

Smart robotics on the rise - Status Quo and Future Visions

Presented by:

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HighJump[™]
SOFTWARE

 **KÖRBER LOGISTICS**





MODEX²⁰²⁰

GEORGIA WORLD CONGRESS CENTER
ATLANTA | MARCH 9-12
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Agenda

1. Introduction and trends
2. Drivers of adoption of modern robotics
3. Warehousing and fitness of robotics
4. Data as a value driver

 <p>  Minneapolis, Bellingham, Bloomfield, Colorado Springs, Denver, Plymouth  Shanghai Markham,  Moncton </p>	 <p>  Pittsburgh  Eindhoven  Bankstown </p>	 <p>  Blumenau, Sao Paulo  Santiago </p>	 <p>  Blackpool  Atlanta, Bellingham  Troyes, Aix-en Provence, La Roche-sur-Yon  Berlin </p>	 <p>  Basingstoke </p>	 <p>  Bad Nauheim, Bremen, Dresden, Essen, Gallin, Hamburg, Heidelberg, Köln, Münster, Stuttgart  Lyon  Barcelona, Madrid </p>	 <p>  Stuttgart </p>	 <p>  Melbourne, Sydney  Auckland  Philippines </p>
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NORTH AMERICA

Automotive
SAP
Simulation and modelling
Warehouse control system



EUROPE


SMB WMS
Enterprise 3PL
Voice

LATAM


Enterprise/SMB, 3PL & automotive WMS Robotics
Simulation and modelling
Voice
Warehouse control system

APAC/ANZ & ROW

Enterprise/SMB, 3PL & automotive WMS Robotics
Simulation and modelling
Voice
Warehouse control system



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Robotics is About More Than Automation

Robotics

Designed to perform a variety of tasks, capable of retooling and reprogramming to perform different tasks

- Multi-task Capable
- Task flexibility
- Mobile (some)
- Intelligent
- Pick & Pack
- Pallet Movement
- Assembly
- Security



Automation

Designed to carry out a specific task, optimized for the task and process being performed

- Process Optimization
- Repetitive Task
- Fixed
- Bottling
- Conveying
- Painting
- Sortation



