

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



Bridging the Gap Between Consultants and Engineers



Global



Independent



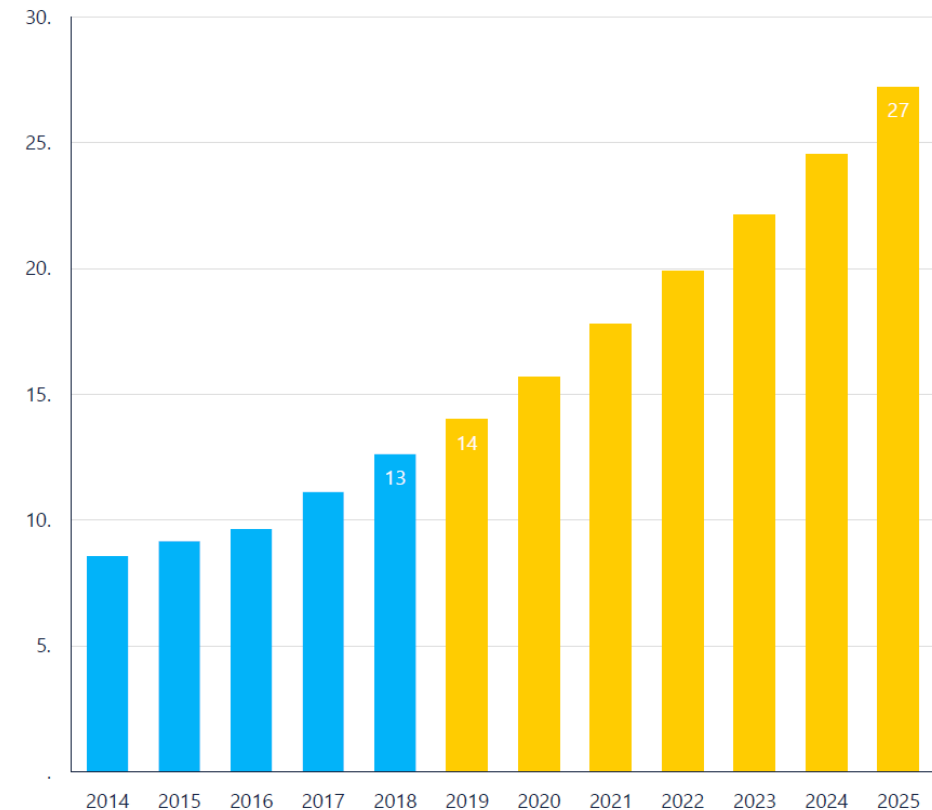
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Warehouse Automation Steadily Increasing

