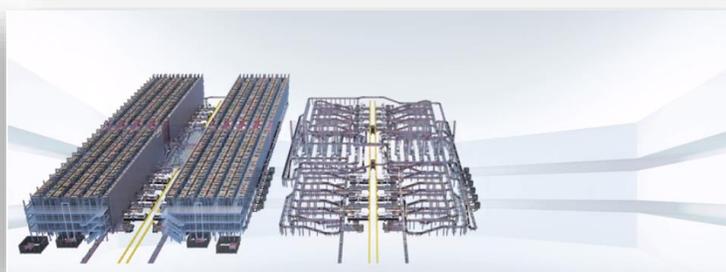
- Robots carrying picking containers travel to bins where picks are required.
- Pickers look for robots in their zone and perform picks.



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

Commonwealth Supply Chain Advisors LLC



Boston
20 Park Plaza, Suite 400
Boston, MA 02116



Cincinnati
250 East 5th Street, Suite 1500
Cincinnati, OH 45202

www.commonwealth-sca.com

For More Information

Kevin Thuet: kevinthuet@commonwealth-sca.com

Website: www.commonwealth-sca.com

Visit ProMat Booth #S3584

For a Copy of This Presentation

Send us a quick email requesting the slides:

robypoe@commonwealth-sca.com

Phone: (513) 533-0138