Robotic Capability Evolution

Industrial Applications

Cognitive Capabilities

Movement & Dexterity

Interaction

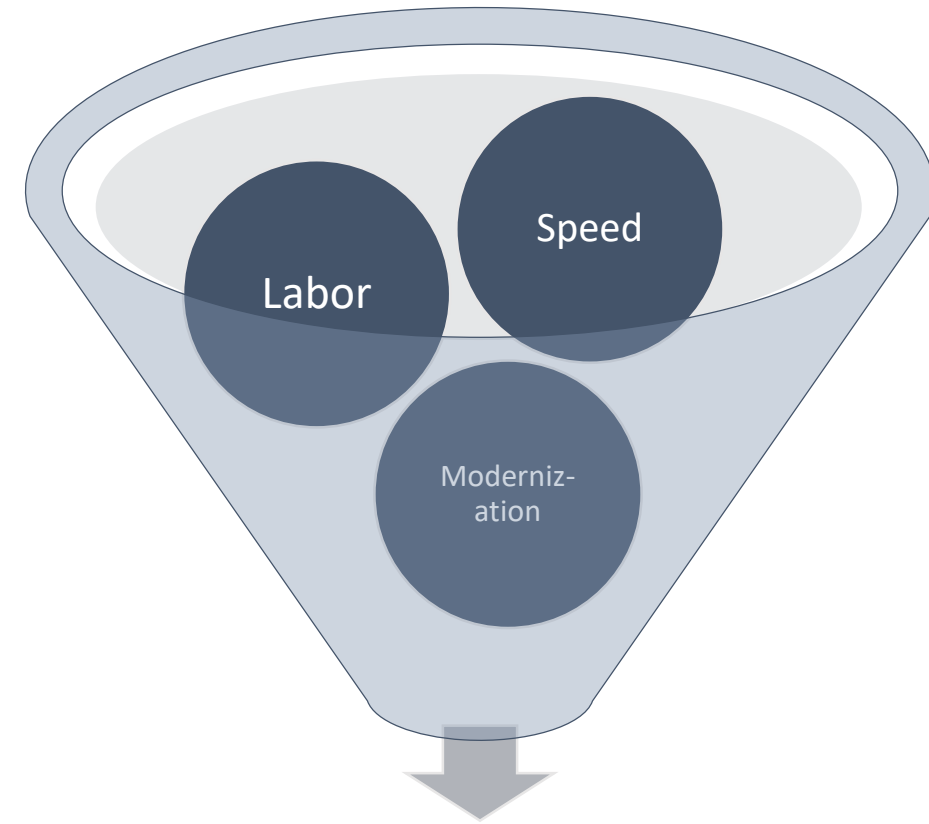
Wide Spread Adoption

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Robotics Market Trends



Drivers Towards Flexible Automation



Operations Innovation

Labor

- Shortage
- Increasing Cost
- Seasonal needs
- Mis-connected

Need for Speed

- Customers expect rapid delivery times
- Rapid flexibility

Cost

- High labor cost
- Reduced cost of robotics
- Robot-as-a-Service

Modernization

- Digital Transformation
- Connected Operations
- Visibility
- Integration

Unemployment Rates By Country

In the United States, there are is approximately 7.4 million open jobs

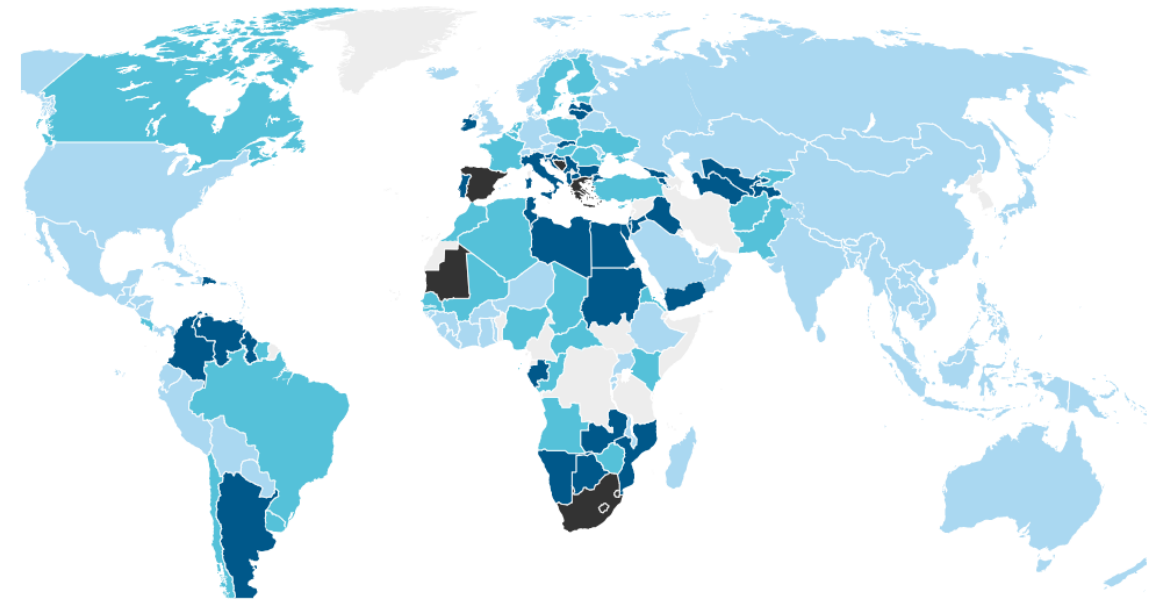
1.34 million of these open jobs are in the industry segment: Trade, Transportation, and Utilities