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

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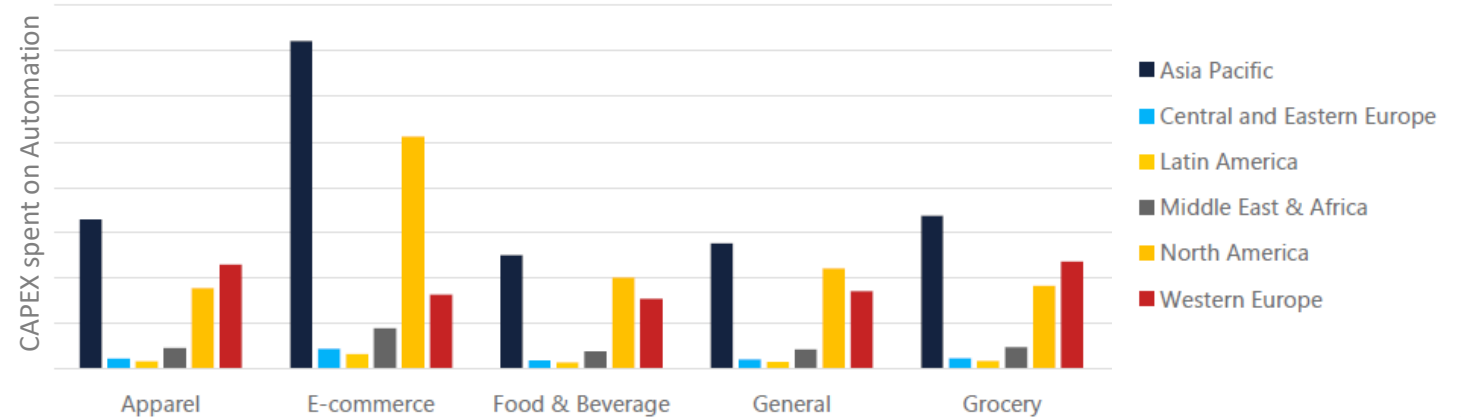
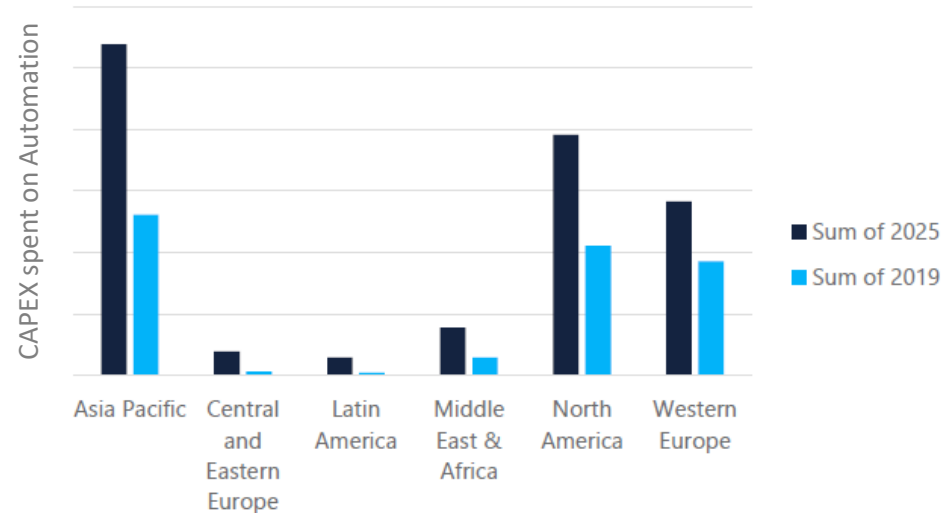
Prevalence of Automation is Increasing in North America, now on par with Europe

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

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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



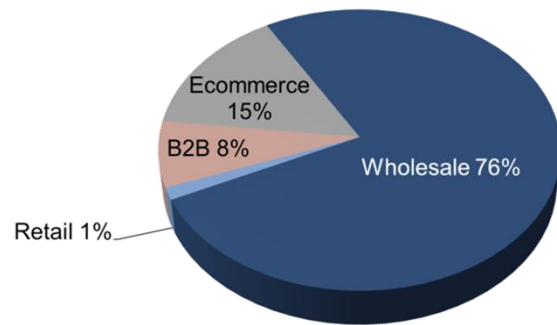
Full Automation

No automation

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Brownfield Design for Workwear Company: Converting to Omni-Channel Fulfillment and Increasing Throughput

Former State

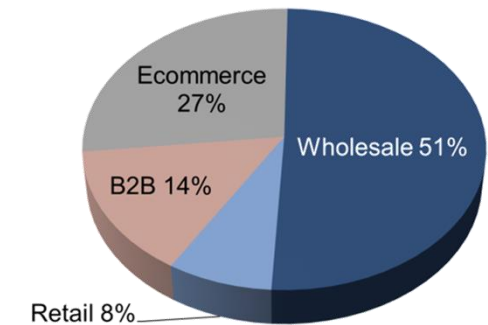


- Most orders are wholesale
- **Single Distribution Facility**
- Footprint: 680,000 SQF
- 500 FTE in **24/7 operations**

