How Much is “Enough”: Best Practices for Right-sizing Automation Levels

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Key Learnings – What are today’s takeaways?

• High-level Industry benchmarks for automation levels in North America and Europe
• Examples of Low-, Medium-, and High-levels of automation installations that we’ve supported
• Key factors that drove the decision-making process for various levels of automation
• Checklist to help determine what levels and types of automation are best for your operation
Extensive Experience Across the Supply Chain - From Strategic Support to Tactical Needs

Supply Chain Focused

Global

Bridging the Gap Between Consultants and Engineers

Independent
Warehouse Automation Steadily Increasing

The global warehouse automation market is expected to more than double between 2018 and 2025 – from $13 billion to $27 billion.

This includes:
- AGV/AMR
- ASRS
- WMS
- AIDC
- Conveyors
- Sortation
- Palletizing/Depalletizing
- Overhead Systems
- Order Picking
- MRO Services

Source: Logistics IQ - Warehouse Automation 2019 Report
Prevalence of Automation is Increasing in North America, now on par with Europe

Historically Europe had a history of greater automation due to:

- Population density and land availability
- Shortage, inflexibility, and high costs of labor
- More flexible ROI targets compared to North America

US facilities are now facing the same design requirements that Europe has:

- Rise in eCommerce
- Demand for shorter lead times
- Smaller more frequent orders across all channels
- Customers wanting specialization
- Limited edition items with shorter life cycles
- Shorter throughput times
- SKU proliferation

Source: Logistics IQ - Warehouse Automation 2019 Report
Understanding the Drivers for Manual Processes

- Highly seasonal business
- Great access to labor and low labor rates
- Availability of land
- Leased facility
- Low availability of funding
- High variability in storage requirements
- Low volumes
- Strict ROI requirements for investments
Understanding the Drivers for Automation

- 2 or 3 shifts, low downtime of equipment
- Low and controllable peaks
- High labor costs and low staff availability
- High quality requirements
- High and increasing SKU complexity
- Fast order fulfillment requirements
- Limited footprint
- Building a greenfield DC
- Low number of process exceptions
Three Case Studies from Different Industries Illustrate the Process of Choosing the Right Automation Level

Case Study 1
Fashion and Apparel Company

Case Study 2
Air/Oil Filter Manufacturer

Case Study 3
Grocery Wholesale

Full Automation

No automation
Challenges for Transition

- Channel mix shifting towards eCom, B2B, and retail
- Outgrowing the facility’s capacity and no room to expand the facility
- No additional labor available in the area
- Customer desire for a seamless shopping experience puts increased demands on the Supply Chain

Future State

- More SKUs and smaller average order size
- Throughput more than double original volume
- Omni-channel fulfillment requirements
Brownfield Design for Workwear Company: Transforming Facility from Manual to High Automation

Original Manual Facility

- GTP Stations & Shoe Sorter
- Bin Shuttle
- Offices
- Shipping Sorter
- Shipping Sorter
- Receiving Automation

New Automated Facility

- Carton Mini-Load ASRS
- Carton VNA Racks w/ in-aisle conveyance
- Pallet VNA Racks w/ in-aisle conveyance
- Value-Added Services Area
- Receiving Automation

Case Study 1 – High Automation
Brownfield Design for Workwear Company: Transforming Facility from Manual to High Automation

Results

✓ Implemented a highly automated system in a brownfield environment
✓ Increased throughput by 65% while maintaining existing footprint
✓ Reduced personnel costs by 40%
✓ Shorter lead time for order processing
New Greenfield DC for Global Air/Oil Filter Corporation: Replacing Conventional Conveyor and Sorter Logistics

Original Operation

- Intensive use of conveyance and sortation – typical design for the 90s and best-in-class at that time.
- Separate processes for case and each picking, requiring order consolidation.
- Ergonomic issues, limitations regarding SKU growth, and high CAPEX requirements if this design was to be rebuilt.
Extensive List of Alternatives and Sensitivities Evaluated to Reach Final Solution

Long List of Alternatives Identified

- Traditional AS/RS – High Invest
- Shuttle – High Invest
- Current Solution – Safety Concerns
- 45’ AS/RS + CarryPick for fast movers
- 45’ AS/RS + Pick Tower for fast movers
- All Carry Pick
- Improved as-is – Not Enough Labor Savings
- AMR Assisted Picking – Facility Too Large

Final Solution

**All Carry Pick** selected for case picking

- 5-year ROI
- Facilitates order picking which eliminates need for dedicated sorting and palletizing downstream
- Synergies with CarryPick system for each picking and storage
- Flexible and very scalable which allows some capital deferment
New Greenfield DC for Global Air/Oil Filter Corporation: Goods-to-Person Picking with Flexible AGVs

New Concept

Results

✓ Storage remains manual

✓ Robots pick up product from floor and deliver product to picking workstation -> no need for expansive AS/RS storage and cranes

✓ Same process for case picking from pallet and each picking out of (mobile) shelf eliminates need for order consolidation

✓ Reduced personnel costs by 15%
National Grocery Chain – New Greenfield Distribution Center to Support 200 Stores

Initial Situation

- Low amount of SKUs with very diverse temperature requirements
- Leased facility
- Very strict ROI requirements (3 years)
Automation Was Feasible, But Did not Provide an Acceptable Pay Back

Results of automation study:
Investigation of deep-lane AS/RS storage within conventional facility with goods-to-person picking
- 50% space reduction
- 30% labor reduction
- Significant maintenance cost increase
- Investment of $15 Million
- Pay-back >15 years

Factors preventing automation:
- New facility should be rented conventional warehouse (prevents very tall storage as well as rack-supported structures)
- Low SKU count and highly performance-based pay structure leads to extremely high manual picking performances

Case Study 3 – Low Automation
Bring Performance Improvements Without Automating at a Low CAPEX

What were we still able to do?

✅ High efficiency **manual multi-order picking**

✅ **AGVs following pickers** and automating order start and completion

✅ **Semi-automation in the processing zone**, for example for stretch wrapping

✅ **Slotting reconfiguration** to match the store layout

✅ **Right-sizing** of storage, depth, staging lanes

✅ Dedicated **pick-to-zero process** zone for perishables

✅ Total **performance increase** of 6%
A Structured and Proven 3-Phase Approach Determines the Optimal Overall Automation and Solution

### Miebach Project Approach

**1. Development of Design Requirements**
- Data collection, validation, and analysis
- Current-state assessment
- Developing design assumptions
- Developing design requirements
- Extrapolation to future state
- Gap analysis from now to tomorrow

**2. Profile & Analysis of Alternatives**
- Development of processes
- Profiling and rights-sizing of equipment and technology alternatives
- Qualitative and quantitative analysis of alternatives
- Selection of concept

**3. Solution Refinement**
- Creation of integrated layouts
- Development of investment estimates
- Development of facility OPEX estimates
- Creation of implementation roadmap and timeline
- Outlined functional and technical requirements
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