There are more open jobs in the US than there are people seeking work

Unemployment rate per country

Percent, 2015

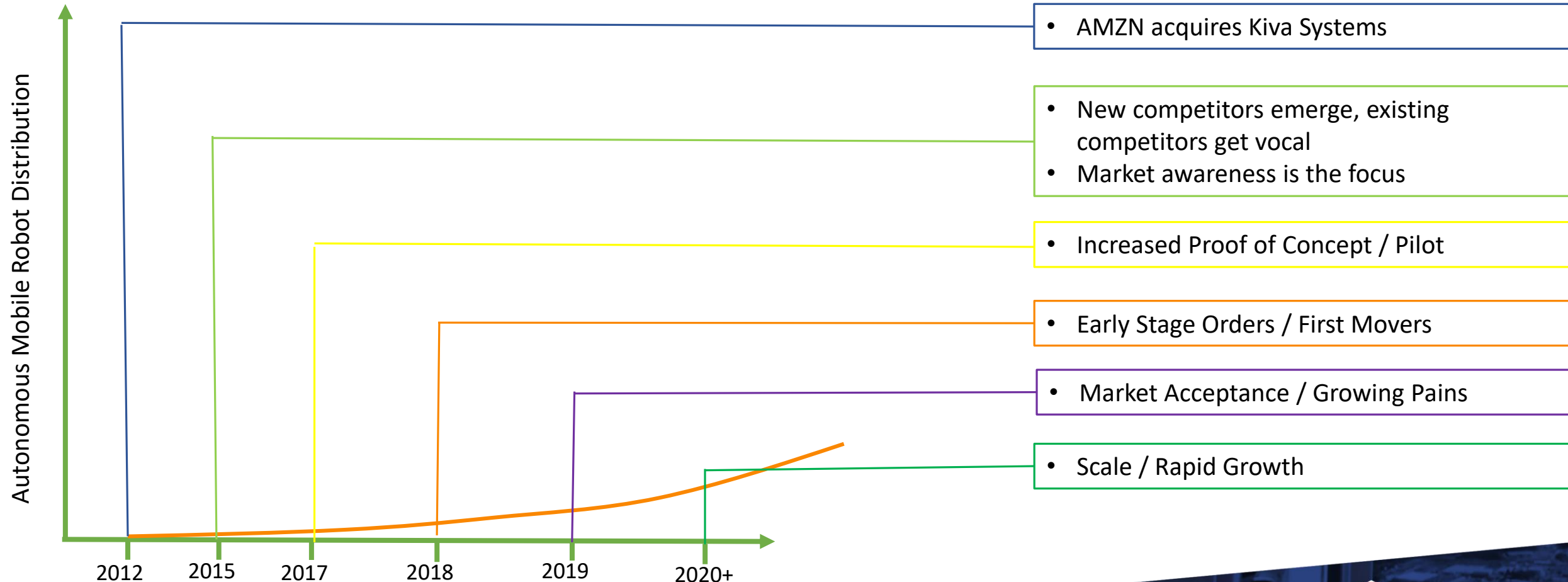
Key | 0-5% 6-10% 11-15% 16-31% No data available



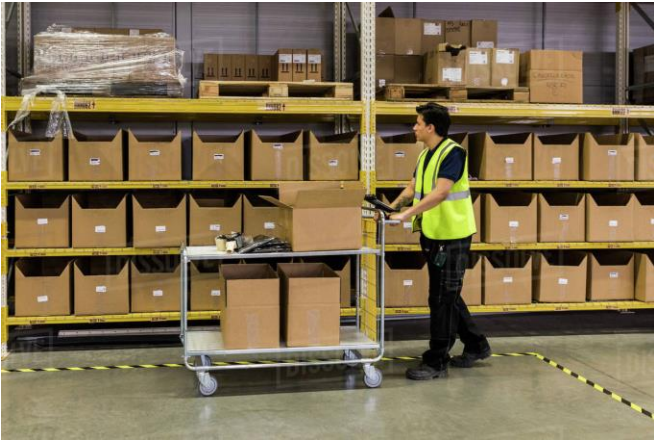
GUARDIAN GRAPHIC

SOURCES: ILO

Collaborative AMR Market Growth Timeline



Traditional Warehousing Options



Manual Operation				
Description	Cost	Flexibility	Scalability	Infrastructure
Reliant upon human workers to move material	Driven by labor cost, increasing wages driving cost up	High , can reallocate workers as necessary	High , can add workers as necessary	No modification, easy to change



Fixed Asset Based Automation				
Description	Cost	Flexibility	Scalability	Infrastructure
Rigid/fixed infrastructure: eg: AS/RS or Conveyance	Very high , big investment in fixed assets	Very low , equipped for a specific use and facility design	Very low , capacity built into design	Significant investment in fixed infrastructure

Mobile Robot Enabled Warehousing Options































Constrained Mobile Asset Based Automation				
Description	Cost	Flexibility	Scalability	Infrastructure
Rack based goods to person, fixed picking stations	Medium , lower than fixed automation	Medium , can make changes, just not quickly or easily	Low , additional infrastructure required to increase capacity	Dedicated area of warehouse, semi-fixed infrastructure



Flexible Mobile Robot Enabled Automation				
Description	Cost	Flexibility	Scalability	Infrastructure
Robots autonomously navigate and move material	Low , variable, option as-a-service	High , can easily make changes to operating environment	High , easily add more robots	Little to no infrastructure modifications required