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

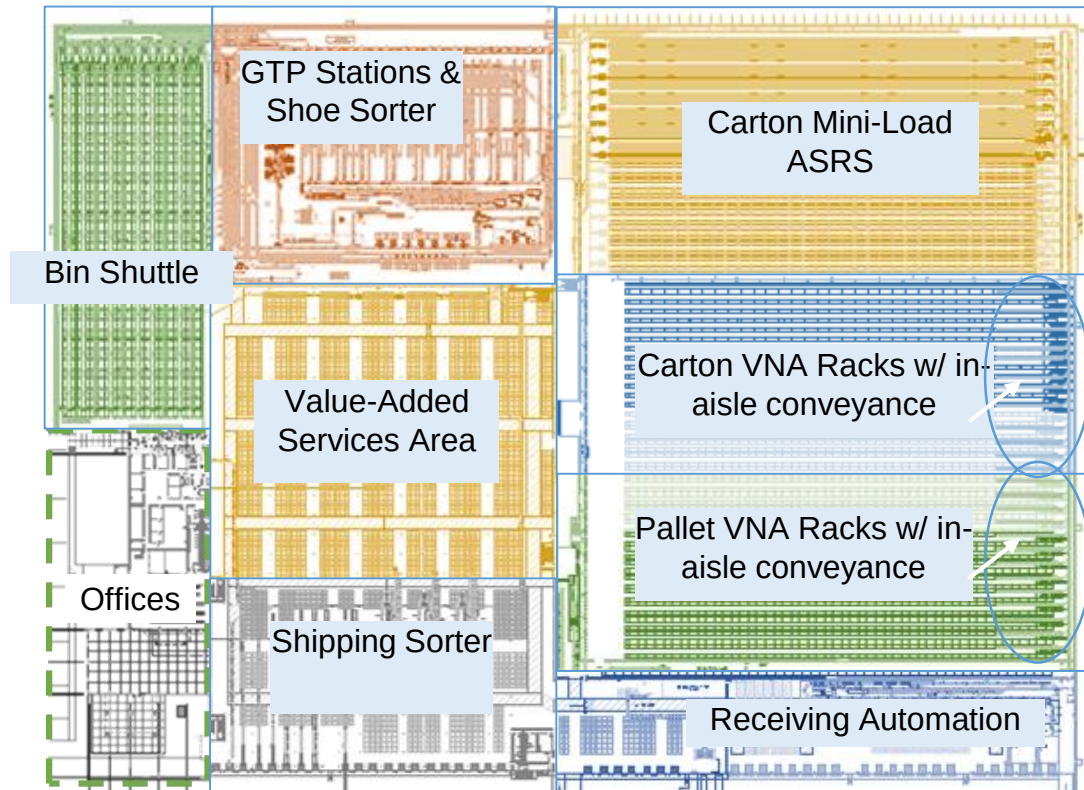
Future State



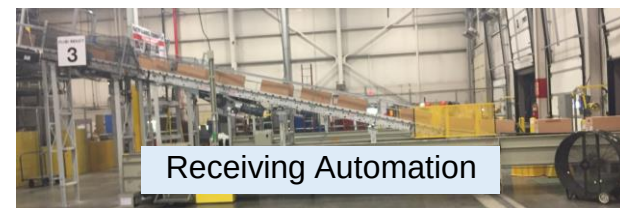
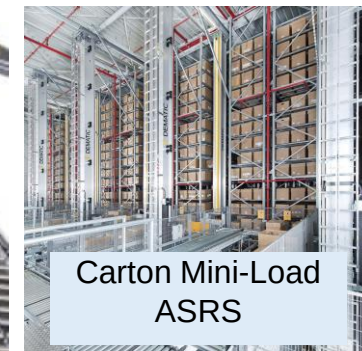
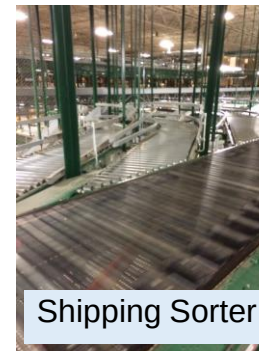
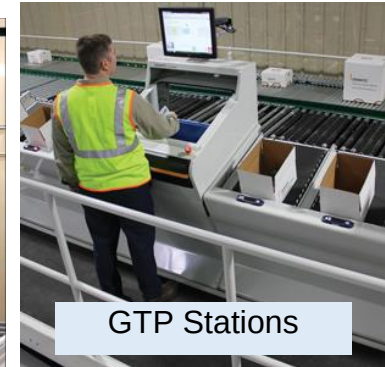
- More SKUs and smaller average order size
- **Throughput more than double original volume**
- Omni-channel fulfillment requirements

Brownfield Design for Workwear Company: Transforming Facility from Manual to High Automation

Original Manual Facility



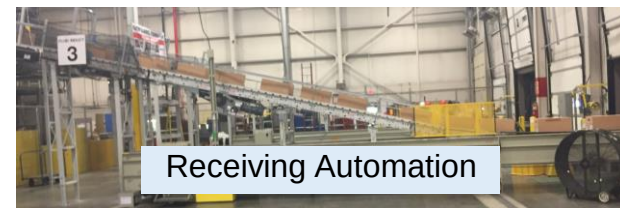
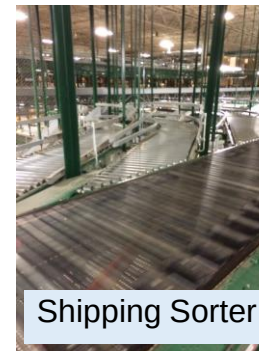
New Automated Facility



Brownfield Design for Workwear Company: Transforming Facility from Manual to High Automation

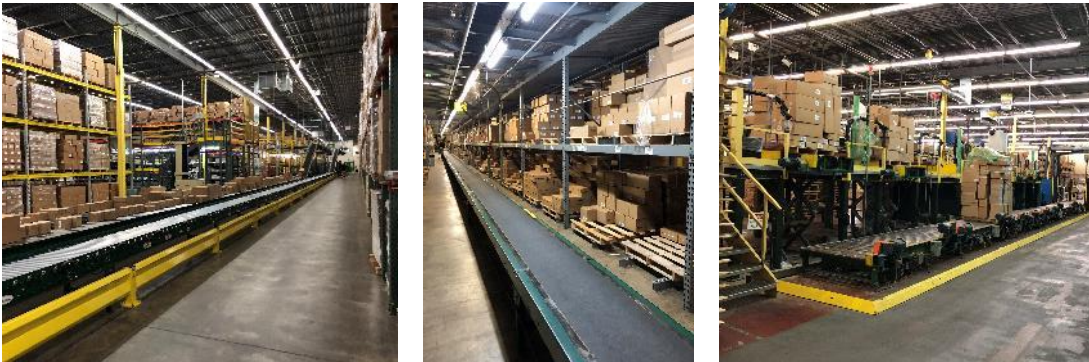
Results

- ✓ 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

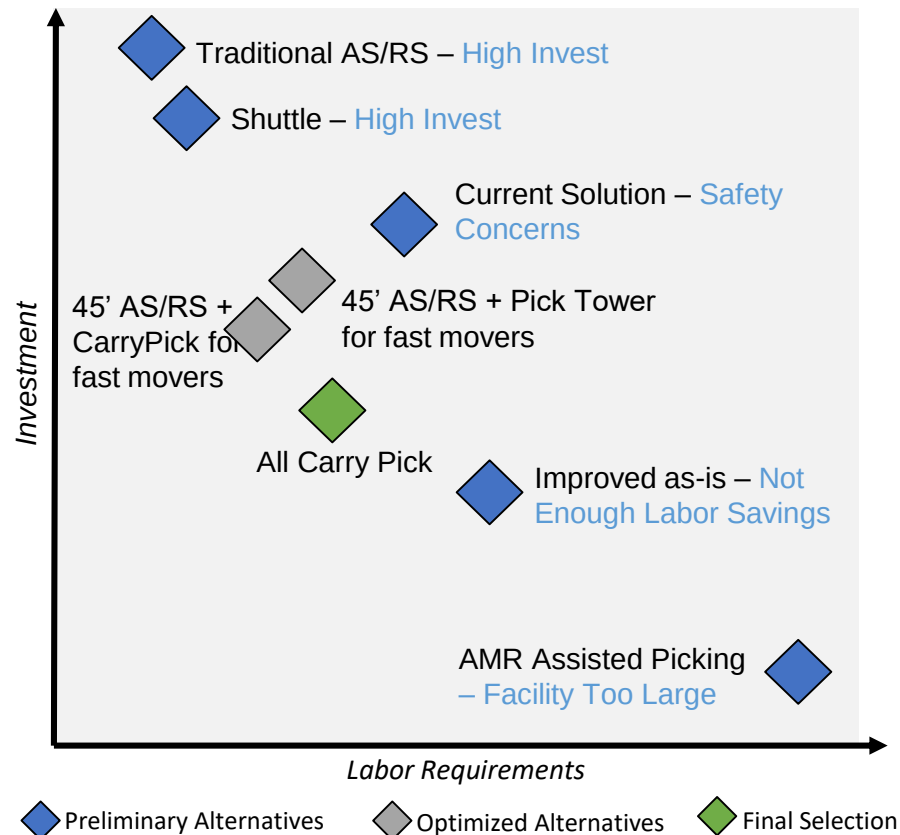
Original Operation



- 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

1 Long List of Alternatives Identified



2 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

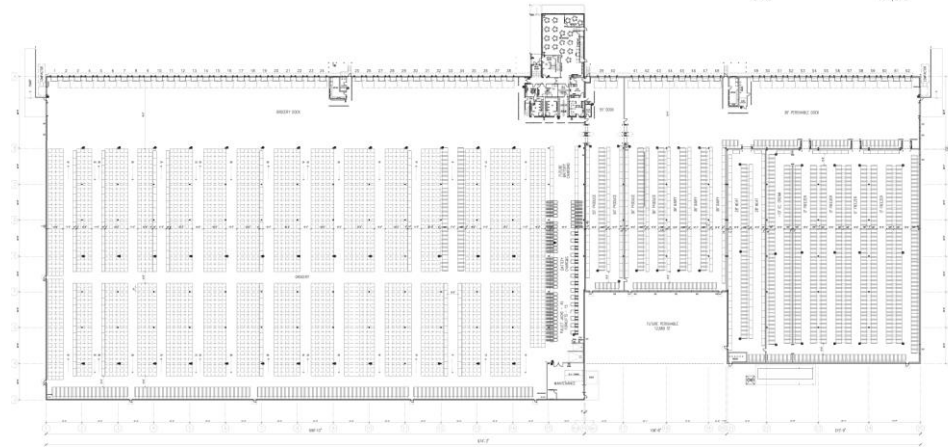
- ✓ Storage remains **manual**