Comparison of Warehousing Approaches

Approach	Cost	Flexibility	Scalability	Speed	Ease of Implementation	Efficiency	Human/machine Collaboration
Manual Operations							
Fixed Asset-Based Automation							
Constrained Mobile Asset Based Automation							
Flexible Mobile Robot Based Automation							

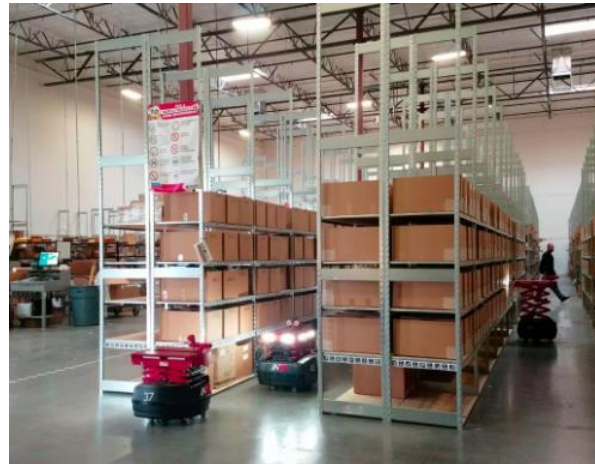
High



Low














































Autonomous Mobile Platform Robotics Driving Business Value



- Increase Throughput
- Flexible Automation
- Enhanced Scalability
- Improve Working Conditions/Safety

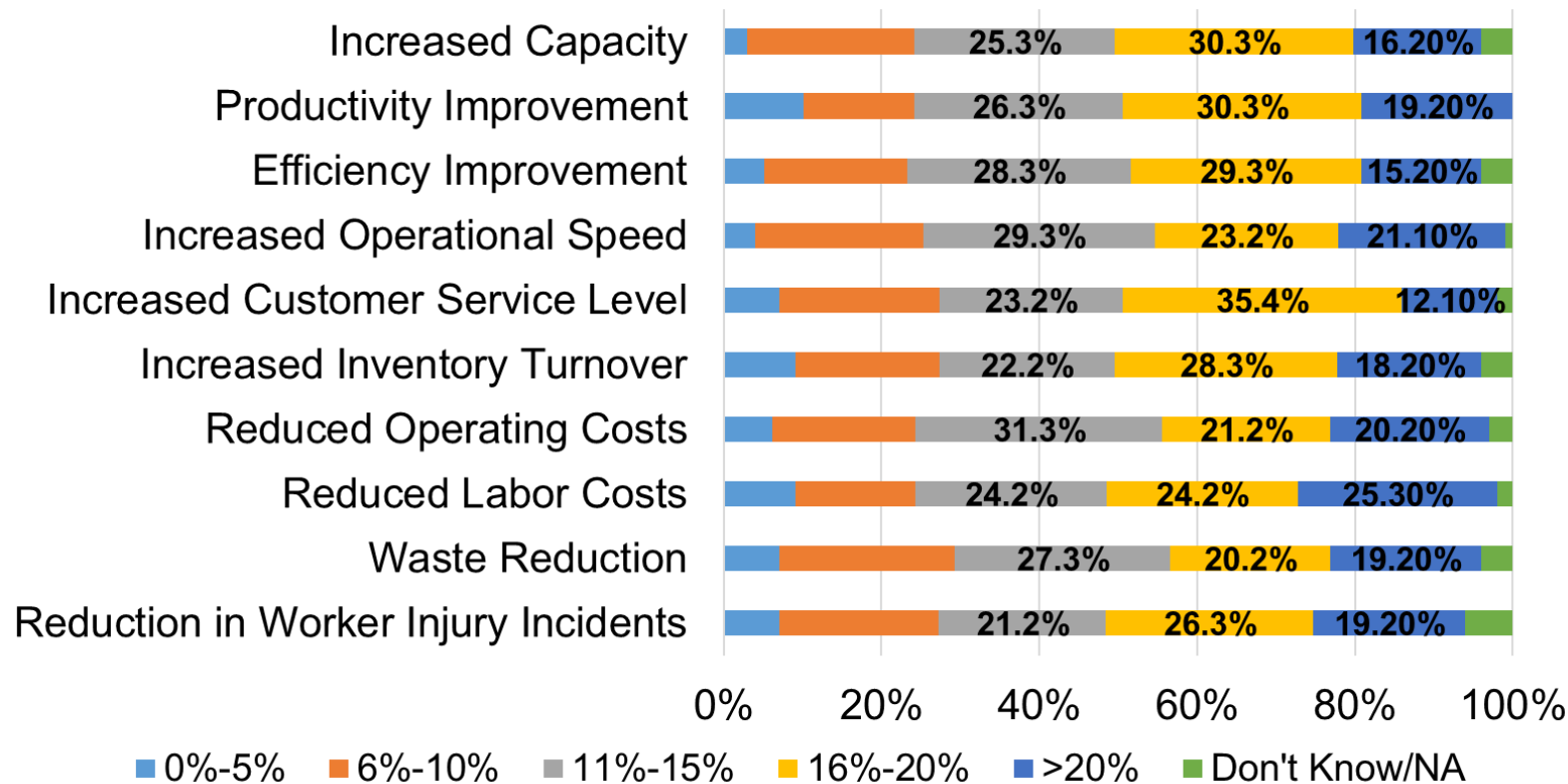
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AMR Ecosystem by Workflow