- ✓ Robots **pick up product from floor and deliver product** to picking workstation -> no need for expansive AS/RS storage and cranes
- ✓ Same process for case picking from pallet and each picking out of (mobile) shelf **eliminates need for order consolidation**
- ✓ Reduced 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**

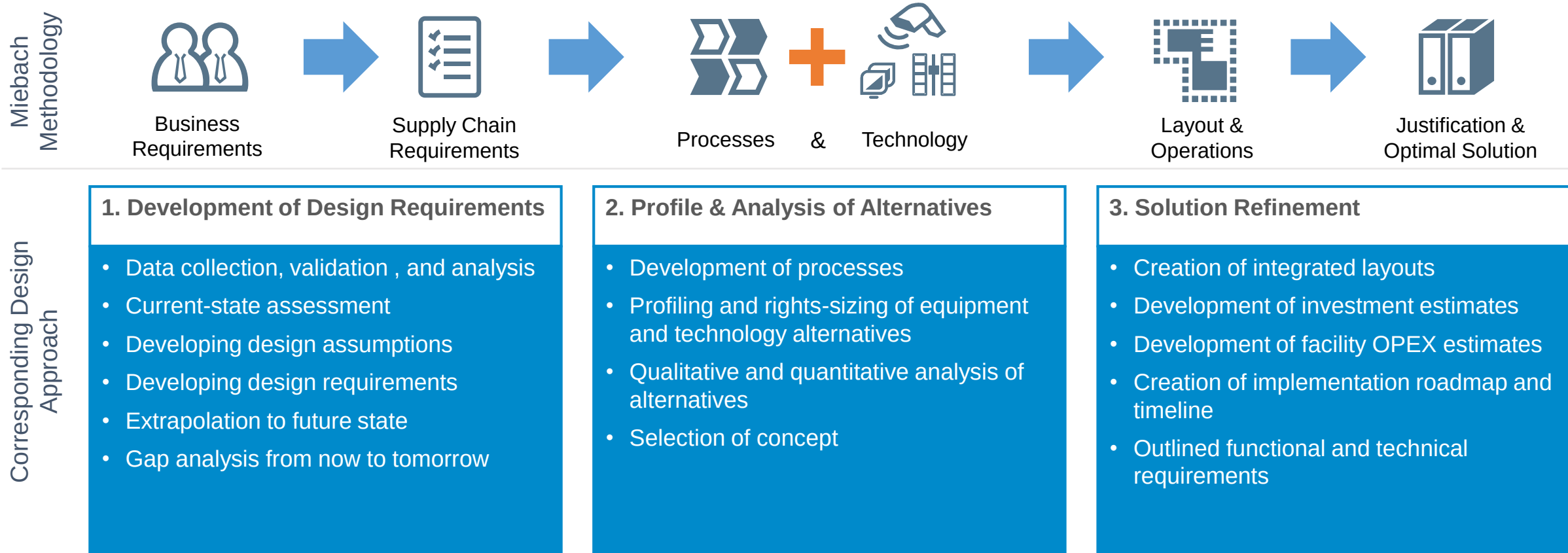
Bring Performance Improvements Without Automating at a Low CAPEX

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



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