Each Picking	      
Goods to Person	    
Mobile Manipulation	  
Put Away/Replen	     
Robot Enabled AS/RS	 
Sortation	    
Components Shuttling	   
Bulk Material Movement	        
Legacy Equipment Augmentation	 

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Scale of Benefits Achieved by Key Metrics



Across most metrics, more than **70%** of users noted **double-digit KPI improvements**

N = 99

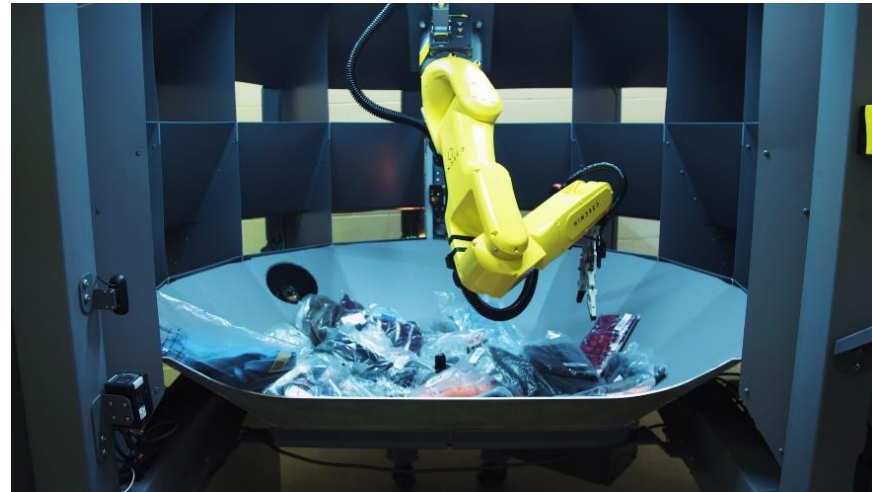
Source: Commercial Service Robotics Survey IDC, July, 2018

Robotic Enabled Picking



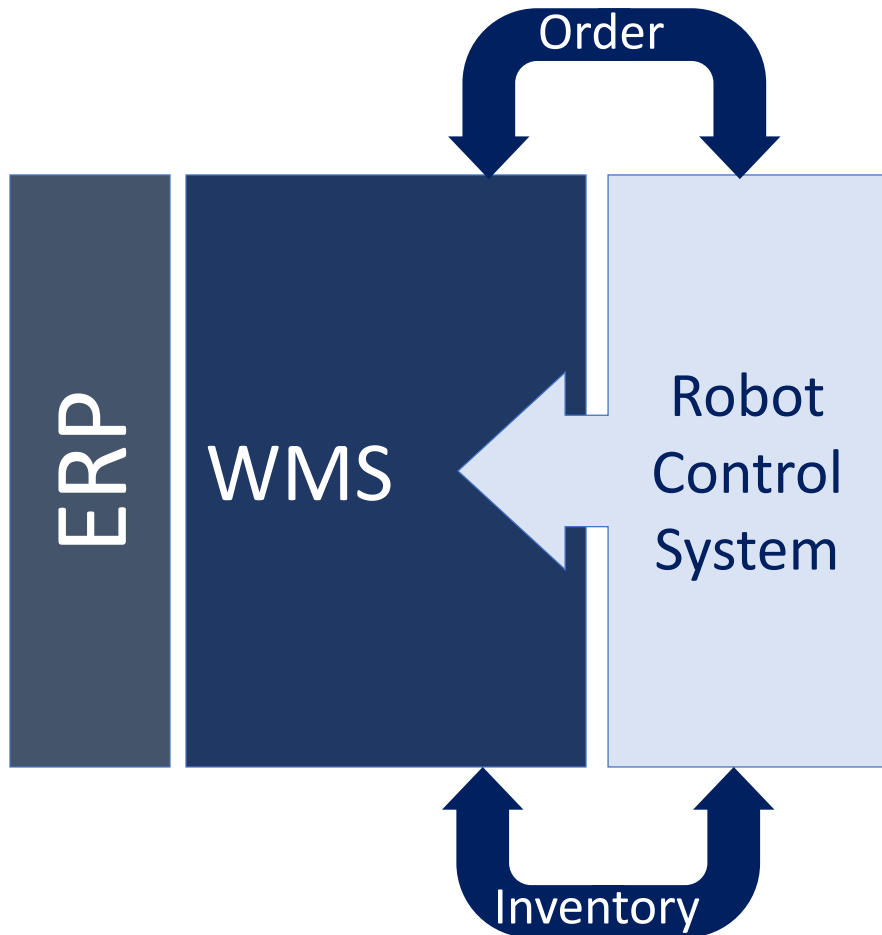
Intelligent cataloging

Flexible handling



Remote piloting

Delivering More Than Task Automation



- Integration Delivers More Than Task Level Automation

- Automated data flows
- Increased visibility
- Automated process flows
- Process execution data
- Process execution analytics
- Real-time inventory optimization

Enabling the Warehouse of the Future

- **Disconnected Current State**

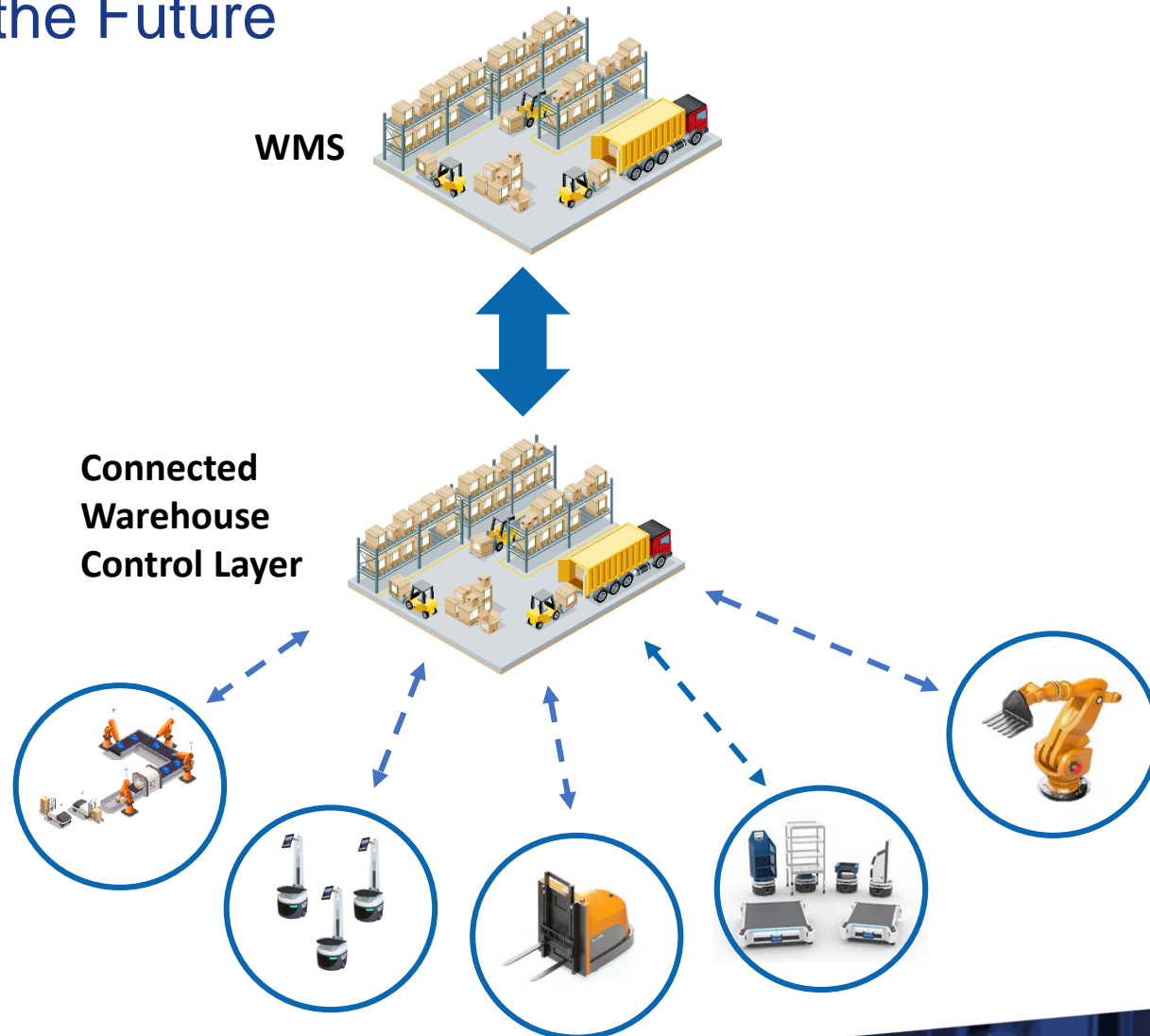
WMS



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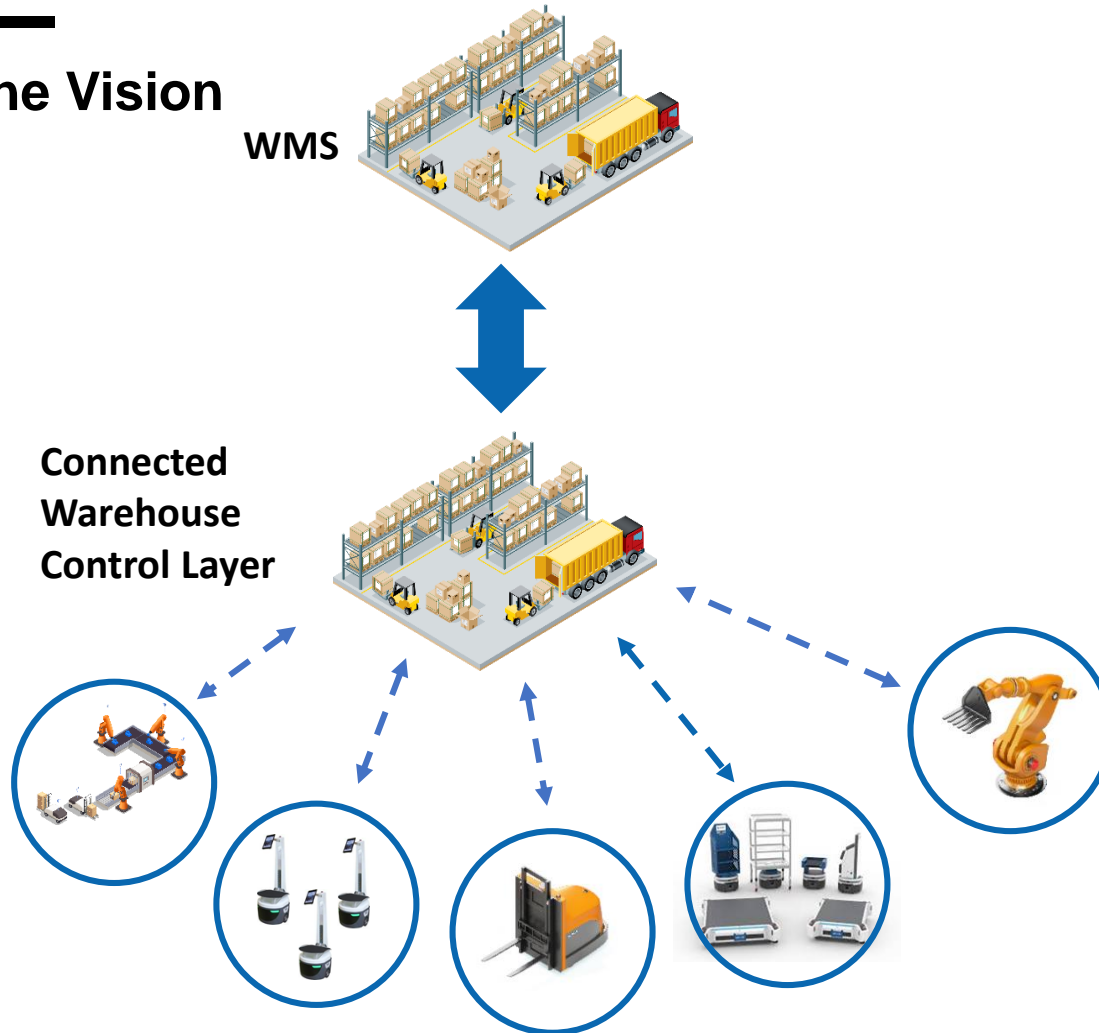
Enabling the Warehouse of the Future

- The Vision



Enabling the Warehouse of the Future

- The Vision



Common data platform

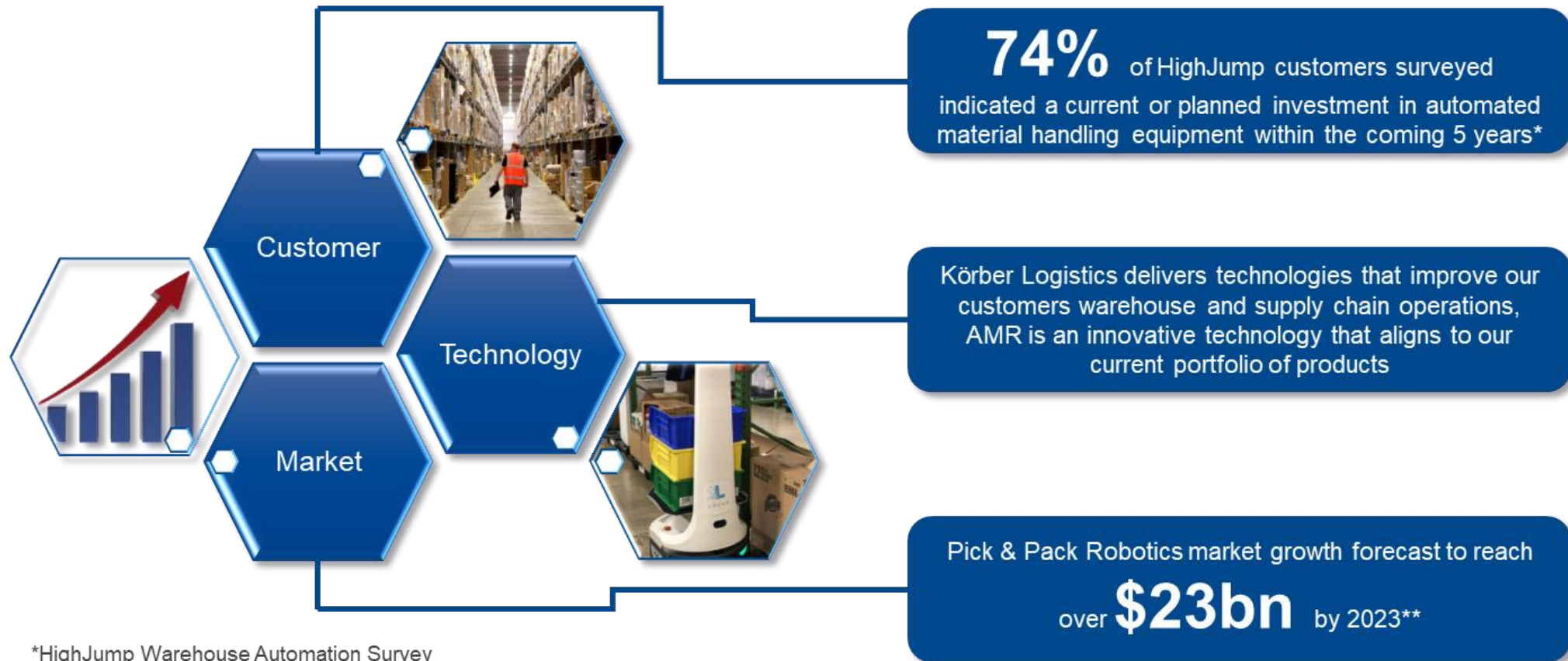
Cross process optimization

Single integration point to WMS

Allow for workflow alignment across disconnected processes

Deeper level of analytic capabilities

Why Körber Entered The AMR Space



*HighJump Warehouse Automation Survey

**IDC Robotics and Drones Spending Guide Forecast 2018H2

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Key Take Aways

- Robotic technology is enabling material handling operations to automate low-value tasks
- Remember, robots are tools meant to improve the operation
- It is possible to start small, build experience, and scale
- New delivery models, such as Robot-as-a-Service (RaaS), increases the availability of this technology to new markets

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